Hamilton Fire Department Asset Management Plan 2024

Hamilton

HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

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SUMMARY AND QUICK FACTS

SERVICE PROFILE

Hamilton Fire Department is dedicated to preserving life, property, and the environment throughout the City of Hamilton through an integrated program of Fire Protection and Rescue services and Emergency Management.

ASSET SUMMARY

Replacement Value
$252 Million
Average Age of 26 Years
or 54% of life remaining.

LEVEL OF SERVICE SUMMARY

Customer

- Customers feel the Hamilton Fire Department has performed **GOOD** overall in the last 24 months in all service areas.
- Customers feel the Hamilton Fire Department **EXCEEDS NEEDS** when meeting service needs overall.
- Customers feel the Hamilton Fire Department has performed **GOOD** providing good value for money when providing infrastructure and services.

Technical

- The Hamilton Fire Department provides three distinct levels of service throughout the City:
  full-time, volunteer, and composite.
- Overall effective firefighting and rescue force response times in 2022 were:
  - Full-time (urban): 9.7 minutes
  - Composite: 15.87 minutes
  - Volunteer (rural): 20.51 minutes

MAJOR ASSET HIGHLIGHTS

MAJOR ASSETS	QUANTITY	REPLACEMENT COST	AVERAGE CONDITION	STEWARDSHIP MEASURES
Fire Stations	26	$110M	FAIR	Building Condition Assessments are completed every five years.
Emergency Response Vehicles	80	$76.5M	GOOD	Vehicles and related equipment are certified for road worthiness annually.

DATA CONFIDENCE

VERY HIGH — MEDIUM — VERY LOW

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Key Demand Drivers

Demographic Shift: Hamilton's demographics will continue to grow and shift to 2052. The Hamilton Fire Department determine their vehicle and staffing requirements using community risk and is pursuant to the Establishing and Regulating By-law 19-034 and the Fire Protection and Prevention Act, 1997.

Technological Changes: Canadian Radio-television and Telecommunications Commission (CRTC) has mandated that all municipalities replace Canada's aging E911 emergency services network and cutover to the new Next Generation-911 (NG-911) platform by March 4, 2025, this is a large change that the Hamilton Fire Department as well as Hamilton Police have been preparing for with the assistance of the Information Technology division.

RISK

- Critical Assets are identified as the Dispatch System, Emergency Response Vehicles, Personal Protective Equipment, Apparatus Equipment and Facilities.

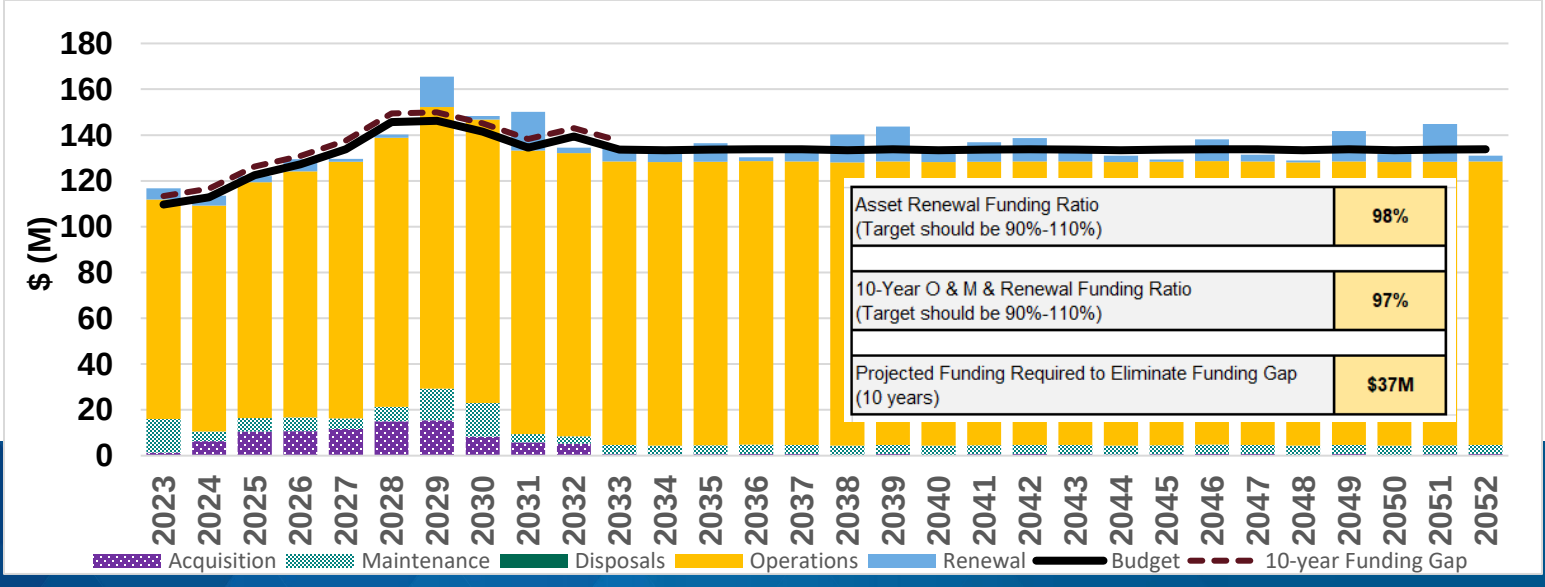
CLIMATE CHANGE

Mitigation

- Proposed Waterdown Station to be built using net-zero and Leadership in Energy and Environmental Design (LEED) principles.
- Fire Apparatus Anti-Idling Technology being considered to reduce Greenhouse Gas Emissions.

Adaptation

- Fire Apparatus Intake has been customized since the early 2000s to be able to traverse high water which is an adaptation for potential increases in road flooding.



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1. INTRODUCTION

Hamilton Fire Department is dedicated to preserving life, property, and the environment throughout the City of Hamilton through an integrated program of Fire Protection and Rescue services and Emergency Management. The purpose of this Asset Management (AM) Plan is to ensure that the Hamilton Fire Department has fulfilled the Asset Management Planning requirements outlined in O. Reg 588/17 for current and proposed levels of service as well as ensure that the Hamilton Fire Department has the required assets and funding to deliver sustainable Fire Protection and Rescue Services and Emergency Management over the 2023 - 2052 planning period that meets the needs of City of Hamilton residents in accordance with the *Fire Protection and Prevention Act, 1997*.

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2.0 BACKGROUND

The information in this section is intended to give a snapshot in time of the current state of the Hamilton Fire Department by providing background on the service, outlining legislative requirements, and defining the asset hierarchy used throughout the report. As well, providing a detailed summary and analysis of existing inventory information as of December 2022, including age profile, condition methodology, condition profile, and asset usage and performance for each of the asset classes. This section will provide the necessary background for the remainder of the plan.

2.1 SERVICE PROFILE

The service profile consists of four main aspects of the service:

- Service History;
- Service Function;
- Users of the Service; and,
- Unique Service Challenges.

2.1.1 SERVICE HISTORY

Rising from the ashes of a tragedy on November 16, 1832, the Hamilton Fire Department has evolved from a citizen's bucket brigade into an organization that includes 599 Full-time Firefighters, Dispatchers, Fire Prevention, Training and Mechanical staff and 300 Volunteer Firefighters protecting our urban and rural communities. In 1879, Hamilton was the first fire department in Canada to implement a *firefighter's pole* so that firefighters were able to respond to emergency calls faster than by using a standard staircase.

In 2001, the communities of Ancaster, Dundas, Flamborough, Glanbrook, Stoney Creek and Hamilton merged to become the 'new' City of Hamilton, and the Hamilton Fire Department grew from 12 stations to 26 and became a composite department which included both full-time and volunteer firefighters, and today serves approximately 570,000 residents.

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2.1.2 SERVICE FUNCTION

According to the *Fire Protection and Prevention Act*, 1997 Section 2, subsection (1), every municipality shall:

(a) Establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and,
(b) Provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.

In discharging its responsibilities under Section 2, subsection (1), a municipality shall,

(a) Appoint a community fire safety officer or a community fire safety team; or,
(b) Establish a Fire Department

If a Fire Department is established for the whole or a part of a municipality or for more than one municipality, the council of the municipality or the councils of the municipalities (whichever the case may be) shall appoint a Fire Chief for the Fire Department. The fire chief is the person who is ultimately responsible to the council of a municipality that appointed him or her for the delivery of fire protection and rescue services.

Fire protection services includes:

(a) Fire suppression, fire prevention and fire safety education;
(b) Mitigation and prevention of the risk created by the presence of unsafe levels of carbon monoxide and safety education related to the presence of those levels;
(c) Rescue and emergency services;
(d) Communication in respect of anything described in (a) to (c);
(e) Training of persons involved in providing anything described in (a) to (d); and,
(f) The delivery of any service described in (a) to (e).

In order to deliver effective fire protection services, The Hamilton Fire Department uses a range of assets. Some of the ways assets support the delivery of services include:

- Reliable vehicles to arrive at emergency incidents in a timely manner;
- Reliable technology to ensure required means of communication are always available to accept calls for emergencies, record information, dispatch vehicles and provide for incident communication;
- Adequate facilities across the city (see ***Figure 1)*** to house and maintain vehicles, personnel, and equipment in preparation to respond to emergencies; and
- Specialized equipment for firefighters to use to protect themselves and others while responding to and actively mitigating emergency situations.

2.1.3 USERS OF THE SERVICE

The Hamilton Fire Department provides service to over 570,000 Hamilton residents and visitors to the City. Hamilton has a diverse population with a density of approximately 509.1 people per square kilometre.

As shown in ***Figure 1***, the Hamilton Fire Department provides three distinct levels of service throughout the City currently utilizing 26 Fire Stations: 14 full-time, 9 volunteer, and 3 composite. The three levels of service are defined as:

- **Full-Time** (urban areas of the City): Incident response is provided by full-time firefighters, operating on a scheduled four-platoon, 24-hour shift schedule;
- **Volunteer** (rural areas of the City): Incident response is provided by volunteer firefighters who are on call 24/7/365 and paged out to respond as required for emergency incidents. Volunteer firefighters are paid an hourly amount for time spent at emergency incidents, training sessions and station duties; and,
- **Composite** (suburban areas of the City): Incident response is provided by both full-time and volunteer firefighters.

Since rural areas of the City are growing due to plans for development, Hamilton Fire Department is continuously evaluating changes in risk to ensure appropriate response models (full-time, composite, volunteer) are employed in these areas.

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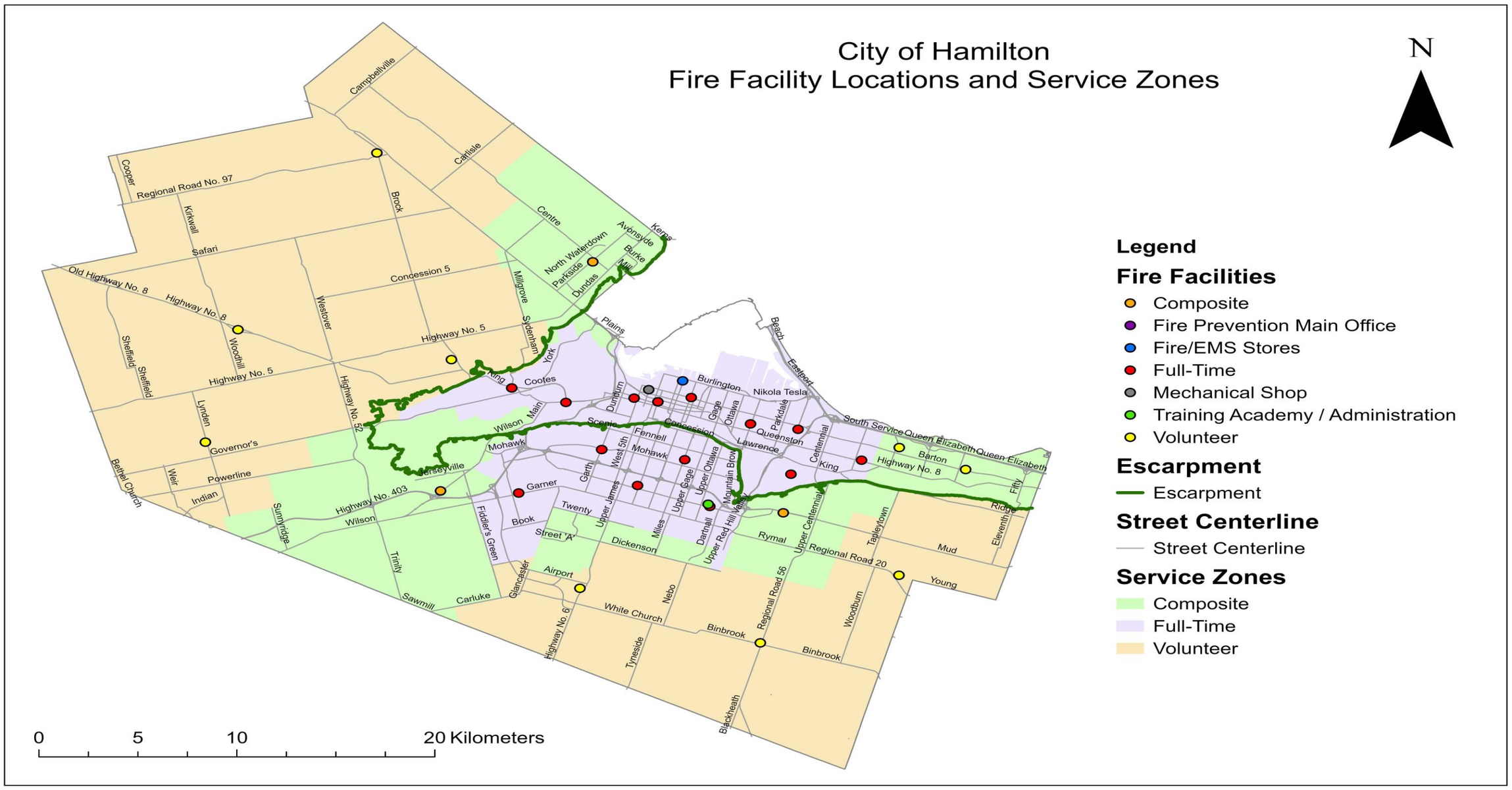
ASSET MANAGEMENT PLAN

Figure 1 : Hamilton Fire Facility Locations and Service Zones



2.1.4 UNIQUE SERVICE CHALLENGES

The Hamilton Fire Department has some unique service challenges which will be discussed throughout this report.

Given the size of the fire apparatus that the fire department operates to deliver time-sensitive service, any change including traffic patterns/flow, drive lane road width, transportation network changes and route circumvention pose a challenge. Some of these challenges are summarized below and identified as demands on the service in ***Sections 5.0 and 7.0:***

- During large City events (e.g., Supercrawl), the fire department responses may be less efficient due to increased congestion, street closures and response route changes;
- During winter months, snow piles create narrower streets which can increase travel times or the inability to access a street. Narrow streets are becoming more prevalent throughout the City and with the addition of on-street parking, bike lanes and traffic calming measures the concern noted above can become more frequent; and,
- Any Escarpment closures which may occur due to erosion, weather and/or accident may affect response routes.

In addition, due to vehicle supply chain issues exacerbated by the COVID-19 pandemic, the Hamilton Fire Department has experienced delays procuring vehicles using the established procurement process. The time it takes to acquire new, or replacement apparatus has increased significantly (i.e., pre-COVID once an order was placed it took one to one and a half years to receive the apparatus and in 2023 it took three years. This could affect the fire department's service delivery over time if this issue remains unmitigated and is identified as a risk in ***Section 6.0.***

2.2 LEGISLATIVE REQUIREMENTS

The most significant legislative requirements that impact the delivery of the fire protection and rescue services and emergency management are outlined in ***Table 1.*** These requirements are considered throughout the report, and where relevant, are included in the levels of service measurements.

Table 1: Legislative Requirements

LEGISLATION OR REGULATION	REQUIREMENT
Fire Protection and Prevention Act, 1997	Sets out the legislative and regulatory framework for the establishment of fire protection in Ontario, which is a mandated municipal responsibility.

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LEGISLATION OR REGULATION	REQUIREMENT
O. Reg 343/22 Firefighter Certification NFPA Codes & Standards (NFPA: National Fire Prevention Association)	All firefighters must meet minimum competency standards to be able to perform their assigned duties. This competency is achieved through training and certification, promotes, and improves methods of fire protection and prevention, electrical safety, and other related safety goals; obtains and circulates information and promotes education and research on these subjects; and secures the cooperation of its members and the public in establishing proper safeguards against loss of life and property.
Establishing and Regulating By-law 19-34	By-law which ensures the City of Hamilton is compliant with the Fire Protection and Prevention Act, 1997 and enshrines the current Council-approved structure, capacity, type, and nature of service delivery provided by the Hamilton Fire Department.
O. Reg. 332/12: Building Code	Any facilities considered “Post-disaster”, like Hamilton Fire Department facilities, must include additional provisions for seismic loading.
O.Reg.378/18: Community Risk Assessments	Every municipality, and every fire department must complete and review a community risk assessment no later than 5 years from the day the previous community risk assessment was completed. The municipality and fire department must use the community risk assessment to inform decisions about the provision of fire services.
O. Reg 380/04: Emergency Management and Civil Protection Act	In developing its emergency management program, every municipality shall identify and assess the various hazards and risks to public safety that could give rise to emergencies and identify the facilities and other elements of the infrastructure that are at risk of being affected by emergencies.

2.3 ALIGNMENT WITH HAMILTON FIRE DEPARTMENT GUIDING PRINCIPLES

As indicated in ***Table 2*** below, this Asset Management Plan is in alignment with the four guiding principles identified in the 2019 – 2020 Hamilton Fire Department 10-Year Service Delivery Plan. These guiding principles were developed considering City of Hamilton's Corporate Cultural Values.

Table 2: Hamilton Fire Department Guiding Principles

HFD Guiding Principles	AM Plan Alignment
Optimized Service Delivery	The Asset Management Plan outlines service profile demands on the service, levels of service, lifecycle management, and financial sustainability. Asset Management Plan also outlines the assets required to deliver optimal service.
Exceptional People and Performance	Asset Management Plan outlines customer and technical levels of service to provide a holistic view of service performance.
Robust Collaboration and Integration	Asset Management Plan uses a consistent template across the organization so all service areas can be evaluated in the same way.
Reduced Risk for a Healthier and Safer Community	Asset Management Plan incorporates findings from the Community Risk Assessment and Hazard Identification and Risk Assessment (HIRA) as well as incorporating other risks found during plan development.

2.4 ASSET HIERARCHY

As previously mentioned, to deliver fire protection and rescue services and emergency management, Hamilton Fire Department requires assets. The fire department's Asset Management Service Area has been broken down into four asset classes for the purpose of this Asset Management Plan: Facilities, Vehicles, Equipment, and Technology.

- **Facilities:** refers to any City-owned facilities necessary to deliver fire protection and services and emergency management.
- **Vehicles:** describes different types of vehicles which are used for either firefighting and rescue operations, fire prevention, mechanical/stores, administrative or training purposes, and any required tools to maintain these assets.
- **Equipment**: refers to all equipment a firefighter or apparatus requires to protect the public as well as themselves.

- **Information & Communications Technology** describes the different type of technology required to deliver the service including communications, IT, desktop, and mobile equipment.

The asset class hierarchy outlining assets included in this section is shown below in ***Table 3***.

Table 3: Asset Class Hierarchy

SERVICE AREA	HAMILTON FIRE DEPARTMENT			
ASSET CLASS	**FACILITIES**	**VEHICLES**	**EQUIPMENT**	**INFORMATION & COMMUNICATIONS TECHNOLOGY**
	• Shared & Fire Stations • Administrative • Fire Prevention Offices • Mechanical Facility • Storage Facility	• Heavy Response Vehicles • Light Response Vehicles • Non-Response Vehicles • Trailers	• Respiratory Protection Gear • Bunker Gear & Uniforms • Apparatus Equipment • Specialty Teams Equipment	• Communications Technology • Technology Equipment • Information Technology

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3. SUMMARY OF ASSETS

Table 4 displays the detailed summary of assets for the Hamilton Fire Department service area. The data is sourced from a combination of datasets included in the fire department's databases. It is important to note that inventory information does change often, and that this is a snapshot of information available as of December 2022.

The City owns approximately **$252 Million** in Hamilton Fire Department assets which are on average in **Good** condition. Assets are a weighted average of **26 years** in age which represents **54%** of the average remaining service life which are weighted using only Facility and Vehicle assets due to gaps in the Equipment and Information & Communications Technology data. For most assets this means that the City should be completing preventative maintenance activities per the inspection reports as well as essential operating activities (e.g. inspection, cleaning).

Data confidence descriptions are outlined on ***page 32*** of the Asset Management Plan Overview. The replacement costs below are typically a **Medium** data confidence level overall. For Facilities, replacement costs are calculated using an internal Corporate Facilities and Energy Management tool which encompasses current market rates, building type and size and were escalated to include additional soft costs. Vehicle replacement costs were gathered from the most recent purchase price for similar assets and are typically High confidence. Equipment and Information & Communications Technology assets' replacement costs were based on the Hamilton Fire Department renewal schedule, but the inventory could not be confirmed and therefore is considered to be a **Medium** data confidence. A continuous improvement item identified in ***Table 28*** is to implement an asset registry for all fire department assets which includes key database fields as well as metadata and follows the newly developed City Data Standard. In addition, improving the process for collecting unit costs for fire department assets has also been identified as a continuous improvement item.

The Corporate Asset Management Office acknowledges that some works and projects are being completed on an ongoing basis and that some of the noted deficiencies may already be completed at the time of publication. It is also important to note that Asset Management Plans only include asset information related to assets that the City owns. Facilities leased from other bodies are incorporated into operational costs but are not incorporated into the total replacement cost for the service. Finally, the assets included below are assets that are assumed and in service at the time of writing. A continuous improvement item identified in ***Table 28*** is to improve and add/track new fire department data that helps inform decisions related to Asset Management by identifying gaps in data and prioritizing what can be improved and/or tracked.

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Table 4: Detailed Summary of Assets
****Weighted Average based on Replacement Cost***

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% Remaining Service Life)	AVERAGE EQUIVALENT CONDITION
FACILITIES				
Shared Stations	17[1]	$76.4M	37 years (51%)	3-FAIR
Data Confidence	Very High	Medium	Very High	High
Fire Stations	8[1]	$33.6M	41 years (45%)	2-GOOD
Data Confidence	Very High	Medium	Very High	High
Administration Facilities (MATC)	3	$26.4M	8 years (89%)	2-GOOD
Data Confidence	Very High	Medium	Very High	High
Mechanical Facility	1	$8.1M	56 years (25%)	4-POOR
Data Confidence	Very High	Medium	Very High	High
Stores (Storage) Facility	1	$2.0M	83 years (0%)	3-FAIR
Data Confidence	Very High	Medium	Very High	High
Fire Prevention Offices	3	$11.0M	34 years (55%)	3-FAIR
Data Confidence	Very High	Medium	Very High	High
SUBTOTAL		**$157.6M**	**35 years* (54%)**	**3-FAIR***
Data Confidence		**Medium**	**Very High**	**High**

[1] The Hamilton Fire Department operates a total of 26 stations, but Station 14 is a leased facility and has not been included in the replacement value calculations.

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Table 4: Detailed Summary of Assets
****Weighted Average based on Replacement Cost***

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
VEHICLES				
Heavy Response Vehicle	64	$74.6M	10 years (52%)	2-GOOD
Data Confidence	High	High	Very High	Low
Light Emergency Response	16	$1.9M	1 years (85%)	2-GOOD
Data Confidence	High	High	Very High	Low
Non-Emergency Response	18	$1.5M	7 years (35%)	3-FAIR
Data Confidence	High	High	Very High	Low
Trailers	4	$0.5M	8 years (53%)	3-FAIR
Data Confidence	High	High	Very High	Low
SUBTOTAL		**$78.5M**	**9 years* (54%)**	**2-GOOD***
Data Confidence		**High**	**Very High**	**Low**

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Table 4: Detailed Summary of Assets
****Weighted Average based on Replacement Cost***

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
EQUIPMENT				
Respiratory Protection Gear (PPE)		$1.5M	Minimal Data - grouped information.	
Data Confidence		Medium		
Bunker Gear & Uniforms (PPE)		$3.7M		
Data Confidence		Medium		
Apparatus Equipment (e.g., hose, cameras, defibrillators)		$2.9M		
Data Confidence		Medium		
Specialty Teams Equipment (e.g., extrication equipment, hazmat, rescue equipment)		$2.2M		
Data Confidence		Medium		
SUBTOTAL		**$10.3M**	**Minimal Data**	
Data Confidence		**High**	**Very Low**	

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Table 4: Detailed Summary of Assets
****Weighted Average based on Replacement Cost***

ASSET CATEGORY	NUMBER OF ASSETS	REPLACEMENT VALUE	AVERAGE AGE (% RSL)	AVERAGE EQUIVALENT CONDITION
INFORMATION & COMMUNICATIONS TECHNOLOGY				
Communication Technology (e.g., mobile radios, portable radios, pagers)		$4.7M	Minimal Data - grouped information.	
Data Confidence		Medium		
Technology Equipment (e.g., Tablets, Remotely Piloted Aircraft System)		$0.6M		
Data Confidence		Medium		
Information Technology (e.g., Desktop, Laptop) Assets		$0.4M	4 years (5%)	4-POOR
Data Confidence		High	High	Low
SUBTOTAL		**$5.7M**	**Minimal Data**	
Data Confidence		**High**	**Very Low**	
TOTAL		**$252.0M**	**26 years*[2] (54%)**	**2-GOOD*[2]**
Data Confidence		**Medium**	**High**	**Medium**

[2] Based on replacement value weighting of only Facilities and Vehicles due to data availability.

3.1 ASSET CONDITION GRADING

Condition refers to the physical state assets are in, a measure of the physical integrity of these assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life.

Since condition scores are reported using different scales and ranges depending on the asset, ***Table 5*** shows how each rating was converted to a standardized 5-point condition category so that the condition could be reported consistently across the AM Plan.

Table 5: Equivalent Condition Conversion Table
**** Weighted Average Based on Replacement Costs***

EQUIVALENT CONDITION GRADING CATEGORY	CONDITION DESCRIPTION	INFORMATION TECHNOLOGY	VEHICLES	FACILITIES CONDITION INDEX (FCI)
1-Very Good	The asset is new, recently rehabilitated, or very well maintained. Preventative maintenance required only.	>79.5% Remaining Service Life	>79.5% Remaining Service Life: Much lower-than-average likelihood for unscheduled repair.	N/A
2-Good	The asset is adequate and has slight defects and shows signs of some deterioration that has no significant impact on asset's usage. Minor/preventative maintenance may be required.	69.5% – 79.4% Remaining Service Life	69.5% - 39.5% Remaining Service Life: Lower than average to average likelihood for unscheduled repair	< 5% Unplanned component failure highly unlikely. Operations and maintenance costs are predictable. The building will provide a clean and functional environment.
3-Fair	The asset is sound but has minor defects. Deterioration has some impact on asset's usage. Minor to significant maintenance is required.	39.5% - 69.4% Remaining Service Life	39.5% - 0% Remaining Service Life: Higher than average to much higher-than-average likelihood for unscheduled repair.	>= 5% to < 10% Unplanned building component failure is unlikely. There may be some variability in operations and maintenance costs. The building will meet most operational needs with minor complaints.
4-Poor	Asset has significant defects and deterioration. Deterioration has an impact on asset's usage. Rehabilitation or major maintenance required in the next year.	19.5% -39.4% Remaining Service Life	<0% Remaining Service Life: Vehicles that are deemed to not be road worthy.	>= 10% to <30% Unplanned building component failure is likely. Unplanned repairs will likely occur, and operations and maintenance costs will be high. Facility will look worn with serious signs of deterioration.
5-Very Poor	Asset has serious defects and deterioration. Asset is not fit for use. Urgent rehabilitation or closure required.	<19.4% Remaining Service Life	N/A	>= 30% Unplanned component failure will occur. Emergency repairs will likely occur, and operations and maintenance costs will be high. Facility will look worn with serious signs of deterioration. Functionality of the entire building will be compromised.

The following conversion assumptions were made:

- Vehicles condition was based on the probability of required repairs based on % remaining service life. The Estimated Service Life for condition for heavy emergency response vehicles was modified to 25 years for condition estimation purposes;
- Facilities Condition Index was based on ranges provided by the consultant who completed the Building Condition Assessment which corresponds to a 4-Point scale; therefore, facilities will not be able to attain a score of 1;
- Facilities Condition Index was reviewed and updated by the City's Corporate Facilities and Energy Management division in January 2024; and
- For Information Technology assets, the condition was based on the % of remaining service life.

3.2 ASSET CLASS PROFILE ANALYSIS

This section outlines the Age Profile, Condition Methodology, Condition Profile, and Performance Issues for each of the asset classes.

- The age of an asset is an important consideration in the asset management process as it can be used for planning purposes as assets typically have an estimated service life where the asset can be expected to be in service before the condition has degraded and requires replacement. Some lower cost or lower criticality assets can be planned for renewal based on age as a proxy for condition or until other condition methodologies are established. It should be noted that if an asset's condition is based on age, it is typically considered to be of a low confidence level. Although typically, age is used when projecting replacements beyond the 10-year forecast to predict degradation;

- As previously mentioned, condition refers to the physical state of assets and is a measure of the physical integrity of assets or components and is the preferred measurement for planning lifecycle activities to ensure assets reach their expected useful life. Assets are inspected/assessed at different frequencies and using different methodologies to determine their condition, which are noted in this section; and,

- Finally, performance issues are also identified because there are often insufficient resources to address all known asset deficiencies, and therefore these issues must be noted and prioritized.

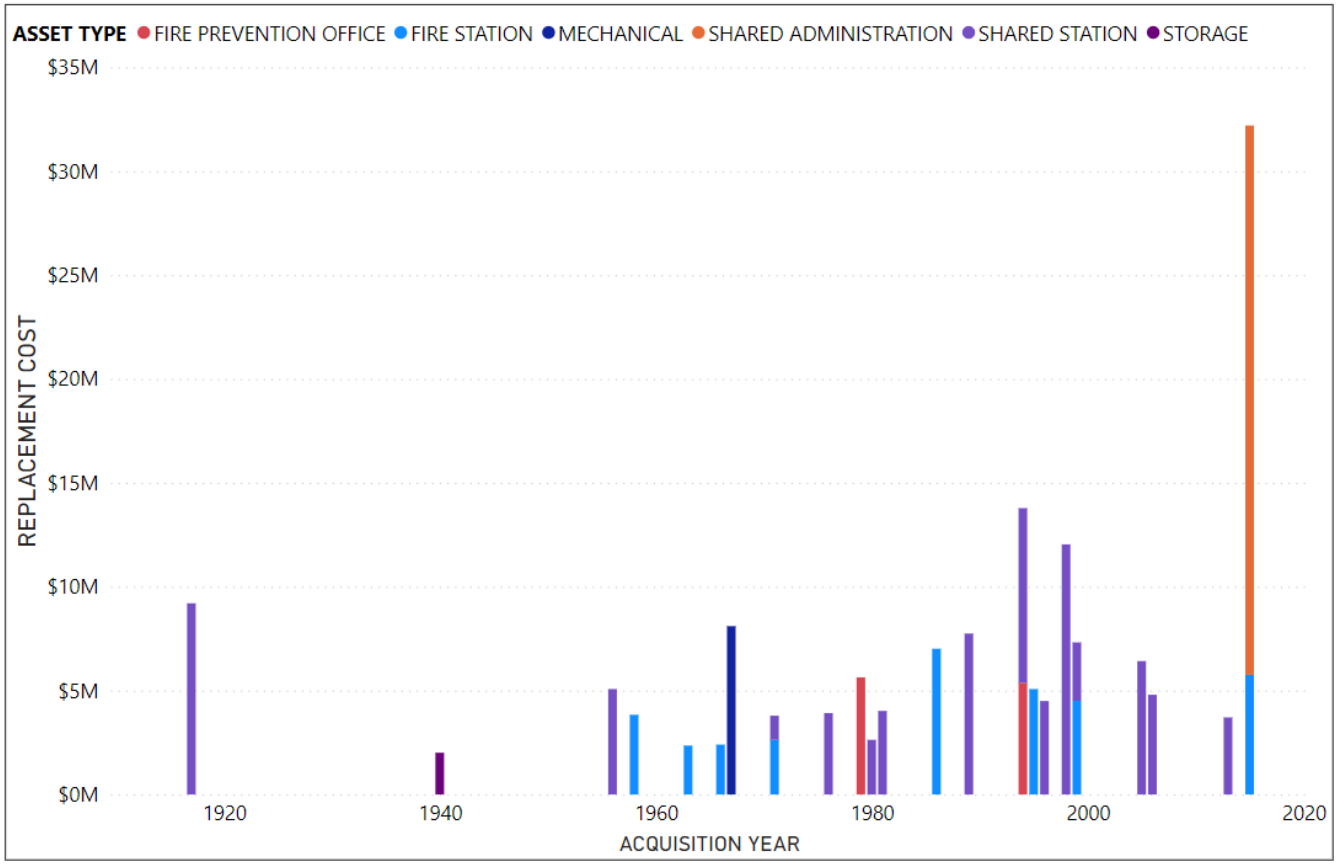
3.2.1 FACILITIES PROFILE

The Hamilton Fire Department share the majority of their current stations with the Hamilton Paramedic Service and the administrative facility the Multi Agency Training Complex with Hamilton Paramedic Service and Hamilton Police Service. For the purposes of this report, facilities where the fire department is the sole occupier of the space, have been considered Fire Stations or Fire Prevention Offices, and for shared facilities, the replacement values have been allocated based on the portion of the building that fire department staff are currently occupying and are referred to as Shared Stations, Mechanical/Stores (Storage), or Shared Administration Multi Agency Training Complex facilities.

3.2.1.1 AGE PROFILE

The age profile for Hamilton Fire Department assets is shown in ***Figure 2.*** For the fire department Facility assets, the data confidence for age is typically Very High because this information was recorded during the construction of the facilities.

Figure 2: Facilities Age Profile



Most Hamilton Fire Department facilities have an Estimated Service Life of 75 years and therefore any facilities built before 1948 would be beyond its Estimated Service Life. The only fire station beyond this Estimated Service Life is Fire Station 1 which was built in 1917 and is

located on John Street North. However, the building was renovated in 2003 and is shown to be in Fair condition per the Building Condition Assessment and is therefore not being considered for replacement.

The other building beyond its service life in the figure below is Station 30 which was built in 1940 and is used by the fire department for the stores/logistics division (Storage). The majority of this facility is occupied by Hamilton Paramedics Service and is therefore discussed further in the Hamilton Paramedics Service Asset Management Plan.

The Multi Agency Training Complex on Stone Church Road -shared by the Hamilton Fire Department, Hamilton Police Service and Hamilton Paramedic Service -is the most expensive facility the fire department occupies. The Hamilton Fire Department is the predominant tenant. in the campus that was constructed as part of the 2009 Federal/Provincial/Municipal infrastructure program and opened in 2011. It houses a fire station, shared administrative offices for all three emergency services, Hamilton Fire Department Dispatch, the City's Emergency Operations Centre, Fire, Police and Paramedic training areas and classrooms.

3.2.1.2 CONDITION METHODOLOGY & PROFILE

Condition for Hamilton Fire Department facilities is determined based on the results of a Building Condition Assessment completed by the Corporate Facilities and Energy Management Division. The Building Condition Assessment identifies necessary major and minor maintenance activities in a 10-year forecast with projected costs, and outputs a detailed report outlining methodology, overall findings, and condition.

Building Condition Assessments are completed on fire department facilities every five years and output a score called a Facility Condition Index which is considered to be a high confidence level source for condition. The Facility Condition Index is a ratio of total cost for required repairs, renewal, or upgrades to replacement value of building components. The 10-year forecast from the Building Condition Assessments were incorporated into the maintenance plan shown in **Section 8.2**.

A summary of the Facilities' condition methodology is provided in ***Table 6***. The condition conversion from Facility Condition Index to the standardized 5-point scale used in Asset Management is shown in ***Table 5.***

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Table 6: Inspection and Condition Information

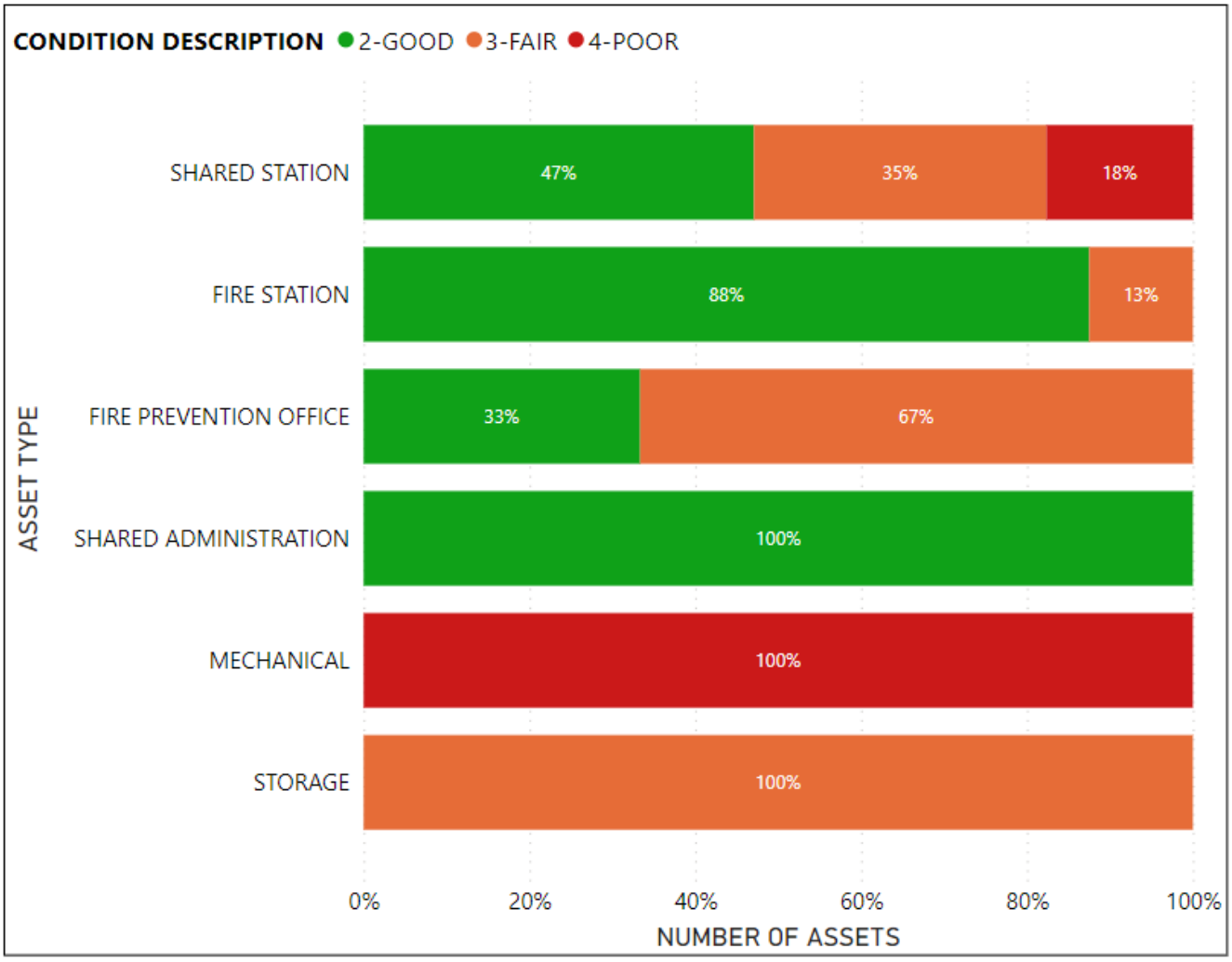
ASSET	INSPECTION FREQUENCY	LAST INSPECTION	CONDITION SCORE OUTPUT
All Facilities	Every 5 years	2019	Facility Condition Index (0% - 100%)

The condition profile for Hamilton Fire Department Facilities assets is shown below in ***Figure 3.*** It is evident that many of the Shared Stations are indicated to be in **Good or Fair** condition based on the results of the Building Condition Assessments.

Since the Hamilton Fire Department is a critical service, it is essential that facilities are kept in a state of good repair. The fire department and Corporate Facilities and Energy Management have ensured facilities are kept in a safe working condition but acknowledge that a significant amount of facility maintenance needs will be required in the next 10 years as shown in **Section 8.2,** and if certain items are not completed, it could result in facilities reaching Poor condition. It is also important to note that the Building Condition Assessments were completed in 2019, and while the forecasted works have been updated in the Corporate Facilities and Energy Management database, a future Building Condition Assessment will be completed in 2024 and therefore these condition ratings may change in the next year.

Although it is well within its Estimated Service Life of 75 years, Fire Station 14 is the only facility considered to be in Very Poor condition per the Building Condition Assessment. Since it is a leased building, it has not been included in the figure below, however, the lease agreement for this facility does require that the City maintain this facility and therefore the large maintenance costs associated with this facility have been incorporated into the Operations and Maintenance Plan in **Section 8.2**. There is also a future acquisition planned to replace Station 14 in **Section 8.1.** Both of these costs have been assumed to be required at this time because it is unclear what condition the City must leave the facility in after occupancy.

Figure 3: Facilities Asset Condition Distribution



3.2.1.3 ASSET USAGE AND PERFORMANCE

The largest performance issues with Facilities involve poor condition of major (high cost or high criticality) facility components. The known service performance deficiencies in ***Table 7*** were identified using information from the 2019 Building Condition Assessment (BCA).

HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

Table 7: Known Service Performance Deficiencies

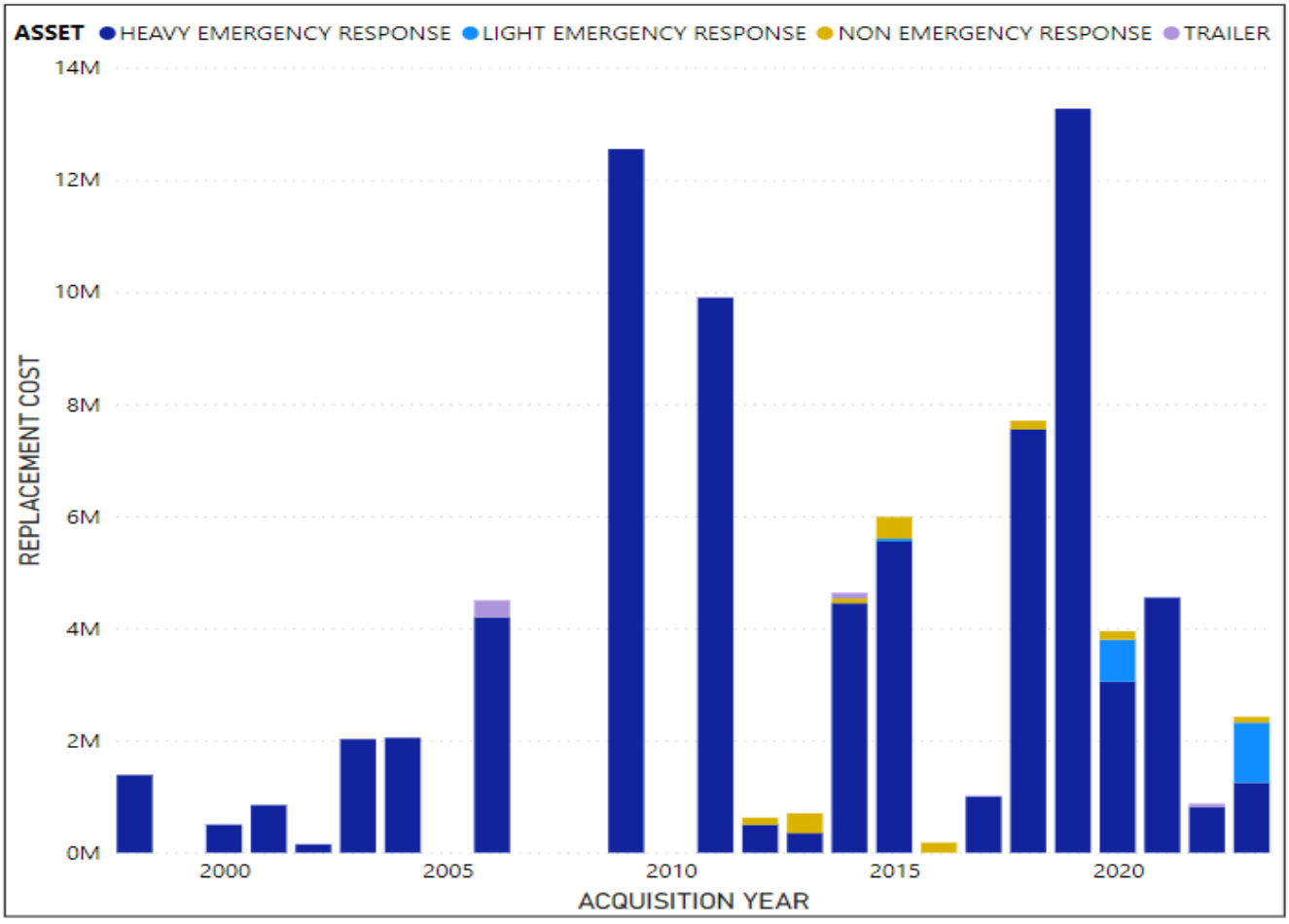
ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Facility	**Stations 4, 12, 14, 18, 20, 24, 25, 28**	Roof Replacement Required	It is recommended to replace the roof as required, at the end of its life cycle.
	Fire Prevention Office 1		
	Stations 11, 14, 15, 16, 19, 21, 24, 25	Parking Lot Replacement Required	It is recommended that the parking lot asphalt be repaired or replaced as required, at the end of its life cycle.
	Stations 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 21, 23	Replace Engine Exhaust Extraction System	It is recommended to replace the extraction system at the end of its life expectancy.
	Stations 4, 12, 24	Passenger Elevator Replacement	It is recommended to replace the elevator at the end of its life expectancy to maintain proper barrier free access through the building.

3.2.2 VEHICLES PROFILE

3.2.2.1 AGE PROFILE

The age profile of the Hamilton Fire Department Vehicle assets is shown in ***Figure 4***. For Vehicle assets, the data confidence for age is typically High because asset's ages are formally tracked, and many assets are replaced based on age.

Figure 4: Vehicles Age Profile



Per ***Figure 4***, there are acquisition spikes in 2009, 2011, and 2019 for heavy emergency response vehicles (i.e., rescue, pumper, engine, ladder, and tanker apparatus). Since these vehicles have an estimated service life Estimated Service Life of 20 years, there will be spikes in renewals in 2029, 2031 and 2039 as discussed in **Section 8.3.**

3.2.2.2 CONDITION METHODOLOGY & PROFILE

Hamilton Fire Department vehicles are inspected, and maintenance activities are conducted at specific intervals throughout the asset's lifecycle as shown in ***Table 8***. Fire Department staff are also responsible for maintaining vehicles for Hamilton Paramedics Service and there is a service level agreement between these two departments to perform these activities at specific intervals. Due to a recent change in Hamilton Paramedics Service legislation and an increase in Hamilton Paramedics Service vehicles, the fire department may not be able to continue hitting all inspection targets for both Hamilton Fire Department and Hamilton Paramedics Service vehicles without additional resourcing, which is shown in **Section 5.3**. Vehicles on the road are generally considered to be in acceptable working condition while they are in service, but this may not be sustainable over time without additional resourcing which should be investigated following this plan.

Table 8: Vehicle Inspection and Maintenance Activities

ASSET	INSPECTION DESCRIPTION	FREQUENCY	CONDITION SCORE OUTPUT
Vehicles	Ensure all vehicles and their related equipment (i.e., pumps) are certified for road worthiness and technical functionality	Annual	No output – MTO Certification

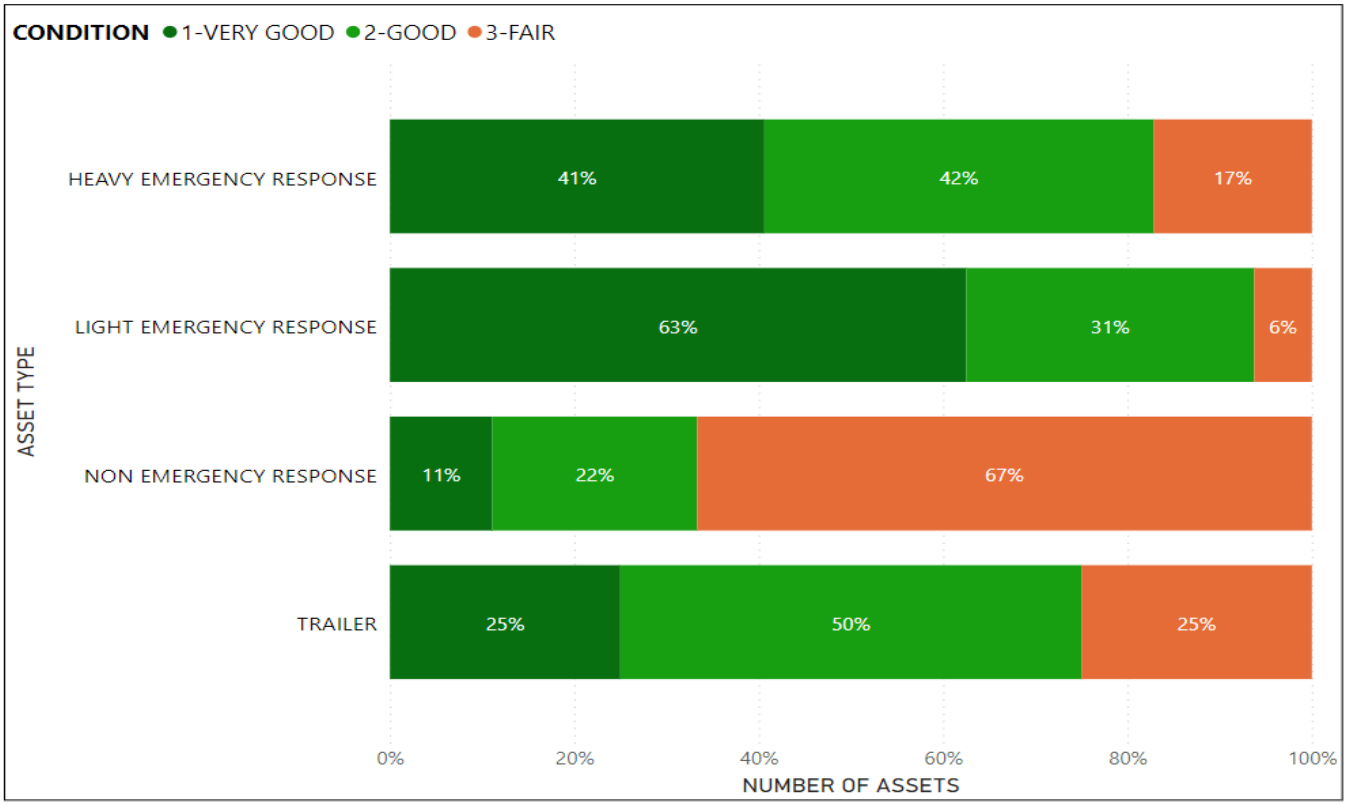
Although vehicles are inspected, there is currently no formal condition rating assigned to each vehicle. A continuous improvement item identified in ***Table 28*** is to incorporate a condition rating during regular vehicle inspection/maintenance activities since there are often indicators during these inspections that can predict the remaining useful life of the asset which will assist Hamilton Fire Department with capital forecasting for all vehicles. In addition, collecting this data will allow the fire department to confirm or revisit the vehicle replacement frequency as there is typically a point in a vehicle's lifecycle where it is more costly to operate and maintain the asset than it is to renew.

The condition profile of Hamilton Fire Department's vehicle assets is shown in ***Figure 5.*** At this time the average condition of the heavy emergency response vehicle assets is considered to be **Good** based on a condition estimated by maintenance probability based on age and weighted by replacement cost.

The large number of non-emergency response vehicles showing **Fair** condition below indicates many of these vehicles are approaching their Estimated Service Life. This is due to a current supply chain shortage as a result of COVID-19 and these vehicles are scheduled for renewal per the renewal plan in **Section 8.3**. Even though a vehicle has reached its Estimated Service Life, it does not mean that the vehicle is not in acceptable working condition, but it does mean

that the vehicle will require replacement in the near future and the likelihood of a mechanical breakdown can increase.

Figure 5: Vehicles Asset Condition Distribution



3.2.2.3 ASSET USAGE AND PERFORMANCE

The largest performance issues with Hamilton Fire Department vehicles involve assets approaching their Estimated Service Life or not being inspected at the recommended frequency. The known service performance deficiencies in ***Table 9*** were identified using staff input.

Table 9: Known Service Performance Deficiencies

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Vehicle	**Various**	Vehicles approaching service life recommendations	Microchip shortage caused by COVID-19 pandemic causing difficulty in replacing assets at desired frequency. Procurement policies can also limit Hamilton Fire Department vendor access.

ASSET	LOCATION	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
		Not all vehicles inspected at recommended frequency or detail	Current demand increases on mechanical staff to maintain both Hamilton Fire Department and Hamilton Paramedic Service vehicles. At the time of writing of this report, the fire department does not currently have enough bays, mechanics, and equipment to maintain all vehicles at the highest standard.

3.2.3 EQUIPMENT PROFILE

At the time of writing this Asset Management Plan, not all individual Equipment assets had readily available information relating to their individual age, condition, or a condition methodology formally tracked and therefore age, condition profiles, and a condition methodology could not be accurately created following Asset Management methodology. In addition, there are no known performance issues with these assets. A continuous improvement item identified in **Table 28** is to formally track age and create condition methodologies for major assets using the Asset Management 5-point scale shown in ***Table 5.***

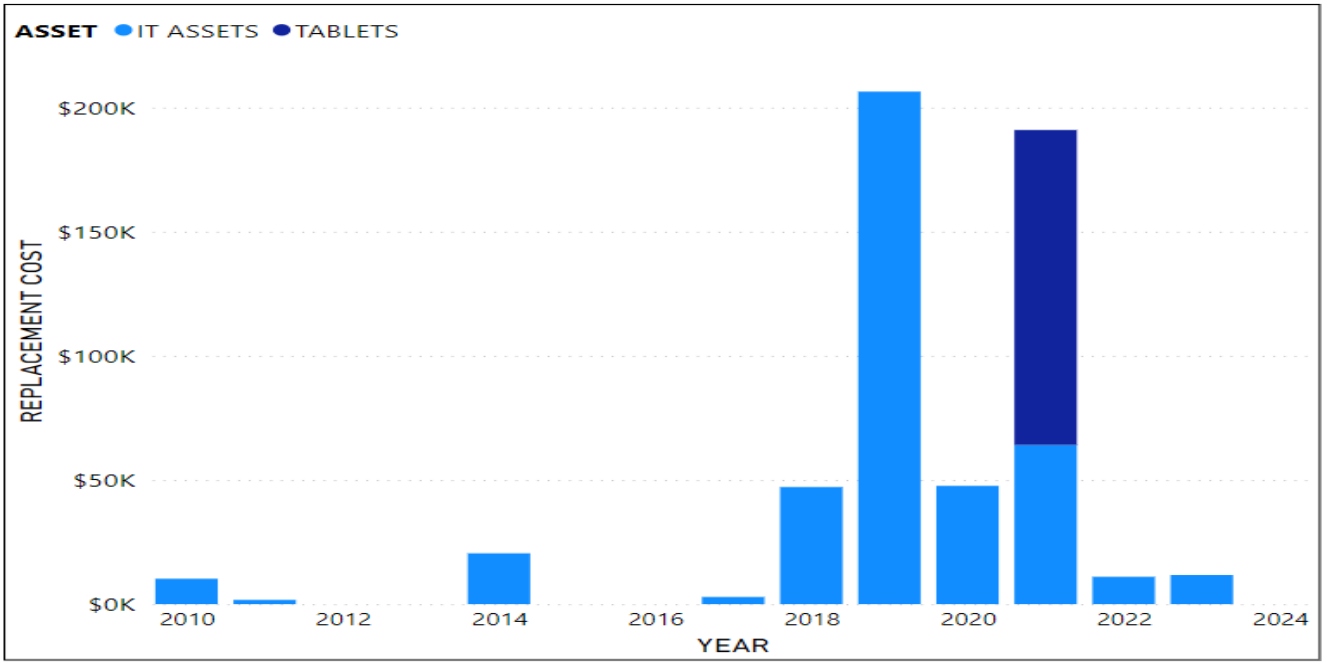
3.2.4 TECHNOLOGY PROFILE

3.2.4.1 AGE PROFILE

At the time of writing this Asset Management Plan, as with Equipment assets many high value Information & Communications Technology assets do not have age formally readily tracked for each individual item. The age profile for assets where this information is available is shown in **Figure 6**. Similarly, to above, a continuous improvement item identified in ***Table 28*** is to formally track age and create condition methodologies for major assets using the Asset Management 5-point scale shown in ***Table 5.***

The Information & Communications Technology assets with known ages have estimated service lives of four years. Since these assets have relatively short Estimated Service Lives, they will repeat throughout the renewal forecast shown in **Section 8.3.** It is evident from the figure below that there are assets beyond their Estimated Service Life and therefore these assets will also appear in the renewal backlog in **Section 8.3**. However, since the costs of these assets are far less than Facility and Vehicle assets, they are not the most significant driver for renewals.

Figure 6: Information & Communications Technology Age Profile

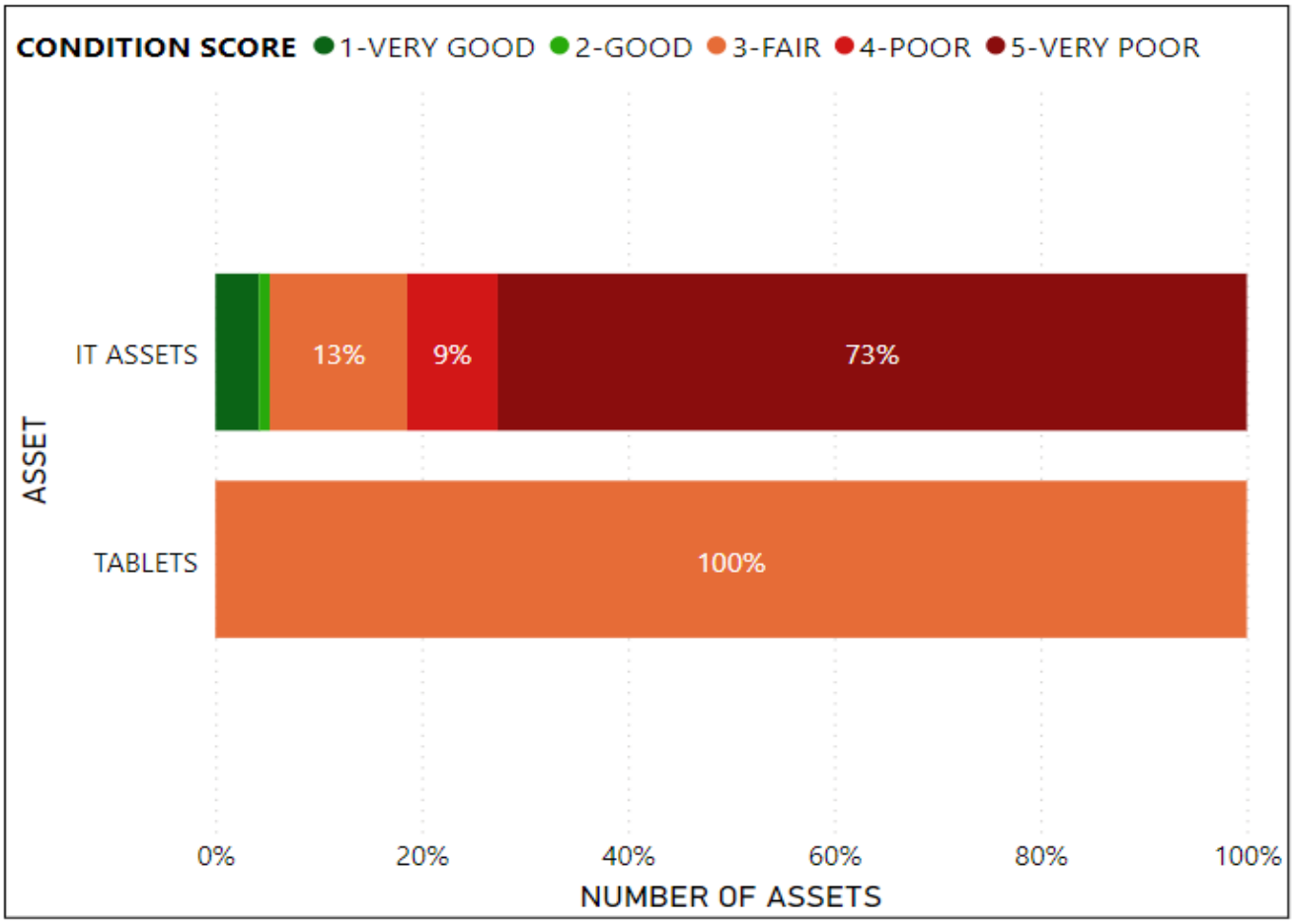


3.2.4.2 CONDITION METHODOLOGY & PROFILE

Currently, Information and Communications Technology assets do not have a formal method to determine condition and therefore age has been used to estimate the condition of these assets where age is known. This has been identified as a continuous improvement item in ***Table 28.***

The condition profile of the City's assets is shown in **Figure 7**. At this time, the average condition of Information & Communications Technology assets is considered to be Unknown since the highest value assets do not have age information available. Due to the condition methodology, many Information & Communications Technology assets have a significant amount of assets showing poor or very poor condition because they are approaching or beyond their Estimated Service Life, but this does not mean they are not in acceptable working condition.

Figure 7: Information and Communications Technology Asset Condition Distribution



3.2.4.3 ASSET USAGE AND PERFORMANCE

The largest performance issues with Information and Communications Technology assets involve obsolete or unsupported technology. The known service performance deficiencies in ***Table 10*** were identified using staff input.

Table 10: Known Service Performance Deficiencies

ASSET	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Pagers	Obsolete Technology	Pagers are beginning to be an unsupported technology which are becoming expensive to maintain. There are modern alternatives which utilize existing mobile services which are also more dependable. Pagers are currently being investigated for disposal.

HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

ASSET	SERVICE DEFICIENCY	DESCRIPTION OF DEFICIENCY
Mobile & Portable Radios	Assets becoming unsupported	Mobile and Portable radios are currently proposed to be replaced because these assets are beginning to become unsupported by the vendor. Radios are replaced in bulk to reduce risk and ensure everyone is trained on the same system.

4. MUNICIPALLY DEFINED LEVELS OF SERVICE

Levels of service are measures of what the City provides to its customers, residents, and visitors, and are best described as the link between providing the outcomes the community desires, and the way that the City provides those services.

O.Reg 588/17 does not define levels of service for Hamilton Fire Department assets and therefore the City has developed municipally defined levels of service. Levels of service are defined in three ways, customer values, customer levels of service and technical levels of service which are outlined in this section. An explanation for how these were developed is provided in ***Section 7.5*** of the Asset Management Plan Overview.

4.1 SURVEY METHODOLOGY

To develop customer values and customer levels of service, a Customer Engagement Survey entitled *Let's Connect, Hamilton – City Services & Assets Review: Hamilton Fire Department* was released on July 24, 2023 on the Engage Hamilton platform and closed on August 28, 2023. The survey results can be found in Appendix "A".

The survey received submissions from 92 respondents and contained 20 questions related to the Hamilton Fire Department delivery of service. For the purposes of this report, data has been evaluated from a confidence level perspective (margin of error at 95% confidence in sample size) and a data consistency (standard deviation) perspective per ***Table 11*** below.

Table 11: Data Confidence Levels

GRADE	DATA CONSISTENCY (STANDARD DEVIATION)	CONFIDENCE LEVEL (MARGIN OF ERROR AT 95% CONFIDENCE IN SAMPLE SIZE)
Very High	0 to 0.5 – results are tightly grouped with little to no variance in response	0% to 5% - minimal to no error in results, can generally be interpreted as is
High	0.5 to 1.0 – results are fairly tightly grouped but with slightly more variance in response	5% to 10% - error has becoming noticeable, but results are still trustworthy
Medium	1.0 to 1.5 – results are moderately grouped together, but most respondents are generally in agreeance	10% to 20% - error is a significant amount and will cause uncertainty in final results
Low	1.5 to 2.0 – results show a high variance with a fair amount of disparity in responses	20% to 30% - error has reached a detrimental level and results are difficult to trust
Very Low	2.0+ - results are highly variant with little to no grouping	30%+ - significant error in results, hard to interpret data in a meaningful way

Based on an approximate population size of 570,000 and the table above, a sample size of 92 correlates to a 10.3% margin of error at 95% confidence, and therefore these survey results correspond with a maximum Medium confidence level. It is important to note that respondents were allowed to opt out of questions, and as such, different questions may have different confidence levels depending on the opt out rate for that question. Therefore, the confidence levels presented differ throughout this section and are often in the Low range. In addition, approximately 87% of survey respondents had not used Hamilton Fire Department's service, so many of the performance-based responses are likely based on the reputation of the fire department and not the fire department's actual performance.

Although the sample size correlates to a maximum medium confidence level, the data consistency also differed between questions. A high data consistency means that respondents came to the same conclusion more often for a question, whereas a low data consistency means that there is a split in respondent's opinions. Therefore, while Corporate Asset Management may be able to improve survey confidence levels over time by increasing the survey sample size, it may not be possible to improve data consistency over time as this depends on the opinions of the respondents, and may require additional insight on why respondents opinions are split. A low consistency of data does not mean the data is bad, but it does mean that it is difficult to make decisions using that information. Overall, Hamilton Fire Department's data consistency was typically medium across all questions indicating most respondents are generally in agreeance.

While these surveys were used to establish customer values and customer performance measures, it is important to note that there were also limitations to the survey methodology which may also reduce the confidence level in the survey data. The survey was only released using an online platform and did not include telephone surveys and consequently there is no way to confirm the identity information provided in the survey. In addition, the survey did not control for IP addresses, and therefore it is possible that respondents could complete the survey more than once and skew the survey results.

When reviewing the demographic responses for the survey, there was no clear evidence that the survey results had been skewed. When comparing the age and postal code demographics from the survey, to the age and postal code demographics for the City, there does not appear to be a significant over-representation of any age or postal code demographic within the survey. In addition, the responses were distributed across the City with responses from most communities, however, there were limited responses from minority self-identifications. When assessing the spikes in respondents per day, the results were distributed across different ages and postal codes.

Therefore, although there are limitations to the survey methodology, it does appear that these results can be used to provide some context about the feelings of customers on the services the Hamilton Fire Department provides, but decisions should not be made based on this survey alone.

The future intent is to release this survey on a more regular basis to measure the trends in customer satisfaction over time and ensure that the City is providing the agreed level of service. In addition, the next survey will have an improved marketing and surveying strategy by both incorporating telephone surveys and/or IP controls to improve confidence levels in the survey responses. In addition, these results will be reviewed and improved upon for the next iteration of the Asset Management Plan. This has been noted in ***Table 28*** in the continuous improvement section.

4.2 CUSTOMER VALUES

Customer values are what the customer can expect from their tax dollar in "customer speak" which outlines what is important to the customer, whether they see value in the service, and the expected trend based on the 10-year budget. These values are used to develop the level of service statements.

Customer Values indicate:

- What aspects of the service is important to the customer;
- Whether they see value in what is currently provided; and,
- The likely trend over time based on the current budget provision.

As previously mentioned, the customer values below were determined using the results from the *Let's Connect, Hamilton – City Services & Assets Review: Hamilton Fire Department* survey.

Table 12: Customer Values

SERVICE OBJECTIVE:			
CUSTOMER VALUES	**CUSTOMER SATISFACTION MEASURE**	**CURRENT FEEDBACK**	**EXPECTED TREND BASED ON PLANNED BUDGET (10-YEAR HORIZON)**
Fighting Fires and Rescue Operations are Very Important services provided by HFD.	2023 Hamilton Fire Department City Services & Assets Review Survey	The average survey respondent rated fighting fires and rescue operations as the most important services that Hamilton Fire Department should be responsible for providing with a high data consistency.	Maintain

SERVICE OBJECTIVE:			
CUSTOMER VALUES	**CUSTOMER SATISFACTION MEASURE**	**CURRENT FEEDBACK**	**EXPECTED TREND BASED ON PLANNED BUDGET (10-YEAR HORIZON)**
All services offered by Hamilton Fire Department **are important to the community.**		Survey respondents indicated all services Hamilton Fire Department provides as Important or greater.	Maintain
The majority of respondents were aware of Hamilton Fire Department **response models.**		Over half (59%) of survey respondents were aware that Hamilton Fire Department has three models for fire and emergency response.	Maintain
Customers prefer that Hamilton Fire Department **maintain their current service level.**		The average survey respondent indicated that they would like Hamilton Fire Department to maintain the current service level with a medium data consistency.	Maintain
Overall customers would recommend Hamilton Fire Department **to others.**		The majority (75.8%) of survey respondents would recommend Hamilton Fire Department to others especially with respect to fighting fires and rescue operations.	Maintain

4.3 CUSTOMER LEVELS OF SERVICE

Ultimately, customer performance measures are the measures that the City will use to assess whether it is delivering the level of service the customers desire. Customer level of service measurements relate to how the customer feels about the Hamilton Fire Department in terms of their quality, reliability, accessibility, responsiveness, sustainability and over course, their cost. The City will continue to measure these customer levels of service to ensure a clear understanding on how the customers feel about the services and the value for their tax dollars.

The Customer Levels of Service are considered in terms of:

Condition	How good is the service? What is the condition or quality of the service?
Function	Is it suitable for its intended purpose? Is it the right service?
Capacity/Use	Is the service over or under used? Do we need more or less of these assets?

In ***Table 13*** under each of the service measures types (Condition, Function, Capacity/Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the currentt budget allocation.

It is important to note that many of Hamilton Fire Department customers are internal customers (e.g., staff) as they are the main users of most of fire department assets (i.e. facilities, vehicles, equipment, communications & information technology). For this first iteration of the Asset Management Plan the focus was on external customers (i.e. the Public), and as a result there are some gaps within the alignment between customer and technical levels of service as discussed in **Section 4.5**.

Table 13: Customer Levels of Service

TYPE OF MEASURE	LEVEL OF SERVICE STATEMENT	SOURCE	PERFORMANCE MEASURE	CURRENT PERFORMANCE	EXPECTED TREND BASED ON PLANNED BUDGET
Quality/ Condition	Provide adequate fire protection services in accordance with municipality needs and circumstances.	2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on how Hamilton Fire Department has performed overall in the last 24 months in all service areas	Good	Maintain
		Confidence level		Low	
		Data Consistency		Medium	
	Be fiscally responsible when delivering services.	2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department is providing good value for money when providing infrastructure and services.	Good	Maintain
		2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if they felt safe and comfortable accessing Hamilton Fire Department services.	Comfortable	Maintain
		Confidence level		Low	
		Data Consistency		Medium	
Function	Provide adequate fire protection services in accordance with municipality needs and circumstances.	2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department is meeting service needs overall	Exceeds Needs	Maintain
		Confidence level		Low	
		Data Consistency		Medium	
	Ensure Hamilton Fire Department can reliably respond to emergency calls within an acceptable timeframe.	2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department response times for an Effective Firefighting and Rescue Force are meeting service needs overall (Urban)	Meets Need (Less than 10 minutes desired)	Maintain
		2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department response times for an Effective Firefighting and Rescue Force are meeting service needs overall (Composite)	Does Not Meet Needs (Less than 10 minutes desired)	Maintain
		2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department response times for an Effective Firefighting and Rescue Force are meeting service needs overall (Rural)	Does Not Meet Needs (Less than 10 minutes desired)	Maintain
		Confidence level		Medium	
		Data Consistency		High	
Capacity	Ensure Hamilton Fire Department services are accessible to the public when required.	2023 Hamilton Fire Department City Services & Assets Review Survey	Average survey respondent opinion on if Hamilton Fire Department services are satisfied with their ability to be accessed overall	Neutral	Maintain
		Confidence level		Very Low	
		Data Consistency		Low	

4.3.1 CUSTOMER INDICES

The three indices calculated to assess how customer expectations are aligning with the perceived performance for Hamilton Fire Department are listed below in ***Table 14.*** These indices are explained and analyzed in detail in the sections below and will eventually be included for all assets (when available) in the overall measures in the Asset Management Plan Overview.

Table 14: Customer Indices

CUSTOMER INDICES	AVERAGE RESULT
Service Importance Versus Performance Net Differential	-5
Net Promoter Score (%)	62

As previously mentioned, since the survey had a sample size corresponding to a maximum medium confidence level there is a minimum margin of error throughout the survey results of 10%. In addition, approximately 87% of survey respondents had not used any aspect of Hamilton Fire Department's service, meaning that many of the results are based on public perception of the service and not a customer's experience of Hamilton Fire Department's performance. Therefore, it is difficult to make any conclusive decisions based on this survey alone. The information below is intended to provide context around the survey results to assist Hamilton Fire Department with areas to further investigate before proposing any new levels of service.

SERVICE IMPORTANCE VERSUS PERFORMANCE INDICE

The Service Importance versus Performance indices is used to determine if a service's importance correlates with the perceived performance. Service areas where the average importance rating exceeds the average performance rating by 20 points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale.

Per **Figure 8** below, the net differential does not exceed 20 points for any of services with a medium data consistency meaning that typically there is a match between the importance of the service and how Hamilton Fire Department is perceived to be performing in that aspect of the service. The services with the largest mismatch are the City Emergency Preparedness Program, Fire Prevention Public Education Programs, and Inspection and Fire Code Enforcement, which are areas were the Hamilton Fire Department could investigate improving performance if the fire department were to consider proposing different levels of service. To reduce the net differential, the Hamilton Fire Department would have to increase their performance to Very Good for these services, which they would accomplish by altering their Technical Levels of Service explained in ***Section 4.4***. However, since on average 87% of respondents had not used any aspect of the Hamilton Fire Department service, these results are based on the customer's perception of Hamilton Fire Department's 's performance, and not customer experience with Hamilton Fire Department performance.

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Figure 8: Importance versus Performance Index Score

Service Area	Importance (index score)	Performance (index score)	Net Differential	Opt Out %
Total	**86**	**80**	**-5**	**20%**
Fighting Fires	97	88	-8	9%
Rescue Operations	93	88	-4	11%
Response to Gas Leaks	90	86	-4	21%
Inspection and Fire Code Enforcement	88	78	-10	23%
Hazardous Materials Operations	88	80	-8	24%
City Emergency Preparedness Program	87	73	-14	23%
Fire Prevention Public Education Programs	87	75	-11	20%
Responses to Life-Threatening Medical Calls	83	83	0	10%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	79	74	-4	26%
Fire Station Tours, Fire Truck School, Visits	78	76	-2	23%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	74	73	-1	31%

NET PROMOTER SCORE INDICE

The Net Promoter Score indices outline how likely an individual is to recommend a service to another person and measures customer loyalty. For municipal services, this score is difficult to interpret because often individuals do not have many alternatives for utilizing different services and there may be internal biases for certain service areas, however, this score does provide valuable information for determining if customers would recommend using the service or whether they may seek alternatives or avoid using the service altogether.

Respondents who selected a score less than 4 are considered to be 'Detractors' meaning that they would not recommend the service. While scores of 5 are considered 'Promoters' who would recommend the service. Scores of 4 are considered 'Passive' which means they do not have strong feelings about the service and as such they are not considered in the Net Promoter score calculation. In addition, respondents who opted out by not answering or selecting 'Can't Say' were removed from the sample. The Detractor and Promoter scores were then converted to a percentage, and the Net Promoter Score was calculated by subtracting (% Detractors) from (% Promoters). The Standard Deviation (σ) is also calculated in a percentage, the same units as the Net Promoter Score.

Based on the results below in ***Figure 9,*** Hamilton Fire Department has a net positive net promoter score indicating that on average customers would recommend HFD services to others. The three lowest scoring aspects of the service are Fee-Based Services, City Emergency Preparedness Program, and Fire Permits.

Figure 9: Net Promoter Score (NPS)

Service Area	σ	NPS	Detractors	Passives	Promoter
All Service Areas	**20.87**	**62.18**	**96**	**75**	**535**
Fighting Fires	17.79	75.68	5	8	61
Rescue Operations	18.30	70.00	7	7	56
Hazardous Materials Operations	22.05	68.33	7	5	48
Response to Gas Leaks	17.74	66.67	7	8	51
Fire Station Tours, Fire Truck School, Visits	22.50	63.49	8	7	48
Fire Prevention Public Education Programs	20.96	62.12	10	5	51
Inspection and Fire Code Enforcement	18.81	60.32	9	7	47
Responses to Life-Threatening Medical Calls	24.44	60.00	11	8	56
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	19.99	55.36	10	5	41
City Emergency Preparedness Program	23.42	49.15	11	8	40
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	21.48	46.30	11	7	36

SERVICE RATES VERSUS VALUE FOR MONEY INDICE

The Service Rates versus Value for Money indice is used to determine if the rate an individual is paying for a service correlates with the perceived value for money. Service areas where rate level ratings exceed value for money ratings by 20 points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale. Positive Net Differential values indicate that 'Value for Money' was greater than willingness for 'Rates'. Low index scores in 'Rates' indicate that respondents are not willing to pay increased rates for the service area. All values were calculated and then rounded to the nearest whole number.

This indice was not measured for this iteration of the Hamilton Fire Department *Asset Management Plan.*

4.4 TECHNICAL LEVELS OF SERVICE

Technical levels of service are operational or technical measures of performance, which measure how the City plans to achieve the desired customer outcomes and demonstrate effective performance, compliance and management. The metrics should demonstrate how the City delivers its services in alignment with its customer values; and should be viewed as possible levers to impact and influence the Customer Levels of Service. The City will measure specific lifecycle activities to demonstrate how the City is performing on delivering the desired level of service as well as to influence how customers perceive the services they receive from the assets.

Technical service measures are linked to the activities and annual budgets covering Acquisition, Operation, Maintenance, and Renewal. Asset owners and managers create, implement and control technical service levels to influence the service outcomes.[3]

[3] IPWEA, 2015, IIMM, p 2|28.

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Table 15 shows the activities expected to be provided under the current 10-Year Planned Budget Allocation and the Forecast activity requirements being recommended in this Asset Management Plan. Currently, these values are estimated based on the budget, but were not perfectly delineated in the capital and operating budgets and forecasts and may change in future iterations of the plan.

Table 15: Technical Levels of Service

LIFECYCLE ACTIVITY	LEVEL OF SERVICE	ACTIVITY MEASURE	CURRENT ACTUAL PERFORMANCE (2022)	CURRENT TARGET PERFORMANCE (2022)	PROPOSED 10-YEAR PERFORMANCE
Acquisition	Ensure Hamilton Fire Department services are accessible to the public when required.	Number of new facility acquisitions	0	0	7
		Budget	**$0**	**$0**	**$81.5M**
Operation	Provide adequate fire protection services in accordance with municipality needs and circumstances.	% of Firefighters who have completed medical training (CPR/Dfib)	81%	75%	100%
		% of Firefighters who have completed Self Contained Breathing Apparatus training (mask drill)	87%	98%	98%
		% of Firefighters completed required annual FitTest (2022)	88%	98%	98%
		% of Ladder Truck Non Destructive Testing (safety testing)	100	100	100
		% of Pump Tests	100	100	100
		Average # of days to close a file (inspections) to bring properties	33.71	35	35

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LIFECYCLE ACTIVITY	LEVEL OF SERVICE	ACTIVITY MEASURE	CURRENT ACTUAL PERFORMANCE (2022)	CURRENT TARGET PERFORMANCE (2022)	PROPOSED 10-YEAR PERFORMANCE
Operation		into compliance for files that are one specific high priority type (i.e., Action Requests: fire suppression action requests as coded in the records management system)			
		Average # of days to assign/respond Action Request type files.	3.55	3	3
		% Vulnerable occupancy inspections (in 2022 there were 124 vulnerable occupancy buildings, and all were inspected)	100%	100%	100%
		Budget	**$178K (2023)**	**Not yet quantified**	
	Ensure Hamilton Fire Department can reliably respond to emergency calls within an acceptable timeframe.	Overall effective firefighting and rescue force composite response times (mins)	15.87	< 18.89	< 18.89
		Overall effective firefighting and rescue force urban response times (mins)	9.7	< 10.9	< 10.9

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LIFECYCLE ACTIVITY	LEVEL OF SERVICE	ACTIVITY MEASURE	CURRENT ACTUAL PERFORMANCE (2022)	CURRENT TARGET PERFORMANCE (2022)	PROPOSED 10-YEAR PERFORMANCE
		Overall effective firefighting and rescue force rural response times (mins)	20.51	< 20.75	< 20.75
	Be fiscally responsible when delivering services.	Actual Operating Expenditures vs Planned Budget	101%	90 – 100%	90 – 100%
		Budget	**$96.1M (2022)**	**Not yet quantified**	
Maintenance	Ensure Hamilton Fire Department assets are maintained in acceptable condition.	Average downtime for Vehicles sent for repairs in 2022 (in days)	Not yet measured	Not yet measured	Not yet measured
		Average days vehicles sent out for warranty repairs	Not yet measured	Not yet measured	Not yet measured
		Vehicles hitting maintenance targets	Not yet measured	Not yet measured	Not yet measured
		Budget	**Not yet quantified**		
Renewal	Ensure Hamilton Fire Department assets are maintained in acceptable condition.	Average Facility Condition Index of Fire Occupied Stations	8.9%	Currently no target	Currently no target
		Budget	$808K (2023)	Not yet quantified	
		% of in-service vehicles over replacement frequency target	26%	Currently no target	Currently no target
		Budget	$5.2M (2023)	$5.2M (2023)	$37.9M (2023 – 2032)

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It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on existing resource provision and work efficiencies. It is acknowledged changing circumstances such as technology and customer priorities will change over time.

It is important to note that these metrics were created specifically for this 2023 Asset Management Plan with available data and some of these metrics are not yet being measured. Many of these metrics should be improved to include a target to be in line with SMART objectives identified on **Page 43** of the Asset Management Plan Overview. The Hamilton Fire Department will work to improve upon their lifecycle platforms by working towards the creation of one tool that will track performance metrics. This has been identified as continuous improvement items in ***Table 28.***

4.5 PROPOSED LEVELS OF SERVICE DISCUSSION

It is evident per ***Table 15*** that Hamilton Fire Department is often meeting technical standards with some exceptions. However, customer preferences and expectations do not always match internal technical targets. Since the confidence level associated with the survey is a maximum of medium, and most survey respondents were not actual users of the service, it is difficult to make any conclusive decisions based on this initial survey. Therefore, Hamilton Fire Department will need to collect more consumer data before proposing any new levels of service. Therefore, it has been assumed in the interim that the current levels of service will be the proposed levels of service moving forward past 2025 in accordance with O. Reg 588/17.Therefore, the information below is intended to provide context to direct Hamilton Fire Department to areas for further investigation before proposing any new levels of service.

In addition, as previously mentioned, many of Hamilton Fire Department's asset customers are internal customers (e.g. staff) as they are the main users of fire department assets. For this first iteration of the Asset Management Plan the focus was on external customers (i.e., the Public), and as a result there are some gaps in the information below with respect to internal customers. This has been identified as a continuous improvement item in ***Table 28***.

CONDITION / QUALITY

Based on the Customer Levels of Service **Table 13** and Technical Levels of Service **Table 15**, it is evident that typically customer expectations match Hamilton Fire Department's service levels.

Survey respondents thought that Hamilton Fire Department had good performance overall and they felt comfortable using Hamilton Fire Department's services. Hamilton Fire Department's technical targets indicate that fire department hit most of their training, testing, and inspection targets for 2022 showing a match in customer expectations and technical targets.

In terms of providing good value for money, customers rated that the Hamilton Fire Department provided good value for money, and when comparing that to technical levels of service, there is only a 1% budget variance in 2022 showing a match in customer expectations and technical targets.

As previously mentioned, the Hamilton Fire Department does not yet have an internal survey to survey internal staff on the condition of assets, and the fire department does not yet have measures or targets for maintaining assets in acceptable condition. This has been identified as a continuous improvement item in ***Table 28.***

FUNCTION

Survey respondents thought that the Hamilton Fire Department was exceeding service needs overall. However, when asked about response times, there was a mismatch in customer expectations and fire department service delivery.

The Hamilton Fire Department measures their response times by how quickly they can respond on site as an Effective Firefighting and Rescue Force. It is important to note that an Effective Firefighting and Rescue Force is distinctly different from the first truck on scene. An Effect Firefighting and Rescue Force refers to having a minimum of four fire trucks and 16 firefighters on site and includes the time for dispatchers to receive the call, gather information and alert fire stations, as well as for firefighters to dress in protective clothing, board fire trucks, and then travel from the fire station to the emergency scene. Depending on where the emergency is in the City (i.e. urban, composite, rural), the response model may involve career firefighters who are stationed at the station and can immediately respond, or composite or volunteer models where firefighters need to travel to the station to respond.

Per **Table 13,** regardless of location in the City, customers expected the Hamilton Fire Department to respond as an effective firefighting and rescue force in less than 10 minutes. Currently, per **Table 15**, urban models are meeting that expectation at 9.7 minutes, but their target is currently just over 10 minutes (90th percentile of 10.9 minutes). In areas of the City rated for composite or volunteer models, the Hamilton Fire Department's targets are a 90th percentile of 18.89 and 20.75 minutes respectively. Therefore, if the Hamilton Fire Department were to propose a different level of service, this is an area where the focus should be. However, it is difficult to make this decision with the limited customer data available in this Asset Management Plan.

Although rural areas typically have a longer effective firefighting and rescue force time, the Hamilton Fire Department has worked to provide rural areas with an adequate level of service. Rural areas in the City do not have fire flow as part of their water system, but the Hamilton Fire Department has worked to receive "Superior Tanker Shuttle" accreditation by Fire Underwriter Survey for the non-hydrant areas in the City, which is considered as equivalent to hydrant protection. This means that rural areas are paying the same in fire insurance as urban areas with hydrants.

CAPACITY

Customers rated their satisfaction with their ability to access services as predominately neutral but were instructed to choose "Can't Say" if they had not used the service. Based on this stipulation, it became apparent that 87% of survey respondents had not used the service, and therefore these results have a very low confidence level.

The Hamilton Fire Department is currently working toward acquiring additional assets such as Waterdown Station as well as expanding and/or renovating existing stations which are indicated in **Section 8.1**. This may result in changes to the current levels of service which are difficult to quantify at this time, but the intent of these projects is to maintain the current levels of service, and it is not anticipated these acquisitions will affect the Hamilton Fire Department's response model.

5. FUTURE DEMAND

Demand is defined as the desire customers have for assets or services and that they are willing to pay for. These desires are for either new assets/services or current assets.

The ability for the City to be able to predict future demand for services enables the City to plan and identify the best way of meeting the current demand while also being responsive to inevitable changes in demand. Demand will inevitably change over time and will impact the needs and desires of the community in terms of the quantity of services (assumption of assets due to service needs) and types of service required (e.g., Next Generation 911).

5.1 DEMAND DRIVERS

For the Hamilton Fire Department service area, the key drivers are population change, and technological changes.

- Demographic Shift
  - Per the Asset Management Plan Overview, Hamilton's population will continue to grow to 2051, and per the HFD 10 Year Service Delivery Plan, it is evident that Hamilton's demographics will also continue to shift to 2028. The Hamilton Fire Department determine their vehicle and staffing requirements using community risk because typically responses are behaviour based and is pursuant to the Establishing and Regulating By-law 19-034 and the Fire Protection and Prevention Act, 1997.

- Technological Changes:
  - At this time, the Canadian Radio-Television and Telecommunications Commission (CRTC) has mandated that all municipalities replace Canada's aging E911 emergency services network and cutover to the new Next Generation-911 (NG-911) platform by March 4, 2025, this is a large change that the Hamilton Fire Department as well as Hamilton Police and Hamilton Paramedics Services have been preparing for with the assistance of the Information Technology division.

  - The Building Stock is currently changing. Newer buildings burn hotter and faster due to material changes. In addition, vertical combustible buildings used to be limited to 4-storeys before requiring fire resistant materials (i.e., concrete), and now the building code has changed to allow five and six-storey buildings to be built with these materials. As customer preference for the "vertical city" continues, more of these buildings will continue to be built.

- Legislative Changes
  - Office of Fire Marshal of Ontario is now dictating that all Hamilton Fire Department staff require official certification to National Fire Protection Association (NFPA) standards whereas before there was no official certification process in Ontario.

A continuous improvement item identified in **Table 28** is to align the Asset Management Demand Drivers work with the data and community risks identified in core Hamilton Fire Department planning documents.

5.2 DEMAND FORECASTS

The present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented in ***Table 16***. Growth projections have been shown on ***Page 45*** in the AM Plan Overview document.

Where costs are known, these additional demands as well as anticipated operations and maintenance costs have been encompassed in the Lifecycle Management Plans in **Section 8.0.**

5.3 DEMAND IMPACT AND DEMAND MANAGEMENT PLAN

The impact of demand drivers that may affect future service delivery and use of assets are shown in ***Table 16.*** Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices can include non-asset solutions, insuring against risks, and managing failures.

Opportunities identified to date for demand management are shown in ***Table 16.*** Climate change mitigation and adaptation demands are included in **Section 7.0**. Many of these demands are difficult to predict at this time and therefore they are not included in the Lifecycle Management Plan. This has been identified as a continuous improvement item in ***Table 28*****.**

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Table 16: Demand Management Plan

DEMAND DRIVER	CURRENT POSITION	PROJECTION	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Demographic Shift: Community Risk Profile Change **Demographic Shift: Community Risk Profile Change**	570,000	820,000 (2051)	Increased number of incidents/ responses. Type of development may alter the relative risk profile which would drive a change in service delivery (i.e., a change from volunteer to composite, composite to fulltime etc.). In addition, growth may lead to increased traffic affecting response times.	Update emergency response procedures for higher risk occupancies based on the Hazzard Identification and Risk Assessment and the Community Risk Assessment. Investigate change of level of response in key areas. Construct a new station in Waterdown and relocate fulltime Hamilton Fire Department resources from existing Parkside location. Increase number of volunteer firefighters at volunteer stations.
Technological Change: Building Stock	Majority of buildings built using traditional materials	Building stock changing to new building materials, and vertical buildings now being permitted to be constructed with light construction.	Increased risk for fires and property damage impacting services of suppression, prevention, and inspections.	Conduct pre-tactical surveys of all risk occupancies and store these in an Hamilton Fire Department database currently being collected during Community Risk Assessment.

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DEMAND DRIVER	CURRENT POSITION	PROJECTION	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Legislative Change: Office of Fire Marshal of Ontario (OFM)	Training followed National Fire Protection Association standards, but no formal certification.	Ontario Fire Marshal recognize and require full certification as per National Fire Protection Association criteria.	Impact on staffing requirements and training needs.	Proposed business case is being brought forward in 2024 for more training staff.
Legislative Change: Paramedic Vehicles	Ambulances need inspection every. 10,000 km or 120 day whichever occurs first and every 12 months there is an Ministry of Transportation inspection which we try to do concurrently with a 10k inspection.	Ambulances need inspection every 10,000 kms	Impact on mechanical staffing and asset requirements.	Proposed business case is being brought forward in 2024.
Technological & Legislative Change: Next Generation (NG)-911	Legacy 911	New proposed NextGeneration-911 from Canadian Radio-television and Telecommunications Commission (CRTC).	Requires change out for technology to process emergency calls. Significant changes to facilities: primary and secondary site required.	Staffing study should be conducted to quantify operating requirements for New Generation-911 technology. Modifications and upgrades are currently being investigated.

DEMAND DRIVER	CURRENT POSITION	PROJECTION	IMPACT ON SERVICES	DEMAND MANAGEMENT PLAN
Customer Preference: Light Rail Transit	Status quo road width on Main and King St.	Road width reduced on Main and King St.	May impact response times because fire apparatus will not be able to maneuver as quickly.	Investigate changing fire apparatus specifications.

5.4 ASSET PROGRAMS TO MEET DEMAND

The new assets required to meet demand may be acquired, donated or constructed. For HFD, typically assets are acquired or constructed.

At this time there are approximately **$90.2 Million** in assets acquired over the next 10 years as discussed in **Section 8.1**. Acquiring new assets will commit the Hamilton Fire Department to ongoing operations, maintenance and renewal costs for the amount of time that the service is required. These future costs have been estimated when possible using available information in the Lifecycle Management Plans in **Section 8.0**, but should be quantified further for future iterations of the report for consideration in developing higher confidence forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan.

6. RISK MANAGEMENT

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'4[4].

The City has released a formalized risk assessment process to identify risks associated with service delivery and to implement proactive strategies to mitigate risk to tolerable levels. The risk assessment process identifies credible risks associated with service delivery and will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process also identifies the likelihood of those risks occurring, and the consequences should the event occur which calculates a risk rating. Risk options are then evaluated, and a risk treatment plan is created which will be initiated after the release of this plan and has been identified as a continuous improvement item in ***Table 28.***

6.1 CRITICAL ASSETS

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified, and along with their typical failure mode, and the impact on service delivery, are summarized in **Table 25**. Failure modes may include physical failure, collapse or essential service interruption.

By identifying critical assets and failure modes, an organization can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

It is important to note that the Hamilton Fire Department's critical assets have several existing risk controls built in and it is unlikely that these assets would approach the failure modes or impacts identified below. The credible risks associated with these assets which were identified during this iteration of the AM Plan have been presented in **Section 6.2.**

Table 17: Critical Assets

CRITICAL ASSET(S)	FAILURE MODE	IMPACT
Dispatch System	Essential Service Interruption	Loss of essential communications service.
Emergency Response Vehicles	Physical Failure	Increased response time due to not enough capacity.

[4] ISO 31000:2009, p 2

CRITICAL ASSET(S)	FAILURE MODE	IMPACT
Personal Protective Equipment	Physical Failure	Injury or death to firefighter on duty.
Apparatus Equipment	Physical Failure	Inability to fulfill purpose during emergency situation.
Facilities	Physical Failure	Loss of essential service.

6.2 RISK ASSESSMENT

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in **Table 18**. It is essential that these critical risks and costs are reported to management.

A continuous improvement item in ***Table 28*** is to identify more existing controls for fire apparatus, which could involve or impact staffing levels to maintain and operate this asset AND the process of acquisition and/or renewal of this asset.

Table 18: Risks and Treatment Plans
Note * The Residual Risk Is The Risk Remaining After The Selected Risk Treatment Plan Is Implemented.

SERVICE OR ASSET AT RISK	WHAT CAN HAPPEN	RISK RATING	RISK TREATMENT PLAN	RESIDUAL RISK *	TREATMENT COSTS
Vehicles	Asset delivery delays due to supply chain issues with vendors and impacts to fleet.	High	Investigate procurement process to reduce barriers for emergency services acquisitions.	Medium	Internal Resources
Mechanical Facility	Potential service disruption due to poor condition facility	High	Acquire mobile mechanical unit. Investigate back-up location. Investigate future new facility.	Medium	$600,000 (mobile mechanical unit) $14.5M estimated for future new facility from 2028-2032

6.3 INFRASTRUCTURE RESILIENCE APPROACH

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions the City needs to understand its capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience covers the capacity of the City to withstand any service disruptions, act appropriately and effectively in a crisis, absorb shocks and disturbances as well as adapting to ever changing conditions. Resilience is built on aspects such as response and recovery planning, financial capacity, climate change risk, assessment and crisis leadership.

We do not currently measure our resilience in service delivery and this will be included in the next iteration of the Asset Management Plan.

6.4 SERVICE AND RISK TRADE-OFFS

The decisions made in Asset Management Plans are based on the objective to achieve the optimum benefits using the available resources. Currently the Hamilton Fire Department does not have any service or risk trade-offs to report.

7. CLIMATE CHANGE AND MITIGATION

Cities have a vital role to play in reducing the emission of greenhouse gases (mitigation), as well as preparing assets for the accelerating changes we've already begun to experience (adaptation). At a minimum the City must consider how to manage our existing assets given potential climate change impacts for our region.

Changes to Hamilton's climate will impact City assets in the following ways:

- Affect the asset lifecycle;
- Affect the levels of service that can be provided and the cost to maintain;
- Increase or change the demand on some of our systems; and,
- Increase or change the risks involved in delivering service.

To quantify the above asset/service impacts due to climate change in the Asset Management Plan, climate change is considered as both a future demand and a risk for both mitigation and adaptation efforts. These demands and risks should be quantified and incorporated into the lifecycle models as well as levels of service targets.

If climate change mitigation/adaptation projects have already been budgeted, these costs have been incorporated into the lifecycle models. However, many asset owners have not yet quantified the effects of the proposed demand management and risk adaptation plans described in this section. As such, associated levels of service and costs will be addressed in future revisions of the plan. This has been identified as a Continuous Improvement item in ***Table 28***.

7.1 CLIMATE CHANGE MITIGATION

Climate Mitigation refers to human intervention to reduce Green House Gas emissions or enhance Green House Gas removals (e.g. electric vehicles, net-zero buildings). The City of Hamilton's Community Energy + Emissions Plan (Community Energy + Emissions Plan includes five Low-carbon Transformations necessary to achieve the City's target of net-zero Green House Gas emissions by 2050:

- Innovating our industry;
- Transforming our buildings;
- Changing how we move;
- Revolutionizing renewables; and,
- Growing Green.

MITIGATION DEMAND ANALYSIS

These transformations were incorporated into the climate mitigation demand analysis for this service area by:

- Identifying the City's modelled targets for the low carbon transformations that applied to the service/asset;

- Discussing the impact the targets would have on the service/asset; and,
- Proposing a preliminary demand management plan for how this modelled target will be achieved by 2050.

As previously mentioned, due to the high level of uncertainty with the demand management plans for climate change, the cost of the demand impacts below are not included in the lifecycle models or levels of service at this time unless they were previously identified. The demand management plans discussed in this section should be explored by asset owners in more detail following the AM Plan, and new projects should incorporate Green House Gas emissions reductions methods, and changes which will be incorporated into future iterations of the AM Plan. This has been identified as a continuous improvement item in ***Table 28*****.**

Moving forward, the Climate Lens tool discussed in the Asset Management Plan Overview will assess projects based on these targets and will assist with the prioritization of climate mitigation projects.

Since the Hamilton Fire Department possesses Facilities and Vehicles, the transformations that relate to *transforming our buildings*, *changing how we move, growing green, and revolutionizing renewables* are the key modelled targets that the Hamilton Fire Department will have to accommodate as shown in ***Table 19*** below.

Table 19: Asset Climate Mitigation Projects

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	IMPACT TO SERVICE/ASSET	DEMAND MANAGEMENT PLAN
Transforming our buildings	By 2050, all new municipal buildings achieve net-zero emissions.	Higher initial capital cost for net zero facilities. Conversion to heat pump may not be feasible and may be costly.	Newest station (Waterdown) will be built using net-zero and LEED principles. Similar new build standards will use Waterdown Station as example. Other facilities will need to be assessed to figure out the feasibility of the proposed conversion. Funding will need to be acquired to retrofit buildings. Staff will need to be trained on new systems.
	By 2050, all municipal buildings are retrofitted to achieve 50% energy efficiency relative to 2016.		
	Post-retrofits, switch buildings to heat pumps for space and water heating by 2050.		

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CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	IMPACT TO SERVICE/ASSET	DEMAND MANAGEMENT PLAN
Changing how we move	100% of new municipal small and light-duty vehicles are electric by 2040. 100% of new municipal heavy-duty vehicles switch to clean hydrogen by 2040.	Significant challenges to navigate to ensure redundancy and resiliency of fire's fleet and maintaining levels of service alongside venturing into new technology. Electric Vehicle Chargers will need to be installed at all Fire Facilities, and electricity grid capacity will need to be investigated. Compensation for staff who charge City vehicles at home will need to be considered. Initial upfront capital costs for electric vehicles will be higher. National Fire Protection Association committee has not considered green vehicles in the standard	Review of business case for changing all or certain % of light-duty vehicles to electric as they age-out of the fleet and determine full-life cycle costs. Direction from the National Fire Protection Association for heavy-duty vehicles solutions will be required. Staff anticipate the following: capital and operating cost will be higher, implementation will require phases and review of risks and costs, operating costs will need to consider setting up mechanical support, training, and education/certification to maintain new types of vehicles.
Growing Green	Planting 50,000 trees a year through 2020	Adding trees may add more operating costs	Review existing facilities to determine which ones could be potential options for additional trees. For any new facilities' trees will be incorporated into the plans.
Revolutionizing renewables	By 2050, 50% of municipal buildings will add rooftop solar PV, covering 30% of	Not all facilities are a fit for rooftop solar PV and may be costly to add.	Determine timing to start reviewing potential facilities and costs to add rooftop solar PV to existing or yet to be built

CLIMATE CHANGE MITIGATION TRANSFORMATION	MODELLED TARGET	IMPACT TO SERVICE/ASSET	DEMAND MANAGEMENT PLAN
	the building's electrical load.		facilities. Work with utility provider to ensure grid feasibility.

MITIGATION RISK ANALYSIS

Since the Hamilton Fire Department's vehicle assets are critical assets to deliver their service and the technology available is currently untested, there are risks associated with applying the *"changing how we move*" climate mitigation transformation. These risks are outlined below in ***Table 20*** and refer to the potential risks if the Hamilton Fire Department were to proceed with the above identified "*changing how we move*" climate mitigation projects.

Table 20: Adapting to Climate Change

CLIMATE MITIGATION TRANSFORMATION	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT CAN HAPPEN	RISK RATING	RISK ADAPTATION PLAN
Changing how we move	**Response Vehicles**	Green Apparatus could be unreliable in Canadian climate and fire apparatus must be reliable.	Medium	Ensure any acquired vehicles are tested in Canadian climates and endorsed by National Fire Protection Agency.
Changing how we move	**Response Vehicles**	Electric vehicle fires can occur and be more difficult to put out than gas vehicles.	Medium	Create/implement procedures for extinguishing electric vehicle fires including fire apparatus.
Changing how we move	**Response Vehicles**	May not be able to adjust battery/intake on green apparatus to tolerate high water levels.	Medium	Prior to acquiring green apparatus, ensure the specifications allow for this capability.

CURRENT MITIGATION PROJECTS

The Hamilton Fire Department is currently working toward climate mitigation goals. Mitigation projects the Hamilton Fire Department is currently pursuing are outlined below in ***Table 21***. The Waterdown Station project is included in the budget and quantified in the lifecycle models, but the fire apparatus anti-idling technology funding request has not yet been approved at the time of writing.

Table 21: Asset Climate Mitigation Projects

PROJECT	CLIMATE CHANGE MITIGATION TRANSFORMATION	PROJECT DESCRIPTION	CLIMATE CHANGE IMPACT
New Waterdown Station Construction	Transforming our buildings	Proposed Waterdown Station specifications call for Net Zero design.	Reduce emissions associated with facility operation.
Fire Apparatus Anti-Idling Technology Funding Request	Changing how we move	Funding has been requested from the City of Hamilton's Climate Change Reserve to install new battery powered Auxiliary Power Units which would allow Fire Apparatus to idle using battery power instead of diesel. The Hamilton Fire Department currently has over 50 apparatus that could be converted to employ this anti-idling technology.	Unlike diesel-powered Auxiliary Power Units, battery powered units emit zero Green House Gas emissions. On an annual basis, using battery powered Auxiliary Power Units to eliminate 2hrs of idling per day would result in a reduction of 40,000 lbs. of greenhouse gas emissions per vehicle. Over the lifespan of a fire apparatus (20 years), this equates to 800,000 lbs. fewer Green House Gas emissions.

CLIMATE MITIGATION DISCUSSION

At this time, the Hamilton Fire Department has already made progress toward some of the modelled target transformations as discussed below.

CHANGING HOW WE MOVE

Currently, this modelled target is a challenge for the Hamilton Fire Department because of the specific requirements for the Hamilton Fire Department vehicles. As discussed in ***Table 21***, there are currently no reliable clean fuel options for heavy response vehicles, resulting in a lot of unknowns for what infrastructure will be required for these vehicles and the potential lifecycle cost. It is anticipated that over the next decade with provincial mitigation targets, that more information will become available to assist with planning purposes, but at this time replacement costs for vehicles in the lifecycle models are based on the existing 2022 cost for gas powered vehicles. A continuous improvement item identified in **Table 28** is to review the feasibility and costs of switching Fire's heavy-duty apparatus to clean hydrogen or other clean source.

TRANSFORMING OUR BUILDINGS & GROWING GREEN

the Hamilton Fire Department is beginning to move toward the *Transforming our Buildings* targets. As shown in **Table 21**, the proposed Waterdown Station is currently being designed to Net Zero standards which is in line with the City facility's net-zero 2050 target, but at this time the total costing associated with this is unknown and will be subject to Council approval.

Finally, the Growing Green transformation, which will involve planting trees, will eventually be incorporated as part of the Facilities' initiatives as discussed in **Table 19**.

7.2 CLIMATE CHANGE ADAPTATION

Climate Adaptation refers to the process of adjusting to actual or expected climate and its effects (e.g. building facilities that can handle new climate loads).

The impacts of climate change may have a significant impact on the assets we manage and the services they provide. Climate change impacts on assets will vary depending on the location and the type of services provided, as will the way in which those impacts are responded to and managed.[5]

In 2021, the City of Hamilton completed a Vulnerability and Risk Assessment Report guided by ICLEI's Building Adaptive and Resilient Communities (BARC) Framework as part of the Climate Change Impact Adaptation Plan (CCIAP) (ICLEI, 2021). The BARC Framework identified thirteen high impact areas.

ADAPTATION DEMAND ANALYSIS

The impact areas were incorporated into the climate change adaptation analysis for this service area by:

- Identifying the asset specific adaptation impact statements that affected the service areas;

[5] IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure

- Discussing the potential impacts on the asset/service using the projected change in climate using the RCP4.5 Scenario; and,
- Proposing preliminary demand management plans to adapt to these impacts.

It is important to note that due to the high level of uncertainty with the demand management plans, the cost of the demand impacts below have not been included in the lifecycle and financial models at this time. The demand management plans discussed in this section should be explored by asset owners in more detail following the Asset Management Plan, and new projects should consider these adaptation impacts during the planning and design processes. Once the demand management plans are finalized, the information will be incorporated into future iterations of the Asset Management Plan. This has been identified as a continuous improvement item in ***Table 28*.**

Moving forward, a Climate Lens tool is currently being developed which will assess projects based on these targets and will assist with the prioritization of climate adaptation projects.

The adaptation impact statements identified by the Hamilton Fire Department staff which will have a potential impact on assets and services include temperature increases, and ice storms as shown in ***Table 22*** below.

Table 22: Managing the Demand of Climate Change on Assets and Services

ADAPTATION IMPACT STATEMENT	BASELINE** * (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
Dryer, hotter and longer summers may affect the health and safety of local vulnerable populations.	71.6 days average length of hot season	102 days average length of hot season	Dryer and hotter summers could increase risk of outdoor grass fires and provincial impacts of forest fires outside of Hamilton resulting in fire bans due to air quality, which results in higher calls and potential enforcement for open burn.	Continue to track trends and review through the 2024 Community Risk Assessment that captures these trends and then changes would be proposed through the potential revisions to the 10-year Fire Service Delivery Plan in 2024/2025. Impacts to costs

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ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
More frequent and intense heatwaves will increase instances of heat-related health and safety issues, particularly for households without access to reliable air-conditioning and the homeless	2.1 average annual heat waves	4.7 average annual heat waves	Heat advisories impact staff activities (i.e. training). The 2022 Hazard Identification Risk Assessment identified extreme heat as a Moderate risk for Hamilton.	could include need for additional staffing for prevention and enforcement of bans and emergency response as fires in summer increase. Urban interface vehicles, all-wheel drive (brush trucks) meant to have capacity to go off road to assist with wild land firefighting. Will continue to investigate capability.
Changes in the frequency of extreme rainfall events will result in increased instances of flooding on private and public properties.	6.7 total heavy precipitation days (20 mm)	7.7 total heavy precipitation days (20 mm)	Flooding on roads will impact routes to respond to various emergencies. Increased flooding may result in higher number or severity of water-rescue emergencies. The 2022 Hazard Identification Risk Assessment identified flooding as a Moderate risk for Hamilton.	Begin tracking roads/routes that are regularly impacted by flooding to determine (where possible) alternate routes. Determine mechanism where Dispatch can be made aware of roads that are significantly flooded/impacted.

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ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
Changes in precipitation resulting in resulting in erosion of natural systems (i.e. water banks, escarpment erosion) leading to washouts of bridges and roadways.	844 mm average annual total precipitation	886 mm average annual total precipitation	Erosion was identified by Fire in its 2022 Hazard Identification Risk Assessment as a top 10 hazard in Hamilton with a moderate risk. Increased erosion will impact routes/roads. Increased erosion may also impact the number, frequency, and severity of rope rescue incidents.	Consider impact to costs related to training, staffing, and apparatus/equipment as frequency increases.
Increased intensity and frequency of ice storms leading to increased hazardous roads, pathways, and sidewalk conditions.	187 mm average total winter precipitation	204 mm average total winter precipitation	Increased intensity and frequency of ice storms will directly impact the number, frequency and severity of vehicle accidents Fire responds to.	Continue to track trends and review through the 2024 Community Risk Assessment that captures these trends and then changes would be proposed through the potential revisions to the 10-year Fire Service Delivery Plan in 2024/2025. Consider impact to costs related to training, staffing, and apparatus/equipment

ADAPTATION IMPACT STATEMENT	BASELINE** (1976 - 2005)	AVERAGE PROJECTED** CHANGE IN 2021-2050 (ASSUMING RCP4.5* SCENARIO)	POTENTIAL IMPACT ON ASSETS AND SERVICES	DEMAND MANAGEMENT PLAN
				as frequency increases.

***RCP4.5 Scenario: Moderate projected Green House Gas concentrations, resulting from substantial climate change mitigation measures. It represents an increase of 4.5 W/m2 in radiative forcing to the climate system. RCP 4.5 is associated with 580-720ppm of CO2 and would more than likely lead to 3°C of warming by the end of the 21st century.
****Baseline and Projected numbers based on 2021 Climate Science Report.

ADAPTATION RISK ANALYSIS

Additionally, the City should consider the risks for the asset or service as a result of climate change and consider ways to adapt to reduce the risk. Adaptation can have the following benefits:

- Assets will withstand the impacts of climate change;
- Services can be sustained; and,
- Assets that can endure may potentially lower the lifecycle cost and reduce their carbon footprint.

Similar to the exercise above and using the risk process in Section 1.6, asset owners:

- Reviewed the likelihood scores in the Vulnerability and Risk Assessment Report for the adaptation impact occurring;
- Identified the consequence to the asset/service if the event did happen to develop a risk rating; and,
- If the risk was identified as high, the asset owner came up with a preliminary risk adaptation plan shown below in ***Table 23.***

It is important to note that due to the high level of uncertainty with the climate change risk adaptation plans, the cost of the mitigating the risks below have not been included in the lifecycle and financial models at this time. The adaptation plans discussed in this section should be explored by asset owners in more detail following the Asset Management Plan, and new projects should consider these risks during the planning and design processes. Future changes will be incorporated into future iterations of the Asset Management Plan. Moving forward, the Climate Lens tool will assess projects based on these targets and will assist with the prioritization of climate adaptation projects.

Table 23: Adapting to Climate Change

ADAPTATION IMPACT STATEMENT	SERVICE OR ASSET AT RISK DUE TO IMPACT	WHAT CAN HAPPEN	RISK RATING	RISK ADAPTATION PLAN
Changes in precipitation resulting in resulting in erosion of natural systems (i.e. water banks, escarpment erosion) leading to washouts of bridges and roadways.	Emergency Response	Increased escarpment erosion may impact routes/roads.	Medium	Investigate planning routes in the event of sudden escarpment closures.
Changes in the frequency of extreme rainfall events will result in increased instances of flooding on private and public properties.	Emergency Response	Increased flooding	Medium	Investigate training staff on swift/open water rescue and potentially acquiring equipment.

CURRENT ADAPTATION PROJECTS

The Hamilton Fire Department completed a past climate change adaptation specific project which is identified below. The impact of climate change on assets and how the City will adapt is a new and complex discussion and further opportunities will be developed in future revisions of this Asset Management Plan.

Table 24: Asset Climate Mitigation Projects

PROJECT	ADAPTATION IMPACT STATEMENT	PROJECT DESCRIPTION OF CLIMATE CHANGE ADAPTATION
Fire Apparatus Intake Specification	Changes in the frequency of extreme rainfall events will result in increased instances of flooding on private and public properties.	Hamilton Fire Department apparatus have been customized since the early 2000s. The height for intake has been modified to be high mounted to reduce vehicle damage when going through high water. This was completed because the Hamilton Fire Department was experiencing challenges with City roads flooding in the past.

CLIMATE ADAPTATION DISCUSSION

INCREASED TEMPERATURE

There are many projections related to increased temperature with include heat waves, rising temperatures, increase in average temperatures, and longer summers. One demand result of hot weather is an increase in emergency response. As stated in ***Table 22***, one of the Adaptation Impact Statements shows that hot weather affects health and safety for households without access to reliable air-conditioning and unhoused individuals. During these events, this would lead to an increase in calls for emergency services. The Hamilton Fire Department and other emergency services should investigate this correlation to ensure appropriate staff and assets are available as the climate continues to shift.

Another demand result is an increase in grass fires. Urban interface vehicles with all-wheel drive capability (i.e. brush trucks) are being investigated to assist with wild land firefighting.

INCREASE IN PRECIPITATION LEADING TO EROSION AND FLOODING

Increased precipitation may lead to flooding and erosion of the escarpment which may impact routes/roads for emergency vehicle response. As mentioned in ***Table 24***, apparatus have been modified to be high mounted to reduce vehicle damage when going through high water, but there is currently no solution for potential erosion issues, which should be investigated following this Asset Management Plan.

Increase erosion and may also impact the number, frequency, and severity of rope rescue incidents. The Hamilton Fire Department and other emergency services should investigate this correlation to ensure appropriate staff and assets are available as the climate continues to shift.

INCREASE IN ICE STORMS

An increase in ice storms can lead to increased motor vehicle collisions and power outages throughout the City which can lead to more emergency response calls. Ice storms could also increase motor vehicle collisions for the Hamilton Fire Department Vehicle assets and availability of staff. The Hamilton Fire Department should investigate this correlation to ensure that appropriate staff and assets are available as climate change continues to affect the service.

8. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the City plans to manage these assets at the agreed levels of service and at the accepted lifecycle costs while excluding inflationary values. The costs included in the lifecycle management plan includes costs from both the Capital and Operating budgets. Asset management focuses on how taxpayer or ratepayer dollars are invested by lifecycle stage (i.e., acquisition, operations, maintenance, renewal, disposal), and not by capital or operating budget allocation. Since both budgets contain various asset activities within different lifecycle stages, these activities have been consolidated and separated by lifecycle stage in this section.

As a result of this new process, there may be some areas where the budget was not able to be broken down perfectly by lifecycle stage. Future Asset Management Plans will focus on improving the understanding of Whole Life Costs and funding options. However, at this time the plan is limited on those aspects. Expenditure on new assets and services will be accommodated in the long-term financial plan but only to the extent that there is available funding. A continuous improvement item included in ***Table 28*** is to modify the budget sheets to incorporate lifecycle stages so that the results can be more accurate in the next iteration of the plan.

At the time of writing, the following budgets were used to develop the budget component of the lifecycle management plan:

- the Hamilton Fire Department maintains a Capital forecast budget for 10 years into the future for asset renewals, acquisitions, and major maintenance activities for vehicle and equipment assets;
- the Hamilton Fire Department also maintains a four-year multi-year operating budget which is revisited annually which typically contains operations, minor maintenance, and minor renewal activities;
- Corporate Facilities & Energy Management maintains a 10-year capital forecast budget for Hamilton Fire Department Facility maintenance and deliver citywide programs to replace major facility components (e.g. roof replacements) which sometimes include fire department facilities. These budget amounts have been included where known; and
- The remainder of the 30-year forecast budget was either assumed based on the status quo or the 10-year average.

8.1 ACQUISITION PLAN

Acquisition reflects new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its current capacity. They may result from growth, demand, legal obligations or social or environmental needs.

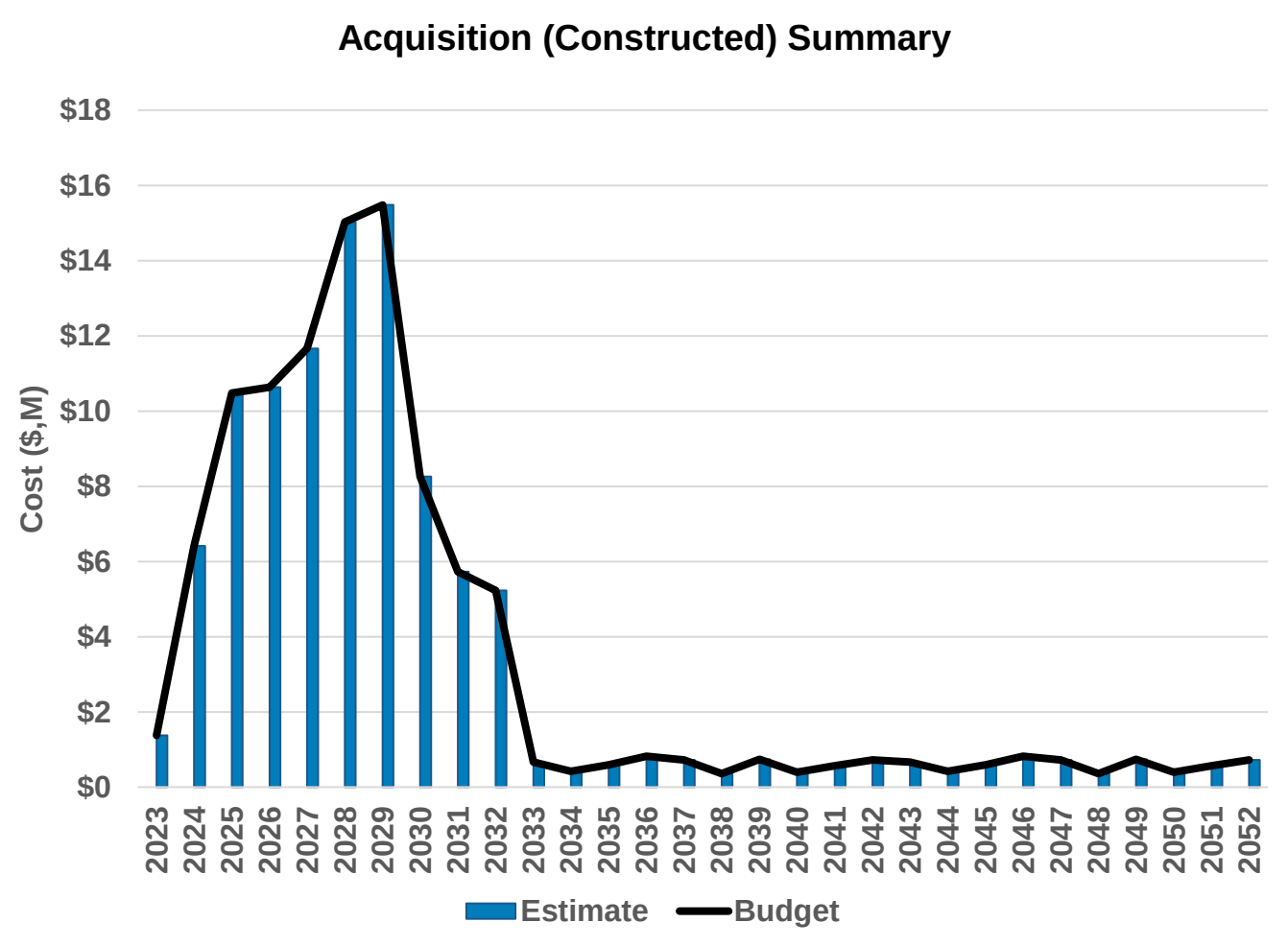
CURRENT PROJECT DRIVERS – 10-YEAR PLANNING HORIZON

Typically the Hamilton Fire Department determines acquisitions and renewals based on the level of risk to the community and makes Council requests for funding as these findings occur.

CONSTRUCTED OR PURCHASED ACQUISITIONS

For Hamilton Fire Department, assets are typically acquired through the purchase or construction of new assets which are mostly related to population growth, risk assessment, demographic shifts or technological changes as discussed in the Demand section. Over the next ten (10) Year planning period, the Hamilton Fire Department will acquire approximately **$90.2M** of purchased or constructed assets as shown below ***in Figure 10***. Hamilton will continue to monitor its constructed and purchased assets annually and update the Asset Management Plan when new information becomes available.

Figure 10: Acquisition (Constructed) Summary
All Figure Values Are Shown In 2023 Dollars.



The major acquisition expenditures over the next ten years include:

- **$65.0 Million** from 2025 – 2032 for New Station 14 acquisition, Mechanical facility relocation, and Station 6, 10, 17, and 19 renovations & additions as well as assets required to support additional staff to maintain current levels of service;
- **$16.5 Million** from 2024-2027 for Shared Waterdown Station;
- **$1.6 Million** from 2023 – 2028 in NG-911 technology assets (*this is included as a multi-year budget item from 2023-2028 in the Information Technology Budget, but has been included in the Hamilton Fire Department Asset Management Plan because the Hamilton Fire Department is considered the asset owner); and,*
- **$1.1 Million** in 2024 for NG-911 Facility Upgrades (*this is included as a multi-year budget item from 2021-2023 in the Facilities Budget but has been included in the Hamilton Fire Department's Asset Management Plan because HFD is considered the asset owner).*

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Since many Facilities are currently in Fair condition per **Section 3.2.1** and it is predicted, the City will continue to experience rapid population growth and demographics shifts per **Section 5.0**, the Hamilton Fire Department is planning on completing major investments to renovate and/or add additions to fire department facilities as shown above. These expanded stations will require additional vehicles and equipment acquisitions to operate, which are included in the figure above and are all assumed to be funded at the time of writing. In addition, some of these upcoming projects may improve the Hamilton Fire Department's overall Facility Condition Index for existing facilities.

In addition, the Shared Waterdown Station explained in **Section 5.0** is included in ***Figure 10*** above which is being acquired to maintain levels of service.

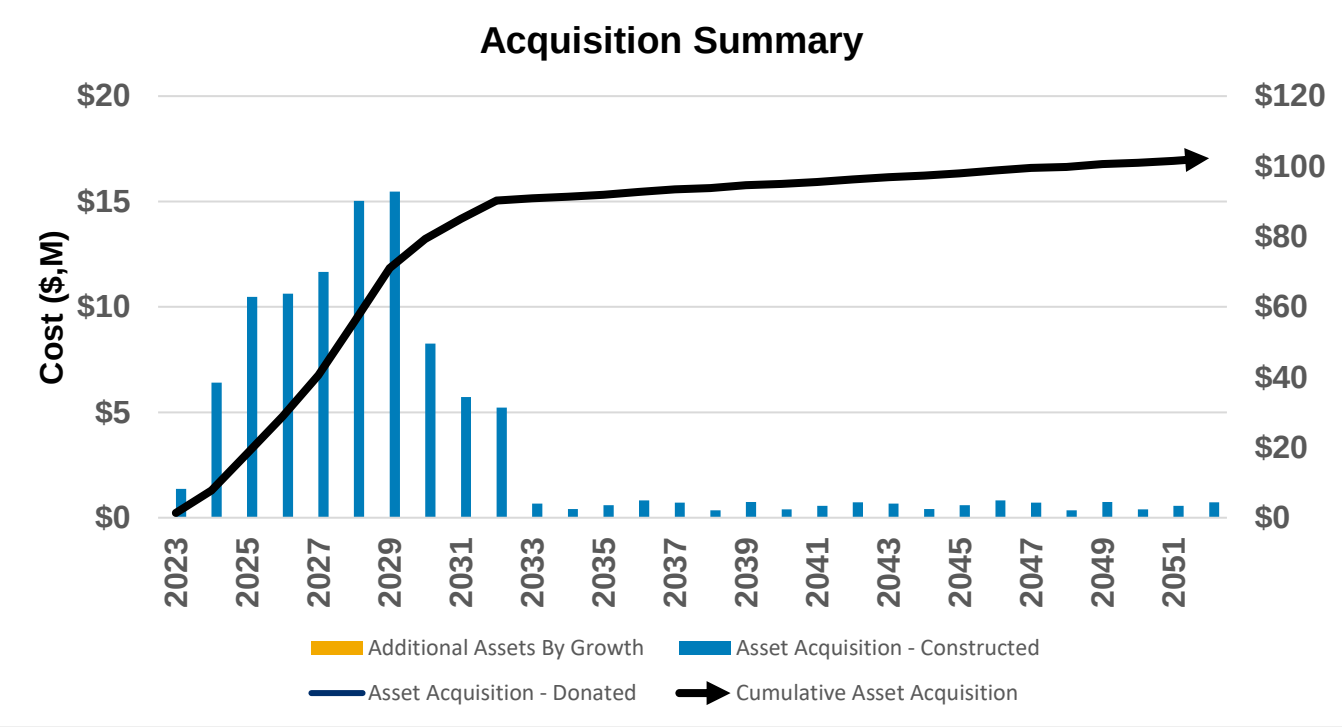
Finally, ***Figure 10***, also includes the required Facility Upgrades to support the NG-911 project explained in ***Section 5*** as well as the NG-911 technology assets allocated to the Hamilton Fire Department which are currently in the Information Technology budget.

In addition, as Asset Management knowledge, practices and abilities mature within the City, there will likely be significant projects with equally significant costs that will appear within the later years of the 30-year planning horizon in future iteration of the Asset Management Plan.

ACQUISITIONS SUMMARY

Forecast acquisition asset costs are summarized in ***Figure 11*** and show the cumulative effect of asset assumptions over the next 10-year planning period.

Figure 11: Acquisition Summary
All Figure Values Are Shown In 2023 Dollars.



When Hamilton commits to constructing or purchasing new assets, the municipality must be prepared to fund future operations, maintenance, and renewal costs, which are estimated in the sections below. Hamilton must also account for future depreciation when reviewing long term sustainability. When reviewing the long-term impacts of asset acquisition, it is useful to consider the cumulative value of the acquired assets being taken on by Hamilton. The cumulative value of all acquisition work, including assets that are constructed and contributed are shown in ***Figure 11***. City of Hamilton will need to address how to best fund these ongoing costs as well as the costs to construct the assets while seeking the highest level of service possible.

8.2 OPERATIONS AND MAINTENANCE PLAN

Operations include all regular activities to provide services. Daily, weekly, seasonal, and annual activities are undertaken by staff to ensure the assets perform within acceptable parameters and to monitor the condition of the assets for safety and regulatory reasons. Examples of typical operational activities include operating assets, utility costs, inspections, and the necessary staffing resources to perform these activities.

Since the Hamilton Fire Department is a largely a people driven service as opposed to an asset driven service, the majority of costs required to deliver the service are employee related costs. Some of the major operational investments over the next 10 years include:

- **$90.8 Million** allocated for employee related costs in 2023 (i.e. salaries, wages, benefits, contractual agreement etc.); and,
- **$0.3 Million** allocated in 2023 for additional operating costs for the Next Generation-911 project.

Maintenance should be viewed as the ongoing management of asset deterioration. The purpose of planned maintenance is to ensure that the correct interventions are applied to assets in a proactive manner and to ensure it reaches its intended useful life. Maintenance does not significantly extend the useful life of the asset but allows assets to reach their intended useful life by returning the assets to a desired condition. Examples of typical maintenance activities for the Hamilton Fire Department include building component replacements, and vehicle repairs along with appropriate staffing and material resources required to perform these activities.

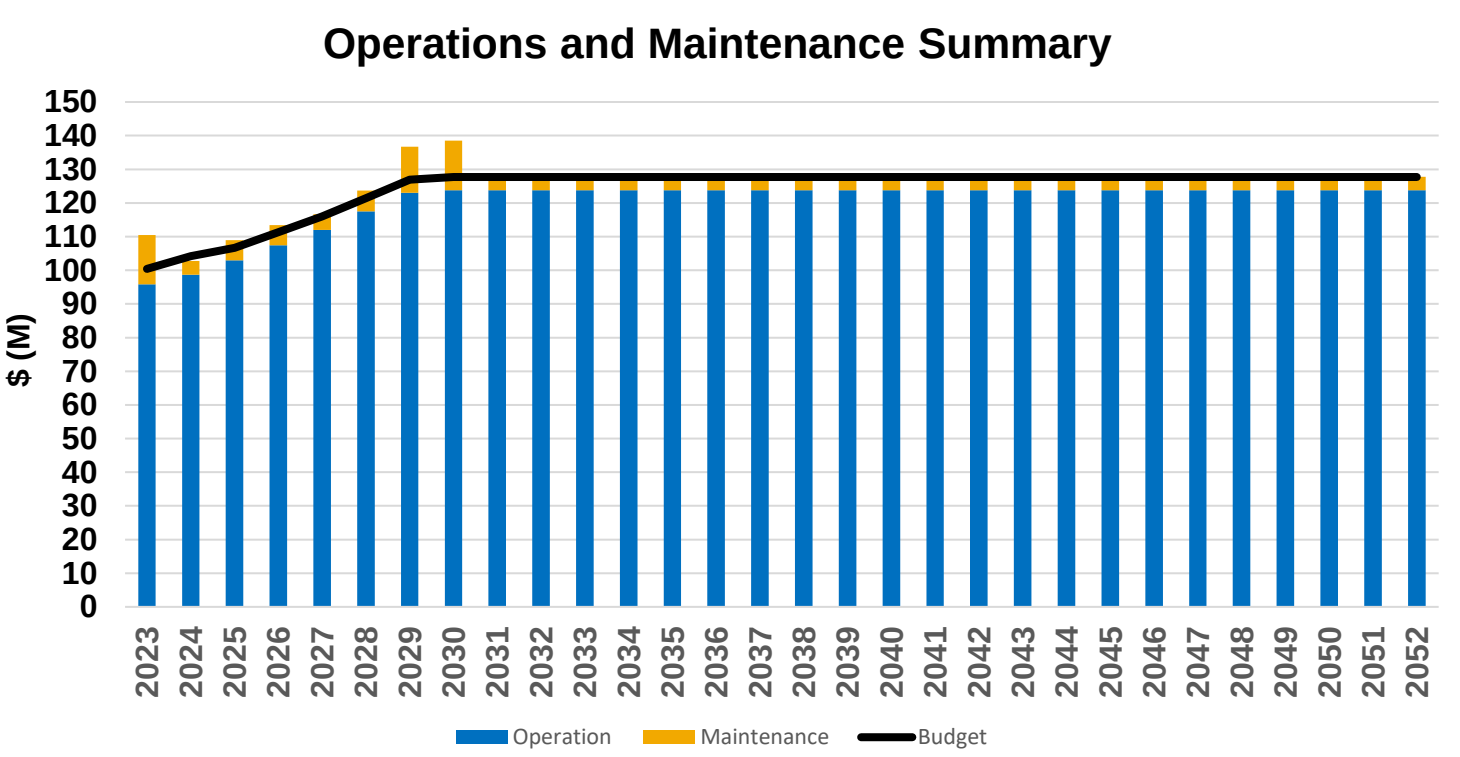
Proactively planning maintenance significantly reduces the occurrence of reactive maintenance which is linked to a higher risk to human safety and higher financial costs. The City needs to plan and properly fund its maintenance to ensure the Hamilton Fire Department assets are reliable and can achieve the desired level of service.

Major maintenance projects the City plans to complete over the next 10 years include:

- **$0.8 Million** allocated in 2023 for facility upgrades; and,
- **$0.7 Million** allocated in 2023 for vehicle maintenance.

Forecast operations and maintenance costs vary in relation to the total value of the asset registry. When additional assets are acquired, the future operations and maintenance costs are forecast to increase. When assets are disposed of the forecast operation and maintenance costs are reduced. ***Figure 12*** shows the forecast operations and maintenance costs relative to the proposed operations and maintenance Planned Budget.

Figure 12: Operations and Maintenance Summary
All Figure Values Are Shown In 2023 Dollars.



Per ***Figure 12*** above, it is evident that operations and maintenance needs are growing for the Hamilton Fire Department over the next 10 years due to anticipated growth within the City. The Hamilton Fire Department is typically fully funded by the City and these additional operational requirements have been assumed to be funded.

However, facilities maintenance amounts in 2023, 2029 and 2030 are assumed currently to be unfunded. The amount in 2023 is considered a maintenance backlog because it includes deferred maintenance due to budget constraints within the Corporate Facilities and Energy Management division over time. This backlog should be investigated following the completion of this Asset Management Plan to ensure critical components have been prioritized in the Corporate Facilities and Energy Management and the Hamilton Fire Department budget forecasts. This has been identified as a Continuous Improvement item in ***Table 28.*** Since needs have only been projected for the next 10 years, and it is unclear if current trends will continue at the same rate past 2032, the figure above has assumed a constant need past 2032, but it is anticipated that the need for the Hamilton Fire Department will continue to grow over time.

The Figure above includes estimates for the energy and water costs for the proposed Waterdown Station based on utility costs from a similar existing station (i.e., Station 5) but does not yet include all anticipated costs associated with the operations and maintenance of the facility. In addition, since not all proposed facility designs have been finalized, the figure above does not

account for any additional Operations & Maintenance costs other than staff associated with the additional $65M of anticipated facility acquisitions explained in **Section 8.1**. Therefore, it is anticipated there may be additional expenditure required which has not yet been quantified.

As the City continues to develop condition profiles and necessary works are identified based on their condition, it is anticipated these operation and maintenance forecasts will change. Future iterations of this plan will provide a more thorough analysis of operations and maintenance costs including types of expenditures for training, mandatory certifications, insurance, staffing costs and requirements, equipment, and maintenance activities.

8.3 RENEWAL PLAN

Renewal is major work which does not increase the assets design capacity but restores, rehabilitates, replaces, or renews an existing asset to its original service potential. Works over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs

Asset renewals are typically undertaken to either ensure the assets' reliability or quality will meet the service requirements set out by the City. Renewal projects are often triggered by service quality failure and can often be prioritized by those that have the highest consequence of failure, have high usage, have high operational and maintenance costs and other deciding factors.

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in ***Table 25*** and are based on estimated design life for this iteration of the Asset Management Plan. Future iterations of the plan will focus on the Lifecycle approach to Estimated Service Life which can vary greatly from design life. Asset useful lives were last reviewed in 2023 however they will be reviewed annually until their accuracy reflects the City's current practices.

Since the Hamilton Fire Department maintains a detailed renewal schedule, but does not yet have a detailed asset registry for all assets, the renewals for many assets were based on the budget renewal forecast which was developed using subject matter expert opinion.

Table 25: Useful Lives of Assets

ASSET (SUB)CATEGORY	AVERAGE ESTIMATED SERVICE LIFE (YEARS)
All Facilities	75
Heavy Response Vehicle	20
Light Emergency Response Vehicle	10
Non-Emergency Response Vehicle	11
Trailer	18
Respiratory Protection Gear (PPE)	Based on Budget Forecast

ASSET (SUB)CATEGORY	AVERAGE ESTIMATED SERVICE LIFE (YEARS)
Bunker Gear	Based on Budget Forecast
Uniform	Based on Budget Forecast
Apparatus Equipment	Based on Budget Forecast
Hazmat Vehicle	Based on Budget Forecast
Specialty Teams Equipment	Based on Budget Forecast
Communication Technology (e.g., mobile radios, portable radios)	Based on Budget Forecast
Information Technology (e.g., Desktop, Laptop) Assets	4

The estimates for renewals in this Asset Management Plan were based on the register method which utilizes the data from the City's asset registry to analyse all available lifecycle information and then determine the optimal timing for renewals based on the Estimated Service Life.

RENEWAL RANKING CRITERIA

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g., vehicles are able to respond to emergency); or,
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g., PPE is in acceptable condition).[6]

Future methodologies may be developed to optimize and prioritize renewals by identifying assets or asset groups that:

- Have a high consequence of failure;
- Have high use and subsequent impact on users would be significant;
- Have higher than expected operational or maintenance costs; and,
- Have potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.[7]

[6] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.
[7] Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

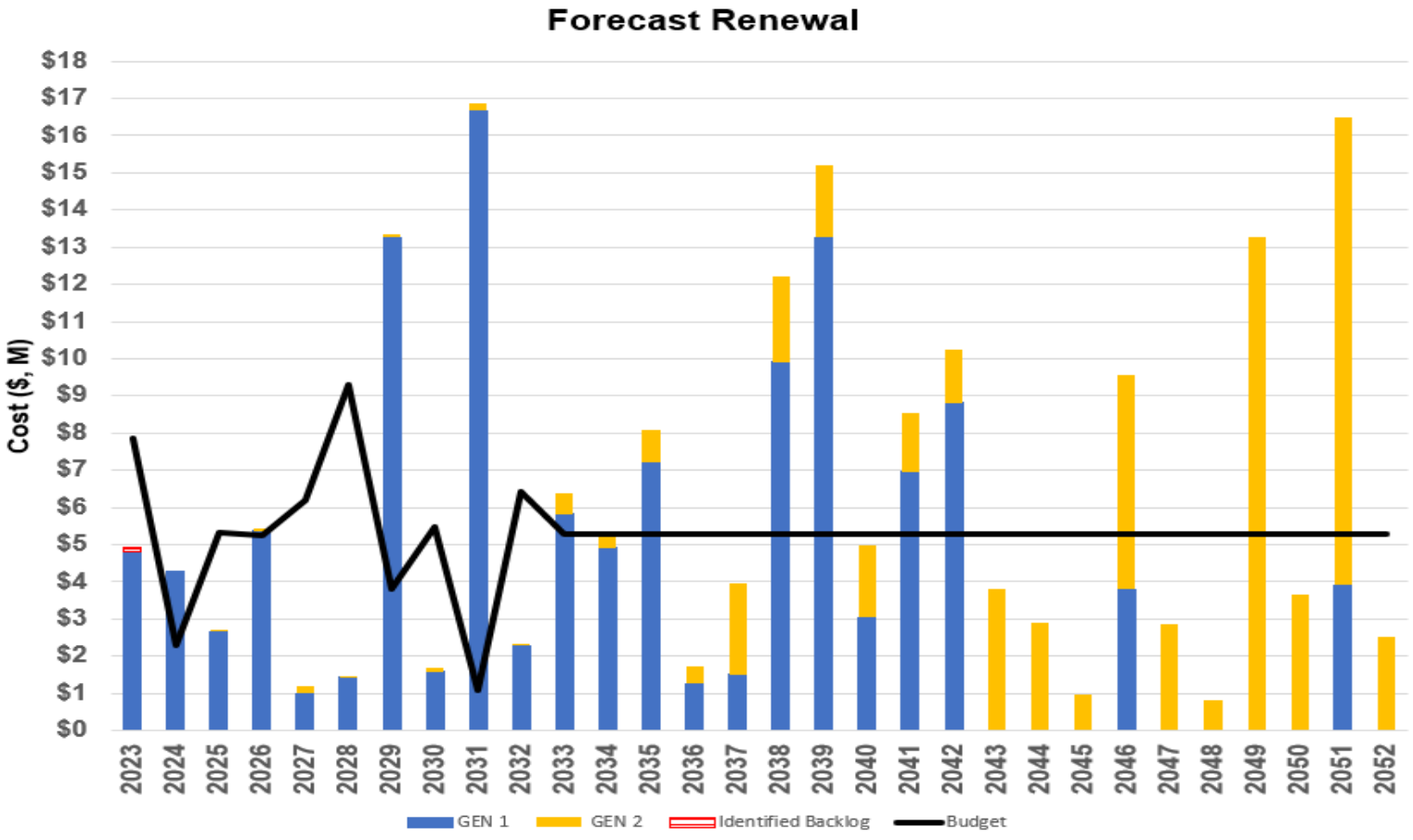
HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

SUMMARY OF FUTURE RENEWAL COSTS

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in ***Figure 13.***

In the figure below, Generation 1 (Gen 1) costs refer to renewals that occur for the first time in the model based on the estimated service life and Generation 2+ (Gen 2+) costs refer to renewals that have occurred twice or more based on the estimated service life.

Figure 13: Forecast Renewal Costs
All Figure Values Are Shown In 2023 Dollars.



Currently, the Hamilton Fire Department has a very minor backlog amount of $80,000 represented for Information Technology equipment which will be investigated following the Asset Management Plan.

The Hamilton Fire Department maintains a robust renewal schedule forecast for vehicles, equipment and technology which replace assets on a prescribed timeline which is often regulated per National Fire Protection Association Guidelines. Per Figure 13 above, there are years where the budget exceeds the need, and years where the need exceeds the budget, but these discrepancies balance out over the forecast. Since asset ages and conditions are not formally inventoried for equipment and technology assets, the renewal figure above was created using the renewal schedule. Following this Asset Management Plan, the Hamilton Fire Department should investigate developing an asset registry for all assets so that the renewal schedule can be validated which has been identified as a continuous improvement item in ***Table 28***.

The Hamilton Fire Department does not currently have renewals planned for any facilities, because typically the Hamilton Fire Department and Corporate Facilities and Energy Management work to maintain facilities in acceptable condition. Fire Station 14 is in Very Poor condition per the Building Condition Assessments, but since it is a leased facility, it is not included in the renewal figure above. However, it is an anticipated future City acquisition in Section 6.1.5.

The planned renewal works over the 10-year planning horizon include**:**

- Replacement of vehicles as they reach the end of useful life; and,
- Replacement of equipment and technology as they reach the end of useful life.

Since properly funded and timely renewals ensures the assets perform as expected, the Hamilton Fire Department is performing satisfactorily by replacing assets at the suggested interval with an appropriate budget. Deferring renewals create risks of higher financial costs, decreased availability, and decreased satisfaction with asset performance. It is recommended to continue to analyze asset renewals based on criticality and availability of funds for future Asset Management Plans.

8.4 DISPOSAL PLAN

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, possible closure of service, decommissioning, disposal of asset materials, or relocation. Disposals will occur when an asset reaches the end of its useful life. The end of its useful life can be determined by factors such as excessive operation and maintenance costs, regulatory changes, obsolescence, or demand for the structure has fallen.

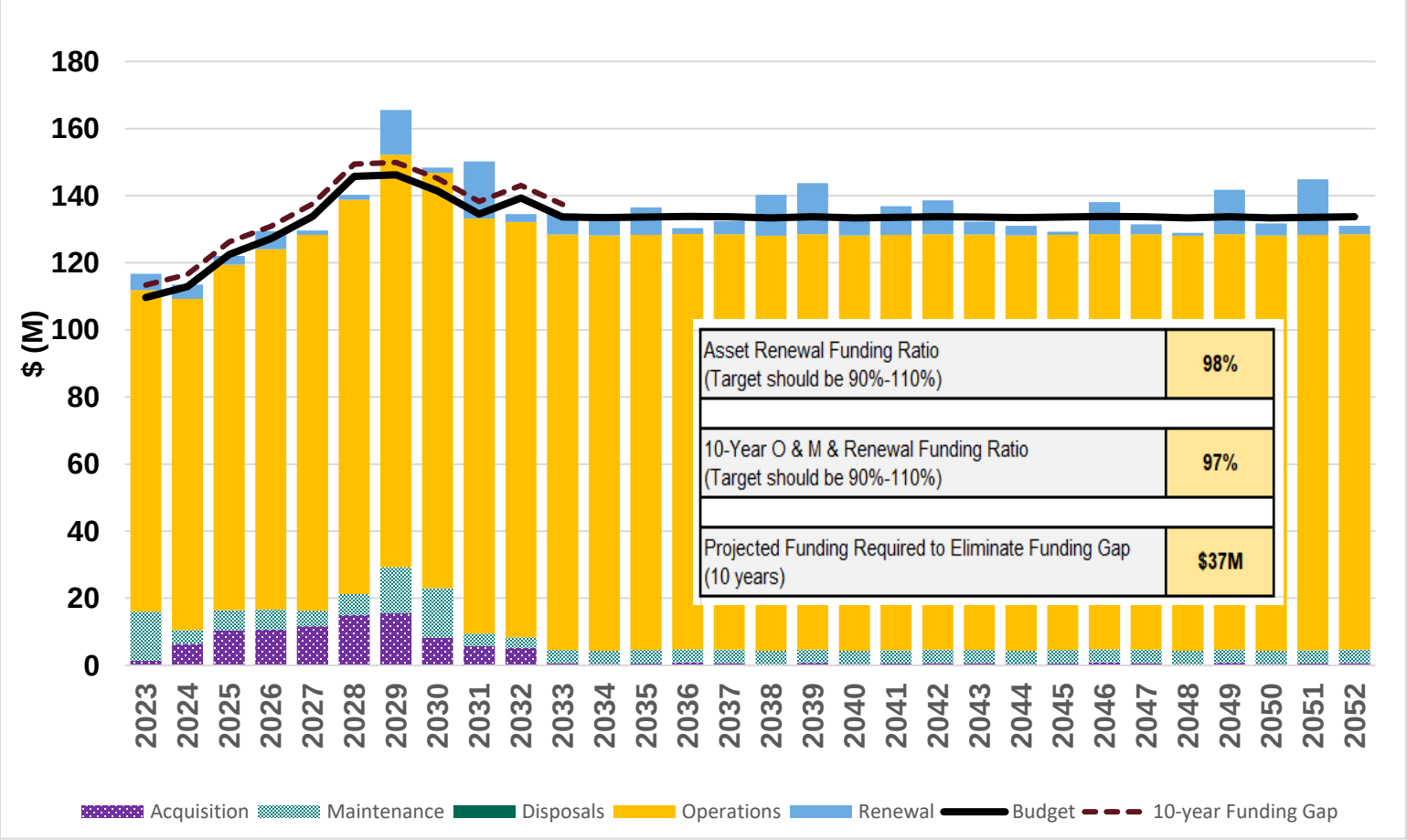
There are no disposals currently identified at this time.

8.5 LIFECYCLE COST SUMMARY

The financial projections from this asset plan are shown in ***Figure 14***. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

The bars in the graphs represent the forecast costs needed to minimize the life cycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.

Figure 14: Lifecycle Summary
All Figure Values Are Shown In 2023 Dollars



There is typically sufficient budget to address the planned lifecycle activities for the 2023-2028 planning period, with the exception of the unfunded facilities maintenance amounts which should be addressed over time. The Hamilton Fire Department will need to increase their operating budget beyond the status quo from 2027-2030 to account for the additional staff and assets to support both the proposed facility renovations/additions, as well as the new Shared Waterdown

Station and Station 14. These are currently assumed to be fully funded in the figure above. The large number of acquisitions from 2024-2032 will also commit the Hamilton Fire Department to funding ongoing operations, maintenance and renewal costs throughout the forecast, which have not all yet been quantified in this model.

The City will continue to improve its lifecycle data, and this will allow for informed choices as how best to mitigate impacts and how to address the funding gap itself. This gap in funding for future plans will be refined over the next three years to improve the confidence and accuracy of the forecasts.

9. FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this Asset Management Plan. Effective asset and financial management will enable the City to ensure The Hamilton Fire Department provides the appropriate level of service for the City to achieve its goals and objectives. Reporting to stakeholders on service and financial performance ensures the City is transparently fulfilling its stewardship accountabilities.

Long-Term financial planning is critical for the City to ensure the networks lifecycle activities such as renewals, operations, maintenance, and acquisitions can happen at the optimal time. The City is under increasing pressure to meet the wants and needs of its customers while keeping costs at an affordable level and maintaining its financial sustainability.

Without funding asset activities properly, the City will have difficult choices to make in the future which will include options such as higher cost reactive maintenance and operational costs, reduction of service and potential reputational damage.

Aligning the Long-Term financial planning with the Asset Management Plan is critical to ensure all the network's needs will be met while the City is finalizing a clear financial strategy with measurable financial targets. The financial projections will be improved as the discussion on desired levels of service and asset performance matures.

9.1 SUSTAINABILITY OF SERVICE DELIVERY

There are two key indicators of sustainable service delivery that are considered within the Asset Management Plan for this service area. The two indicators are the:

- Asset renewal funding ratio (proposed renewal budget for the next 10 years / forecast renewal costs for next 10 years); and,
- Medium term forecast costs/proposed budget (over 10 years of the planning period).

ASSET RENEWAL FUNDING RATIO

Asset Renewal Funding Ratio[8] **97.8%**

The Asset Renewal Funding Ratio is used to determine if the City is accommodating asset renewals in an **optimal** and **cost-effective** manner from a timing perspective and relative to financial constraints, the risk the City is prepared to accept and targeted service levels it wishes to maintain. The target renewal funding ratio should be ideally between **90% - 110%** over the entire planning period.

Over the next 10 years the City expects to have 97.8% of the funds required for the optimal renewal of assets, which is within the 90-110% threshold, and shows that the Hamilton Fire

[8] AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.

Department's renewals are well funded with the only current renewal shortfall involving IT equipment.

If assets are not renewed in the appropriate timing, it will inevitably require difficult trade off choices that could include:

- A reduction of the level of service and availability of assets;
- Increased complaints and reduced customer satisfaction;
- Increased reactive maintenance and renewal costs; and,
- Damage to the City's reputation and risk of fines or legal costs.

The lack of renewal resources will be addressed in future AM Plans while aligning the plan to the Long-Term financial planning. This will allow staff to develop options and long-term strategies to address the renewal rate. The City will review its renewal allocations once the entire inventory has been confirmed and amalgamated.

MEDIUM TERM – 10 YEAR FINANCIAL PLANNING PERIOD

10-Year Lifecycle Financial Ratio 98%

Although this Asset Management Plan includes forecast projections to 30-years, the higher confidence numbers are typically within the first 10years of the lifecycle forecast. The 10-year Lifecycle Financial Ratio compares the Planned Budget with the Lifecycle Forecast for the optimal operation, maintenance, and renewal of assets to provide an agreed level of service over the next 10-year period. Similar to the AARF, the optimal ratio is also between **90-110%**. A low ratio would indicate that the service is not being funded at the rate that would meet the organization' risk and service level commitments.

The forecast operations, maintenance and renewal costs over the 10-year planning period is **$126 Million** on average per year. Over time as improved information becomes available, it is anticipated to see this number change. The proposed (budget) operations, maintenance and renewal funding is **$122 Million** on average per year giving a 10-year funding shortfall of **$3.7 Million** per year or **$37 Million** over the 10-year planning period. This 10-year funding shortfall is predominately due to the facilities maintenance needs identified in the Building Condition Assessments mentioned in **Section 3.2.1** which are currently not fully funded and should be prioritized based on the criticality of components.

This indicates that **98%** of the forecast costs needed to provide the services documented in this Asset Management Plan are accommodated in the proposed budget, which is within the 90-110% range. Therefore, it can be concluded that the Hamilton Fire Department is funding their service at an acceptable rate and that the service will be sustainable over time. Note, these calculations exclude acquisition costs.

Funding an annual funding shortfall or funding 'gap' should not be addressed immediately. The overall gap in funding city-wide will require vetting, planning and resources to begin to incorporate gap management into the future budgets for all City services. This gap will need to

be managed over time to reduce it in a sustainable manner and limit financial shock to customers. Options for managing the gap include;

- Financing strategies – increased funding, block funding for specific lifecycle activities, long term debt utilization;
- Adjustments to lifecycle activities – increase/decrease maintenance or operations, increase/decrease frequency of renewals, limit acquisitions or dispose of underutilized assets; and,
- Influence level of service expectations or demand drivers.

These options and others will allow Hamilton to ensure the gap is managed appropriately and ensure the level of service outcomes the customers desire.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to eventually achieve a financial indicator of **90-110%** for the first years of the Asset Management Plan and ideally over the 10-year life of the Long-Term Financial Plan.

9.2 FORECAST COSTS (OUTLAYS) FOR THE LONG-TERM FINANCIAL PLAN

Table 26 shows the forecast costs (outlays) required for consideration in the 10-year long-term financial plan.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the operational and capital budget. The City will begin developing its long-term financial plan (LTFP) to incorporate both the operational and capital budget information and help align the LTFP to the Asset Management Plan which is critical for effective asset management planning.

These options will be explored in the next Asset Management Plan and the City will provide analysis and options for Council to consider going forward.

Table 26; Forecast Costs (Outlays) For the Long-Term Financial Plan
Forecast Costs Are Shown In 2023 Dollar Values.

YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2023	$1,373,090	$95,827,408	$14,629,936	$4,904,969	$-
2024	$6,412,554	$98,654,152	$4,157,640	$4,289,113	$-
2025	$10,481,774	$102,928,880	$5,991,743	$2,654,108	$-
2026	$10,635,881	$107,415,424	$6,029,058	$5,370,836	$-

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YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2027	$11,658,601	$112,027,440	$4,621,263	$1,286,470	$-
2028	$15,028,625	$117,468,256	$6,261,318	$1,478,866	$-
2029	$15,478,613	$122,989,088	$13,772,738	$13,330,543	$-
2030	$8,254,989	$123,766,336	$14,741,072	$1,599,741	$-
2031	$5,725,100	$123,766,336	$3,744,478	$16,962,060	$-
2032	$5,231,680	$123,766,336	$3,150,499	$2,329,935	$-
2033	$669,090	$123,766,336	$3,976,498	$6,373,228	$-
2034	$417,980	$123,766,336	$3,976,498	$5,243,961	$-
2035	$594,774	$123,766,336	$3,976,498	$8,155,000	$-
2036	$820,881	$123,766,336	$3,976,498	$1,726,238	$-
2037	$723,303	$123,766,336	$3,976,498	$3,950,206	$-
2038	$359,139	$123,766,336	$3,976,498	$12,128,257	$-
2039	$743,162	$123,766,336	$3,976,498	$15,268,602	$-
2040	$395,800	$123,766,336	$3,976,498	$4,977,458	$-
2041	$569,900	$123,766,336	$3,976,498	$8,520,714	$-
2042	$726,480	$123,766,336	$3,976,498	$10,164,327	$-
2043	$669,090	$123,766,336	$3,976,498	$3,876,037	$-
2044	$417,980	$123,766,336	$3,976,498	$2,896,363	$-
2045	$594,774	$123,766,336	$3,976,498	$966,672	$-
2046	$820,881	$123,766,336	$3,976,498	$9,490,724	$-
2047	$723,303	$123,766,336	$3,976,498	$2,959,150	$-
2048	$359,139	$123,766,336	$3,976,498	$800,583	$-
2049	$743,162	$123,766,336	$3,976,498	$13,278,506	$-

YEAR	ACQUISITION	OPERATION	MAINTENANCE	RENEWAL	DISPOSAL
2050	$395,800	$123,766,336	$3,976,498	$3,579,616	$-
2051	$569,900	$123,766,336	$3,976,498	$16,557,306	$-
2052	$726,480	$123,766,336	$3,976,498	$2,539,113	$-

9.3 FUNDING STRATEGY

The proposed funding for assets is outlined in the City's operational budget and 10-year capital budget.

These operational and capital budgets determine how funding will be provided, whereas the Asset Management Plan typically communicates how and when this will be spent, along with the service and risk consequences. Future iterations of the Asset Management plan will provide more detailed service delivery options and alternatives to optimize limited financial resources.

9.4 VALUATION FORECASTS

Asset values are forecast to increase as additional assets are added into service. As projections improve and can be validated with market pricing the net valuations will increase significantly.

Additional assets will add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs for future renewals. Any additional assets will also add to future depreciation forecasts. Any disposals of assets would decrease the operations and maintenance needs in the longer term and would remove the high costs renewal obligations. At this time, it is not possible to separate the disposal costs from the renewal or maintenance costs however this will be improved for the next iteration of the plan.

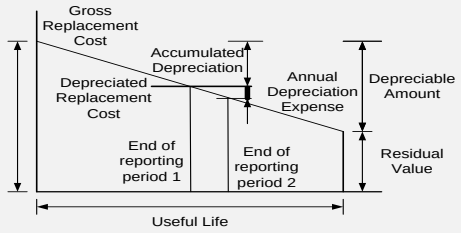
HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

9.5 ASSET VALUATIONS

The best available estimate of the value of assets included in this Asset Management Plan are shown below. The assets are valued at estimated replacement costs:

Figure 15: Asset Valuations

Replacement Cost (Current/Gross)	**$ 251,971,308**
Depreciable Amount	**$ 251,971,308**
Depreciated Replacement Cost6F[9]	**$ 144,742,144**
Depreciation	**$ 7,493,644**



The current replacement cost is the most common valuation approach for specialized infrastructure assets. The methodology includes establishing a comprehensive asset registry, assessing replacement costs (based on market pricing for the modern equivalent assets) and useful lives, determining the appropriate depreciation method, testing for impairments, and determining remaining useful life.

As the City matures its asset data, it is highly likely that these valuations will fluctuate significantly over the next three years, and they should increase over time based on improved market equivalent costs as well as anticipated cost changes due to climate change mitigation and adaptation strategies.

9.6 KEY ASSUMPTIONS MADE IN FINANCIAL FORECASTS

In compiling this Asset Management Plan, it was necessary to make some assumptions. This section details the key assumptions made in the development of this Asset Management plan and should provide readers with an understanding of the level of confidence in the data behind the financial forecasts.

Key assumptions made in this Asset Management Plan are:

- Operational forecasts are based on current budget allocations and encompass additional operational need estimates where already quantified;
- Maintenance forecasts are based on current budget allocations and encompass anticipated needs where known;
- Replacement costs were based on current pricing. They were also made without determining what the asset would be replaced with in the future (e.g., hydrogen vehicles were not encompassed in replacement costs).

[9] Also reported as Written Down Value, Carrying or Net Book Value.

9.7 FORECAST RELIABILITY AND CONFIDENCE

The forecast costs, proposed budgets, and valuation projections in this Asset Management Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is defined on ***Page 32*** in the Asset Management Plan Overview.

Table 27: Data Confidence Assessment for Data Used in AM Plan

DATA	CONFIDENCE ASSESSMENT	COMMENT
Demand Drivers	Medium	Values for Next Generation-911 and anticipated acquisitions required to support service were included, but other demand drivers were not able to be quantified at this time.
Acquisition Forecast	Medium	Used current pricing for proposed Waterdown Station and Next Generation-911 Upgrades which are subject to change. Used current estimates for anticipated acquisitions provided by the Hamilton Fire Department which are subject to change.
Operation Forecast	Medium	Staff costs for all new acquisitions were quantified. Projected future energy and water & sewer pricing for proposed Waterdown Station was included based on square footage and energy intensity which is lower confidence. Other operational costs for new facility acquisitions were not included.
Maintenance Forecast	Medium	Maintenance forecast in this Asset Management Plan are typically based on the results of the Building Condition Assessment which have been updated by the Corporate Facilities and Energy Management division, are assumed to be a medium confidence. Maintenance needs for new facilities have not yet been included. It was also assumed for this analysis that the “Fire Facility Upgrade” amount in the Corporate Facilities and Energy Management Capital Budget was used for Fire, Shared Stations, and Shared Administrative Facilities and not Hamilton Paramedic Stations (i.e., Station 30 and 32).

DATA	CONFIDENCE ASSESSMENT	COMMENT
Renewal Forecast - Asset Values	Medium	Market pricing was used for renewal replacement costs for vehicles and IT equipment which have high confidence, but facilities replacement costs were of medium confidence and are a high value asset which affected the overall confidence. In addition, since there was minimal age and replacement cost data available for equipment and technology, the existing Hamilton Fire Department fourteen-year equipment budget forecast (2019-2032) for equipment, technology and communications was used to project the future needs and estimate replacement cost.
Renewal Forecast - Asset Useful Lives	Medium	Estimated service lives are typically adhered to for vehicle assets and there is high confidence in vehicle age data. Estimated service lives for facilities renewals were less confident and there was minimal age data for equipment which affected the overall confidence. In addition, renewals for newly acquired assets were excluded from this analysis.
Renewal Forecast - Condition Modelling	Medium	Condition information was only known for Facilities. Vehicle's condition was based on probability of repairs based on age.
Disposal Forecast	Very Low	No disposals were integrated into the forecast.

The estimated confidence level for and reliability of data used in this Asset Management Plan is considered to be a **Medium** confidence level.

10. PLAN IMPROVEMENT AND MONITORING

10.1 STATUS OF ASSET MANAGEMENT PRACTICES

ACCOUNTING AND FINANCIAL DATA SOURCES

This AM Plan utilizes accounting and financial data. The sources of the data are:

- 2019 Hamilton Fire Department 10 Year Service Delivery Plan;
- 2023 Hamilton Fire Department Capital & Operating Budgets;
- 2024-2027 Hamilton Fire Department Multi Year Budget;
- 2019-2032 Equipment Renewal Forecast Schedule;
- 2017-2032 Projected Vehicle Budget;
- 2023 – 2032 Projected Next Generation-911 Costs from Information Technology Budget;
- 2023 Corporate Facilities and Energy Management Capital Budget;
- 2024 Corporate Facilities and Energy Management Capital Budget;
- Building Condition Assessment reports;
- Various internal reports;
- Asset Management Data Collection Templates;
- Financial Exports from internal financial systems; and,
- Historical cost and estimates of budget allocation based on SME experience.

ASSET MANAGEMENT DATA SOURCES

This AM Plan also utilizes asset management data. The sources of the data are:

- Data extracts from various city databases;
- Asset Management Data Collection Templates;
- Development Charges Collection Template;
- Condition assessments; and,
- Subject matter Expert Opinion and Anecdotal Information.

10.2 IMPROVEMENT PLAN

It is important that the City recognize areas of the Asset Management Plan and planning processes that require future improvements to ensure both effective asset management and informed decision making. The tasks listed below are essential to improving the Asset Management Plan and the City's ability to make evidence based and informed decisions. These improvements span from improved lifecycle activities and improved financial planning to plans to physically improve the assets.

The Improvement Plan, ***Table 28***, highlights proposed improvement items that will require further discussion and analysis to determine feasibility, resource requirements and alignment to current workplans. Future iterations of this AM Plan will provide updates on these improvement plans. The costs and resources to complete each of these tasks has not been included in the lifecycle models to data, and resource requirements would need to be reviewed for internal resource driven projects.

Table 28: Improvement Plan

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
1.	Implement an asset registry for all Hamilton Fire Department assets which includes key database fields and follows the newly developed City Data Standard. This may involve the procurement and implementation of an inventory management software system that will further assist with efficiencies. Hamilton Fire Department staff will leverage this work to assist with the Asset Management Plan.	Hamilton Fire Department Mechanical Division and Administration	Internal Resources	2024-2028
2.	Improve and add/track new data that helps inform decisions related to Asset Management. Identify gaps in data and prioritize what can be improved and/or tracked. Potential to connect with replacement of the department's data management system project and dashboard.	Hamilton Fire Department Administration	Internal Resources	TBD
3.	Incorporate a condition rating during regular vehicle inspection/maintenance activities using Asset Management 5-point scale	Hamilton Fire Department Mechanical	Internal Resources	Q4 2025
4.	Formally track age and create condition methodologies for major equipment and technology assets using AM 5-point scale	Hamilton Fire Department Administration	Internal Resources	2024-2028
5.	Improve the marketing strategy by both incorporating telephone surveys and IP controls to improve confidence levels in the survey responses	Corporate Asset Management	Internal Resources	Q4 2025
6.	Review results from 2023 survey and improve upon the first iteration.	Hamilton Fire Department Administration	Internal Resources	Q4 2024

HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
7.	Improve upon Lifecycle platforms/systems that track metrics: work towards the creation of one tool that helps track metrics Project to review and determine software and systems. More closely review average # of days to close a file (inspections) to bring high-priority type incidents or properties into compliance. Create categories and benchmarking as a starting point.	Hamilton Fire Department Mechanical Division and Administration	Internal Resources	Q4 2024
8.	Create survey for internal Hamilton Fire Department customers who are the main users of the assets.	Corporate Asset Management / Hamilton Fire Department Administration	Internal Resources	Q4 2025
9.	Initiate risk treatment plans for risks identified in this plan.	Hamilton Fire Department Administration	Internal Resources	Q4 2025
10.	Identify more existing controls for fire apparatus, which could involve or impact staffing levels to maintain and operate this asset AND the process of acquisition and/or renewal of this asset.	Hamilton Fire Department Mechanical Division and Administration	Internal Resources	Q1 2026
11.	Implement the demand and risk management plans associated with climate mitigation and adaptation and include in future iterations of Asset Management Plan.	Corporate Asset Management / Hamilton Fire Department Administration	Internal Resources	Q4 2025
12.	Review the feasibility and costs of switching Fire's heavy-duty apparatus to clean hydrogen or other clean source.	Hamilton Fire Department Mechanical Division and Administration	Internal Resources	2040

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	TIMELINE
13.	Align the Asset Management Demand Drivers work with the data and community risks identified in core Hamilton Fire Department planning documents.	Hamilton Fire Department Administration	Internal Resources	Q4-2024
14.	Quantify demands and risks and incorporate them into future lifecycle models.	Corporate Asset Management / Hamilton Fire Department Administration	Internal Resources	Q4 2025
15.	Modify budget sheets to incorporate lifecycle stages so that the results can be more accurate in the next iteration of the plan.	Corporate Asset Management /Finance	Internal Resources	Q4 2024
16.	Investigate maintenance backlog for Facilities assets to ensure critical components are being prioritized in capital forecast.	Corporate Facilities and Energy Management / Hamilton Fire Department Administration	Internal Resources	Q4 2024
17.	Improve process to collect unit costs for assets.	Hamilton Fire Department Administration	Internal Resources	Q4 2025

10.3 MONITORING AND REVIEW PROCEDURES

This Asset Management Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The Asset Management Plan will be reviewed and updated on a regular basis to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget will be incorporated into the Long-Term Financial Plan once completed.

10.4 PERFORMANCE MEASURES

The effectiveness of this Asset Management Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this Asset Management Plan are incorporated into the long-term financial plan;
- The degree to which the one to 10-year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the Asset Management Plan;
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans; and,
- The Asset Renewal Funding Ratio achieving the Organizational target (this target is 90 – 110%).

HAMILTON FIRE DEPARTMENT ASSET MANAGEMENT PLAN

Appendix A – Survey Analysis

Hamilton
Corporate Asset Management

Hamilton Fire Service

Survey Period: July, 24 - August 28, 2023

September 2023

City Services & Asset Review

Hamilton Fire Services

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Hamilton Fire Service

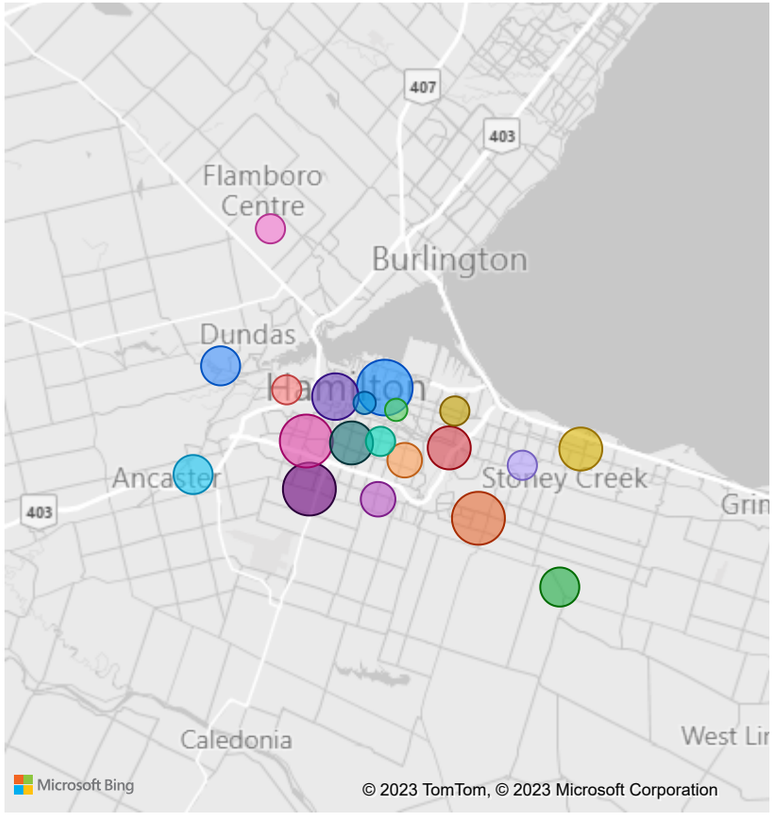
Survey Response Demographics

07/24/2023 to 08/28/2023

92	104	5	8787	454
Respondents	Survey Questions	Demographic Questions	Survey Responses	Demographic Responses

Postal Code	Respondents	% of Respondents	Population
L8L	9	9.78%	50,110
L8J	8	8.70%	42,665
L9B	8	8.70%	38,295
L9C	8	8.70%	64,505
L8P	6	6.52%	42,655
L8E	5	5.43%	64,835
L8K	5	5.43%	52,085
L9A	5	5.43%	40,750
L0R	4	4.35%	123,805
L9G	4	4.35%	38,540
L9H	4	4.35%	50,480
L8T	3	3.26%	31,140
L8W	3	3.26%	39,195
L8B	2	2.17%	38,035
L8G	2	2.17%	36,075
L8H	2	2.17%	41,715
L8S	2	2.17%	26,295
L8V	2	2.17%	34,910
L8M	1	1.09%	22,530
L8N	1	1.09%	26,220

% Respondents by FSA

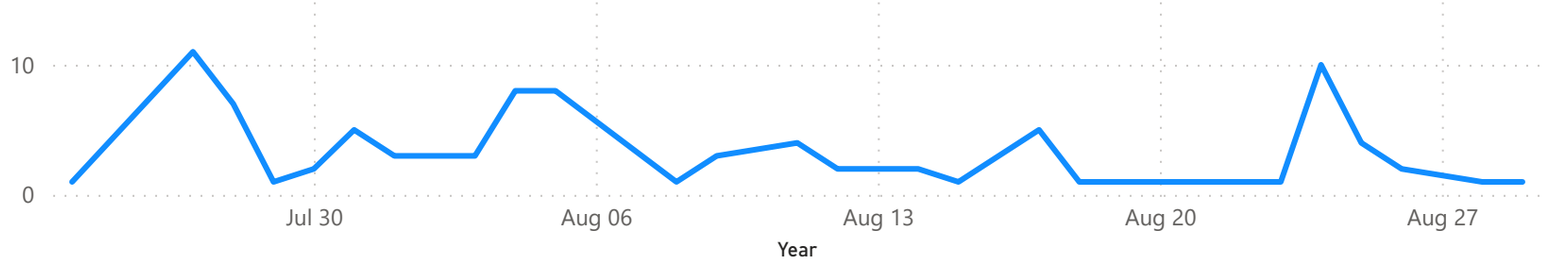


Age	% Pop. by Age	% Respondents	Respondents
18 to 24	6.80%	2.17%	2
25 to 34	15.30%	13.04%	12
35 to 44	13.80%	18.48%	17
45 to 54	13.20%	19.57%	18
55 to 64	14.70%	23.91%	22
65 to 79	14.30%	18.48%	17
80+	5.20%	1.09%	1

Gender	% of Respondents	Respondents
Female	45.65%	42
Male	44.57%	41
Prefer not to answer	8.70%	8
Other	1.09%	1

Residency	Respondents
I live in Hamilton	76
I work in Hamilton	35
I am retired	18
Prefer not to Answer	5
I run a Hamilton based business	4
I run a business outside of Ham	1

Respondents by Day



Value	Respondents
I do not identify with any of the above groups	55
Prefer not to Answer	17
2SLGBTQIA+	8
Persons with disabilities	6
Immigrant arrived in Canada mor	5
Racialized (i.e. Black People o	3
Indigenous	1

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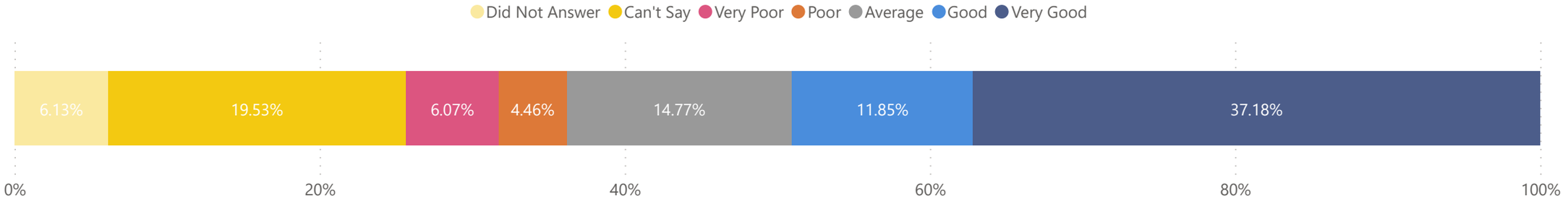
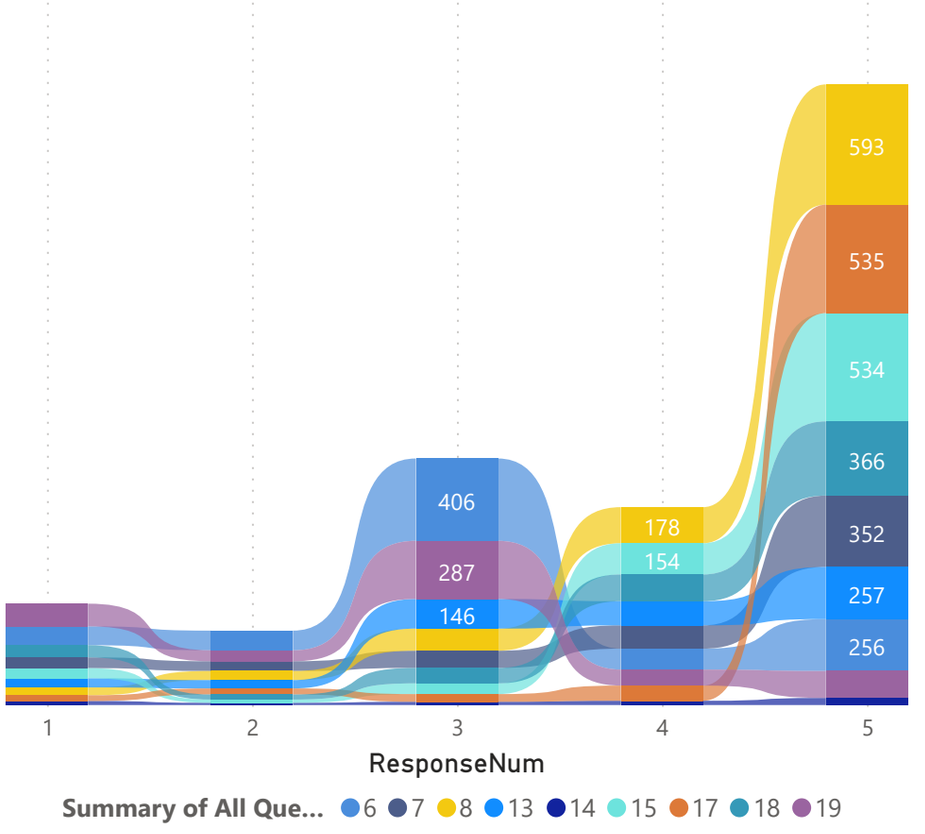
Summary of Survey Results

Responses
6120

Respondents
92



Questions	σ	Avg.	Avg. %	Opt Out	Opt Out %
All Questions	**1.29**	**3.94**	**57.30**	**2483**	**27.26%**
Q17 Recommend to Others	1.04	4.50	61.21	226	22.33%
Q15 Safe and Comfortable Access	1.11	4.37	68.75	157	15.51%
Q8 Importance of Services	1.09	4.29	81.32	30	2.96%
Q18 Value for Money	1.28	4.09	51.11	243	24.01%
Q7 Overall Performance	1.30	4.02	51.44	338	33.40%
Q13 Services Meeting Needs	1.25	3.83	49.65	270	29.35%
Q14 Satisifaction With Services	1.52	3.39	45.99	875	86.46%
Q6 Awareness of Services	1.25	3.35	62.89	42	4.15%
Q19 Service Level Changes	1.29	3.10	34.87	302	27.36%



City Services & Asset Review

Hamilton Fire Services

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Responses

6212

Respondents

92

Survey Question Summary

Question #	Survey Question	n	σ (Consistency)	Margin of Error (Confidence Level ±)
6	The Hamilton Fire Department provides multiple services for its citizens. Are you aware of these services?	87	1.25	26%
7	Over the last 24 months, how do you feel the Hamilton Fire Department has performed overall in the following services?	59	1.30	28%
8	How important should the following services be as responsibility for the Hamilton Fire Department?	88	1.09	23%
11	How many minutes do you think is acceptable for this process to take place, including the arrival on-scene of an Effective Firefighting and Rescue Force?	84	0.74	15%
13	Do the following services provided by the Hamilton Fire Department meet your needs	55	1.25	27%
14	In the last 24 months if you have used Hamilton Fire Department's services, how satisfied are you with your ability to access these services? If you have not used these services, in the past 24 months, please select "Have Not Used This Service".	9	1.52	52%
15	Do you feel comfortable and safe accessing services provided by the Hamilton Fire Department?	73	1.11	23%
17	How likely would you be to recommend these services to others?	64	1.04	23%
18	Based on the chart above and any additional knowledge or experience you have, how would you rate the Hamilton Fire Department in providing good value for the services provided to your community?	60	1.28	29%
19	Are there any services being provided that you feel need a service level change?	60	1.29	29%

Hamilton

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Hamilton Fire Services

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Question

6

Awareness of Services

The Hamilton Fire Department provides multiple services for its citizens. Are you aware of these services?

Responses

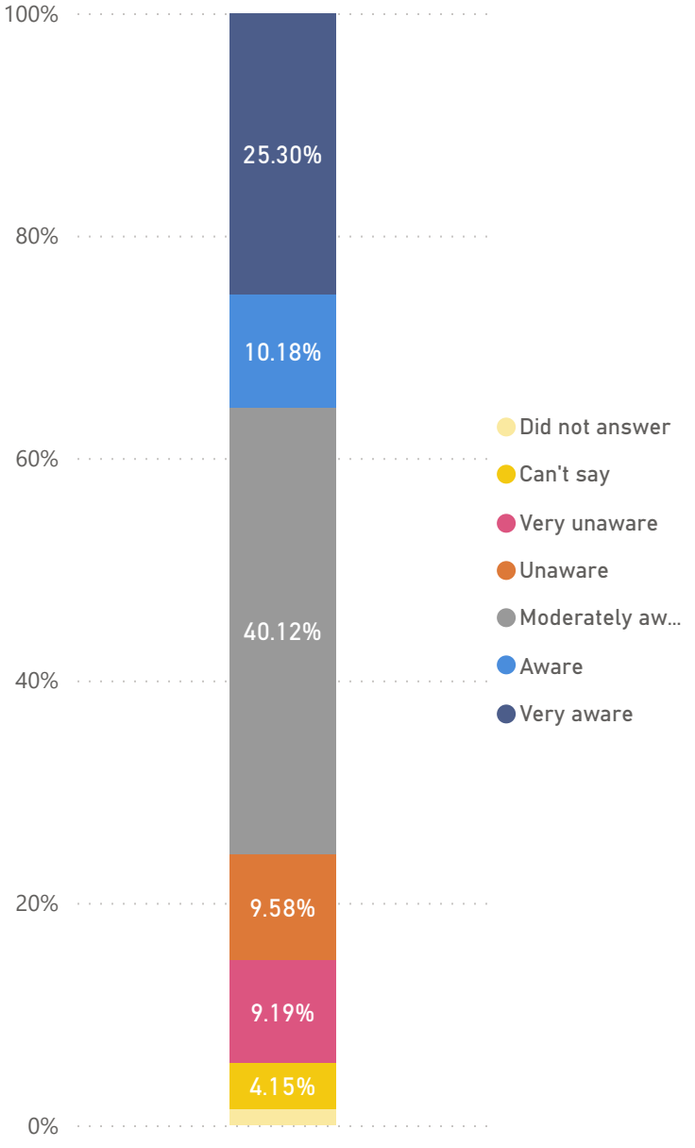
955

Respondents

90

Service Area	Very unaware	Unaware	Moderately aware	Aware	Very aware
Total	**93**	**97**	**406**	**103**	**256**
Responses to Life-Threatening Medical Calls	6	2	41	14	26
Response to Gas Leaks	5	10	40	10	22
Rescue Operations	6	2	46	7	26
Inspection and Fire Code Enforcement	8	3	40	9	28
Hazardous Materials Operations	7	10	39	6	24
Fire Station Tours, Fire Truck School, Visits	10	16	30	9	22
Fire Prevention Public Education Programs	9	7	34	13	24
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	10	8	38	9	21
Fighting Fires	6	2	35	8	34
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	16	22	29	5	14
City Emergency Preparedness Program	10	15	34	13	15

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**3.35**	**66.95**	**1.25**	**42**	**4.2%**
Fighting Fires	3.73	74.59	1.21	6	6.5%
Responses to Life-Threatening Medical Calls	3.58	71.69	1.13	3	3.3%
Inspection and Fire Code Enforcement	3.52	70.45	1.22	2	2.2%
Rescue Operations	3.52	70.34	1.14	4	4.3%
Fire Prevention Public Education Programs	3.41	68.28	1.26	3	3.3%
Response to Gas Leaks	3.39	67.82	1.15	3	3.3%
Hazardous Materials Operations	3.35	66.98	1.23	4	4.3%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.27	65.35	1.25	4	4.3%
Fire Station Tours, Fire Truck School, Visits	3.20	63.91	1.31	4	4.3%
City Emergency Preparedness Program	3.09	61.84	1.21	4	4.3%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	2.76	55.12	1.28	5	5.4%



Hamilton

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Hamilton Fire Services

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Question

7

Overall Performance

Over the last 24 months, how do you feel the Hamilton Fire Department has performed overall in the following services?

Responses

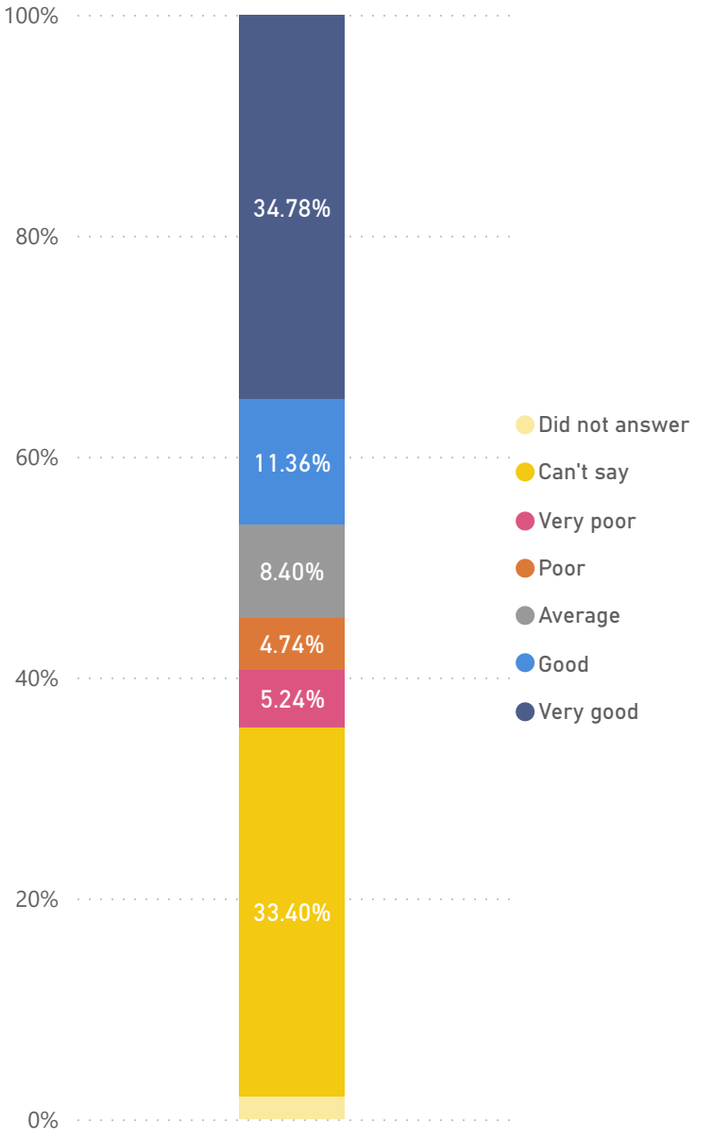
653

Respondents

82

Service Area	Very poor	Poor	Average	Good	Very good
Total	**53**	**48**	**85**	**115**	**352**
Responses to Life-Threatening Medical Calls	6	3	9	11	46
Response to Gas Leaks	1	4	6	11	34
Rescue Operations	1	1	10	16	45
Inspection and Fire Code Enforcement	4	7	6	10	27
Hazardous Materials Operations	3	7	6	10	28
Fire Station Tours, Fire Truck School, Visits	7	5	7	9	26
Fire Prevention Public Education Programs	8	3	9	14	25
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	6	7	6	7	24
Fighting Fires	4		8	14	52
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	7	4	6	7	20
City Emergency Preparedness Program	6	7	12	6	25

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**4.02**	**80.37**	**1.30**	**338**	**33.4%**
Rescue Operations	4.41	88.22	0.87	18	19.6%
Fighting Fires	4.41	88.21	1.03	13	14.1%
Response to Gas Leaks	4.30	86.07	1.03	32	34.8%
Responses to Life-Threatening Medical Calls	4.17	83.47	1.26	16	17.4%
Hazardous Materials Operations	3.98	79.63	1.28	35	38.0%
Inspection and Fire Code Enforcement	3.91	78.15	1.34	36	39.1%
Fire Station Tours, Fire Truck School, Visits	3.78	75.56	1.45	36	39.1%
Fire Prevention Public Education Programs	3.76	75.25	1.39	31	33.7%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.72	74.40	1.47	40	43.5%
City Emergency Preparedness Program	3.66	73.21	1.42	35	38.0%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	3.66	73.18	1.51	46	50.0%



Hamilton

City Services & Asset Review

Hamilton Fire Services

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Responses

1985

Respondents

74

Awareness of Services

Service areas where importance exceeds performance by 20 points is indicative of a mismatch between expectations and service levels, equal to one point on the Likert scale used.

Service Area	Importance (index score)	Performance (index score)	Net Differential	Opt Out %
Total	**86**	**80**	**-5**	**20%**
Fighting Fires	97	88	-8	9%
Rescue Operations	93	88	-4	11%
Response to Gas Leaks	90	86	-4	21%
Inspection and Fire Code Enforcement	88	78	-10	23%
Hazardous Materials Operations	88	80	-8	24%
City Emergency Preparedness Program	87	73	-14	23%
Fire Prevention Public Education Programs	87	75	-11	20%
Responses to Life-Threatening Medical Calls	83	83	0	10%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	79	74	-4	26%
Fire Station Tours, Fire Truck School, Visits	78	76	-2	23%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	74	73	-1	31%

Performance *Q7 Over the last 24 months, how do you feel the Hamilton Fire Department has performed overall in the following services?*

Importance *Q8 How important should the following services be as responsibility for the Hamilton Fire Department?*

Hamilton

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Question

8

Importance of Services

How important should the following services be as responsibility for the Hamilton Fire Department?

Responses

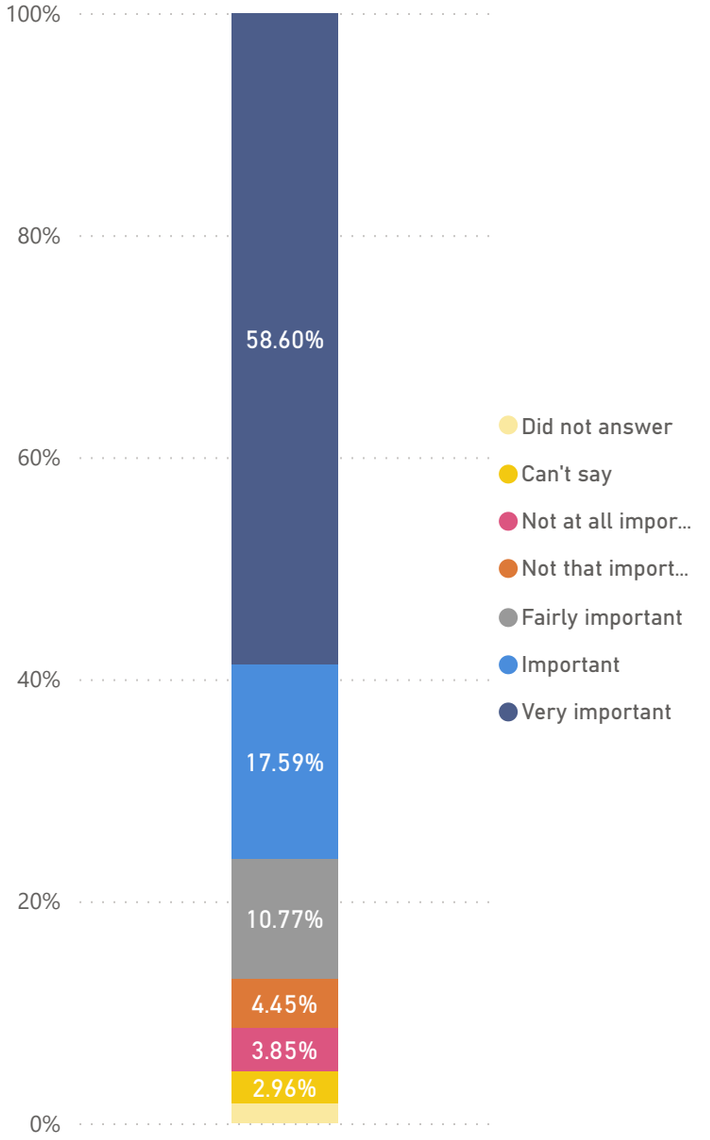
964

Respondents

90

Service Area	Not at all important	Not that important	Fairly important	Important	Very important
Total	**39**	**45**	**109**	**178**	**593**
Responses to Life-Threatening Medical Calls	8	5	6	17	54
Response to Gas Leaks	3	5	4	11	66
Rescue Operations	2	2	2	15	69
Inspection and Fire Code Enforcement	2	1	12	17	56
Hazardous Materials Operations	3	1	11	16	54
Fire Station Tours, Fire Truck School, Visits	5	9	12	26	36
Fire Prevention Public Education Programs	2	4	10	19	54
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3	6	23	16	38
Fighting Fires	3			3	84
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	7	8	19	17	32
City Emergency Preparedness Program	1	4	10	21	50

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**4.29**	**85.75**	**1.09**	**30**	**3.0%**
Fighting Fires	4.83	96.67	0.73	1	1.1%
Rescue Operations	4.63	92.67	0.82		
Response to Gas Leaks	4.48	89.66	1.04	1	1.1%
Inspection and Fire Code Enforcement	4.41	88.18	0.92	3	3.3%
Hazardous Materials Operations	4.38	87.53	0.99	5	5.4%
City Emergency Preparedness Program	4.34	86.74	0.94	5	5.4%
Fire Prevention Public Education Programs	4.34	86.74	0.99	1	1.1%
Responses to Life-Threatening Medical Calls	4.16	83.11	1.29	1	1.1%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.93	78.60	1.14	4	4.3%
Fire Station Tours, Fire Truck School, Visits	3.90	77.95	1.21	2	2.2%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	3.71	74.22	1.29	7	7.6%



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Hamilton Fire Services

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Question

10

Geographic Areas

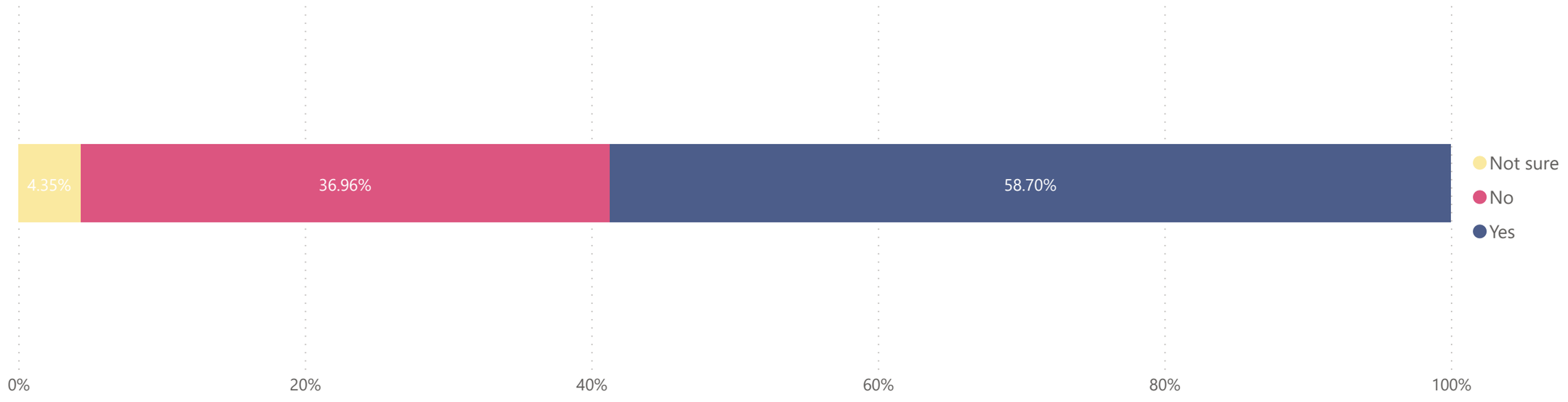
Are you aware that Hamilton has three (3) models for fire and emergency response based on geographic area?

Responses

92

Respondents

92



Service Area	Not sure	No	Yes	Opt Out	Opt Out %
Total	**4**	**34**	**54**	**4**	**4.35%**
Are you aware that Hamilton has three models for fire and emergency response based on geographic area?	4	34	54	4	4.35%

Hamilton

Question

11

On-Scene Arrival Time

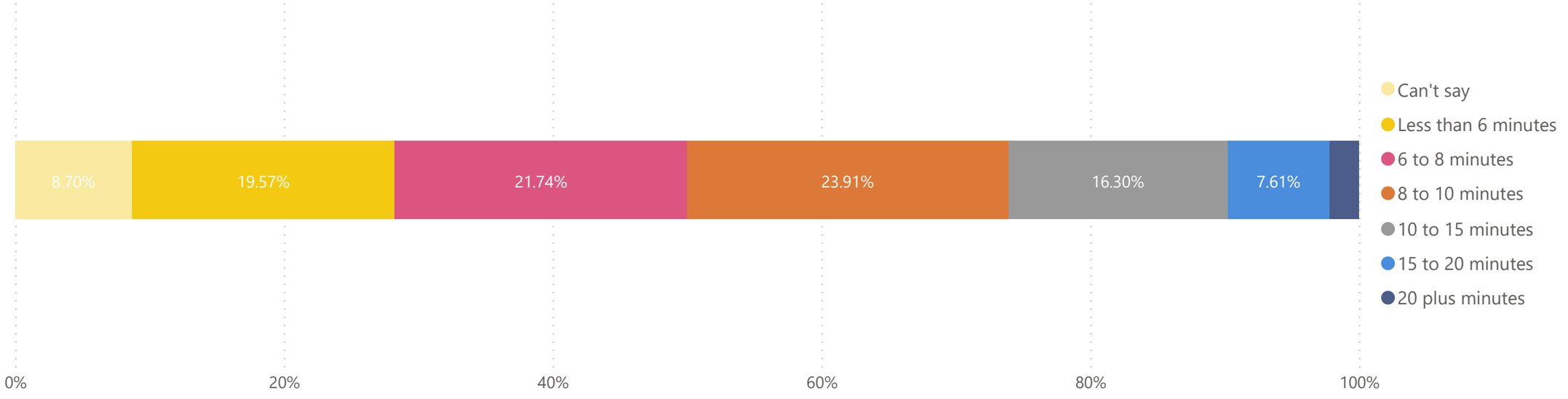
How many minutes do you think is acceptable for this process to take place, including the arrival on-scene of an Effective Firefighting and Rescue Force?

Responses

84

Respondents

84



Service Area	Less than 6 minutes	6 to 8 minutes	8 to 10 minutes	10 to 15 minutes	15 to 20 minutes	20 plus minutes	Opt Out	Opt Out %
Total	**18**	**20**	**22**	**15**	**7**	**2**	**8**	**8.70%**
How many minutes do you think is acceptable for this process to take place, including the arrival on-scene of an Effectivce Firefighting and Rescue Force?	18	20	22	15	7	2	8	8.70%

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Question

13

Services Meeting Needs

Do the following services provided by the Hamilton Fire Department meet your needs

Responses

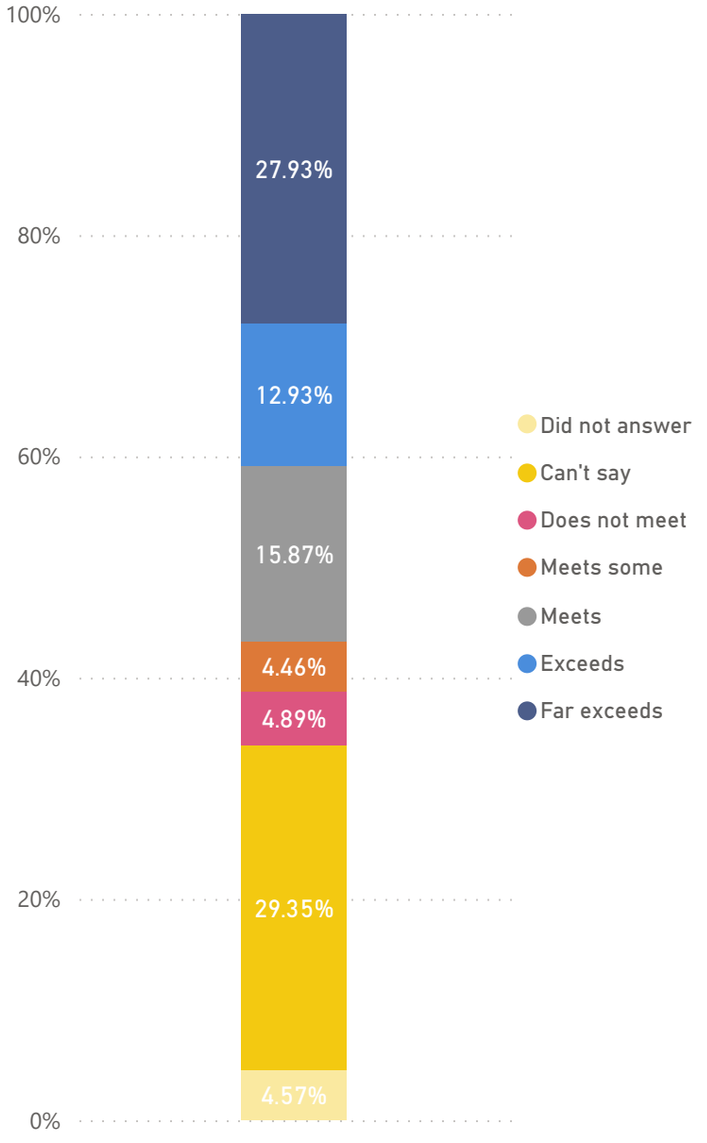
608

Respondents

80

Service Area	Does not meet	Meets some	Meets	Exceeds	Far exceeds
Total	**45**	**41**	**146**	**119**	**257**
Responses to Life-Threatening Medical Calls	7	5	17	13	31
Rescue Operations	1	2	16	14	31
Inspection and Fire Code Enforcement	5	5	14	12	22
Hazardous Materials Operations	3	3	13	12	23
Fire Station Tours, Fire Truck School, Visits	5	6	12	13	23
Fire Prevention Public Education Programs	7	4	16	11	25
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	5	5	13	8	24
Fighting Fires	2	4	13	17	40
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	4	2	16	6	19
City Emergency Preparedness Program	6	5	16	13	19

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**3.83**	**76.51**	**1.25**	**270**	**29.3%**
Fighting Fires	4.17	83.42	1.06	12	13.0%
Rescue Operations	4.13	82.50	0.99	24	26.1%
Hazardous Materials Operations	3.91	78.15	1.17	34	37.0%
Responses to Life-Threatening Medical Calls	3.77	75.34	1.32	15	16.3%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.75	74.91	1.34	33	35.9%
Fire Station Tours, Fire Truck School, Visits	3.73	74.58	1.30	28	30.4%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	3.72	74.47	1.27	41	44.6%
Inspection and Fire Code Enforcement	3.71	74.14	1.29	30	32.6%
Fire Prevention Public Education Programs	3.68	73.65	1.34	24	26.1%
City Emergency Preparedness Program	3.58	71.53	1.29	29	31.5%



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Question

14

Responses

103

Respondents

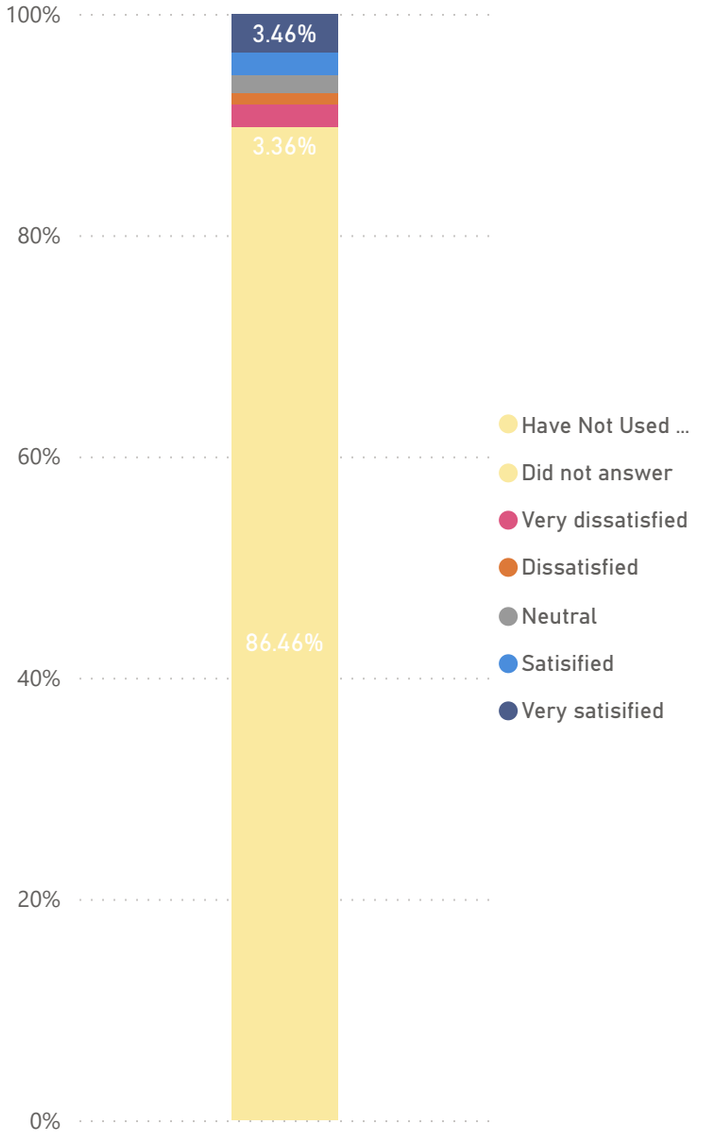
33

Satisifaction With Services

In the last 24 months if you have used Hamilton Fire Department's services, how satisfied are you with your ability to access these services? If you have not used these services, in the past 24 months, please select "Have Not Used This Service".

Service Area	Have Not Used This Service	Very dissatisfied	Dissatisfied	Neutral	Satisified	Very satisified
Total	**875**	**20**	**11**	**16**	**21**	**35**
Responses to Life-Threatening Medical Calls	73	2	1	1	3	9
Response to Gas Leaks	82		2	1	1	2
Rescue Operations	86	1		1		1
Inspection and Fire Code Enforcement	79	3	1	1	4	1
Hazardous Materials Operations	86	1		1	1	
Fire Station Tours, Fire Truck School, Visits	72	1	2	3	3	8
Fire Prevention Public Education Programs	71	3	1	2	4	7
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	79	3	2	2	1	2
Fighting Fires	82	1		1	2	3
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	86	2		2		
City Emergency Preparedness Program	79	3	2	1	2	2

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**3.39**	**67.77**	**1.52**	**875**	**86.5%**
Responses to Life-Threatening Medical Calls	4.00	80.00	1.41	73	79.3%
Fire Station Tours, Fire Truck School, Visits	3.88	77.65	1.28	72	78.3%
Fighting Fires	3.86	77.14	1.36	82	89.1%
Fire Prevention Public Education Programs	3.65	72.94	1.49	71	77.2%
Response to Gas Leaks	3.50	70.00	1.26	82	89.1%
Rescue Operations	3.00	60.00	1.63	86	93.5%
Inspection and Fire Code Enforcement	2.90	58.00	1.45	79	85.9%
City Emergency Preparedness Program	2.80	56.00	1.54	79	85.9%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	2.70	54.00	1.49	79	85.9%
Hazardous Materials Operations	2.67	53.33	1.25	86	93.5%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	2.00	40.00	1.00	86	93.5%



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Question
15

Safe and Comfortable Access

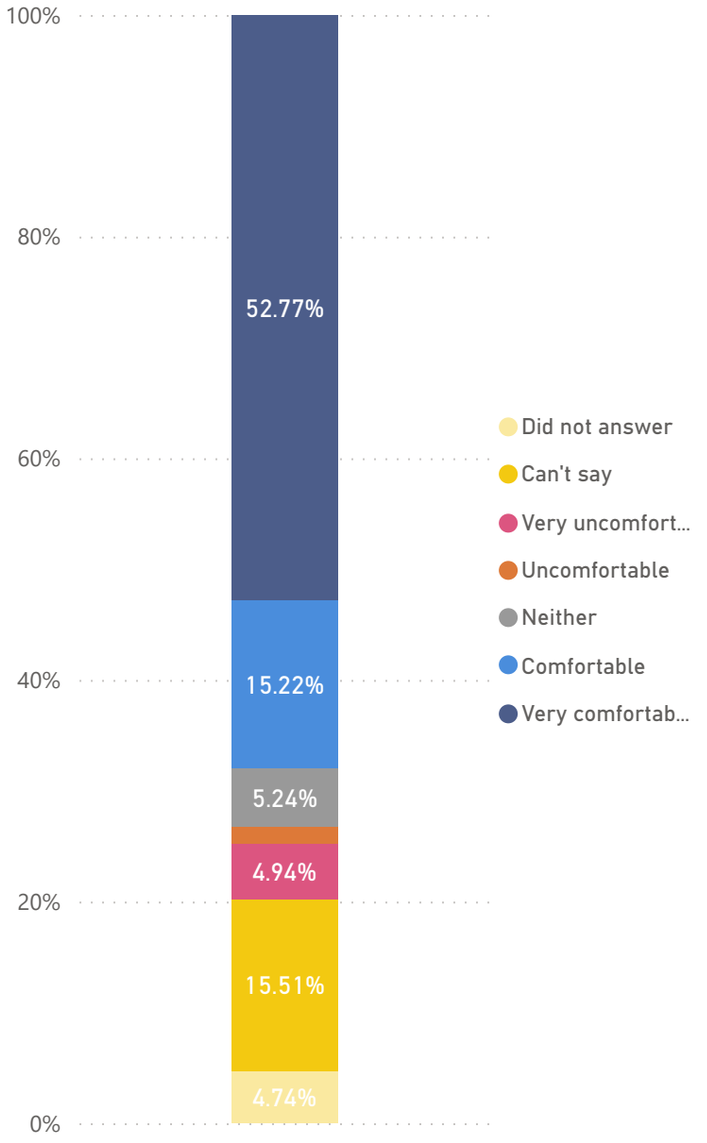
Do you feel comfortable and safe accessing services provided by the Hamilton Fire Department?

Responses
807

Respondents
86

Service Area	Very uncomfortable	Uncomfortable	Neither	Comfortable	Very comfortable
Total	**50**	**16**	**53**	**154**	**534**
Responses to Life-Threatening Medical Calls	8	2	3	17	55
Response to Gas Leaks	4	1	5	14	52
Rescue Operations	3		5	15	56
Inspection and Fire Code Enforcement	4	1	6	13	46
Hazardous Materials Operations	5	1	3	14	49
Fire Station Tours, Fire Truck School, Visits	5	2	6	12	46
Fire Prevention Public Education Programs	5	1	5	14	50
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	4	2	5	14	41
Fighting Fires	4	1	3	13	62
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	4	2	5	14	35
City Emergency Preparedness Program	4	3	7	14	42

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**4.37**	**87.41**	**1.11**	**157**	**15.5%**
Fighting Fires	4.54	90.84	0.99	5	5.4%
Rescue Operations	4.53	90.63	0.91	9	9.8%
Response to Gas Leaks	4.43	88.68	1.04	11	12.0%
Hazardous Materials Operations	4.40	88.06	1.11	17	18.5%
Fire Prevention Public Education Programs	4.37	87.47	1.12	13	14.1%
Inspection and Fire Code Enforcement	4.37	87.43	1.08	17	18.5%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	4.30	86.06	1.13	21	22.8%
Fire Station Tours, Fire Truck School, Visits	4.30	85.92	1.18	15	16.3%
Responses to Life-Threatening Medical Calls	4.28	85.65	1.24	3	3.3%
City Emergency Preparedness Program	4.24	84.86	1.15	19	20.7%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	4.23	84.67	1.16	27	29.3%



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Question

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Recommend to Others

How likely would you be to recommend these services to others?

Responses

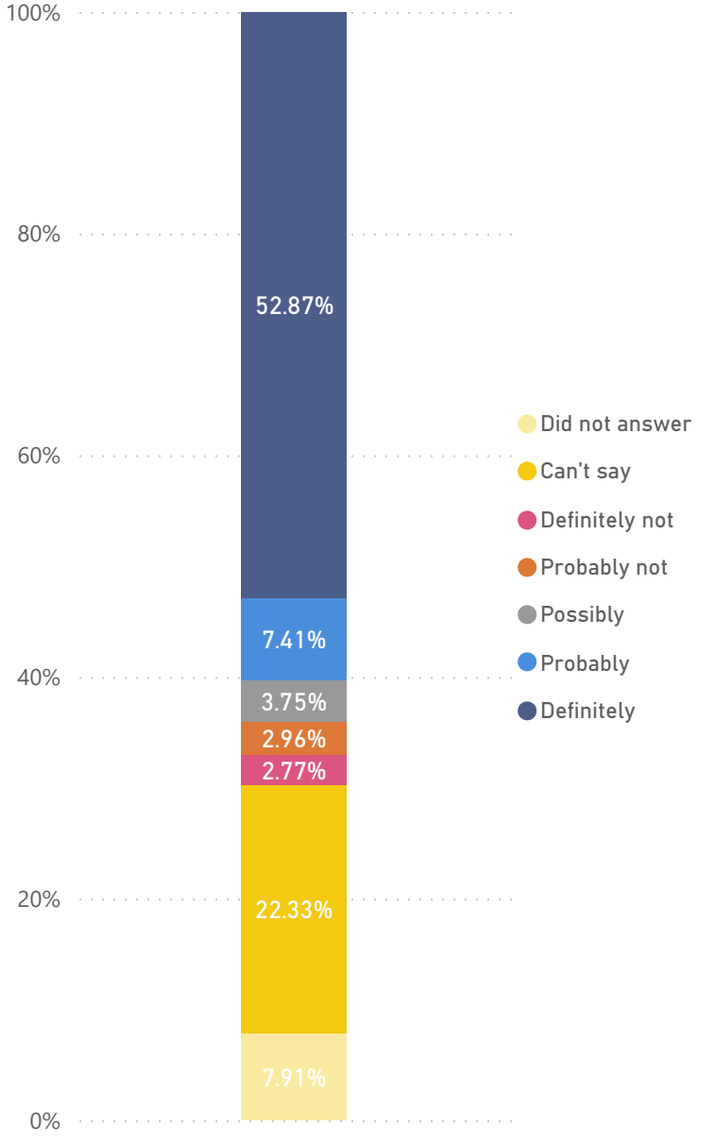
706

Respondents

78

Service Area	Definitely not	Probably not	Possibly	Probably	Definitely
Total	**28**	**30**	**38**	**75**	**535**
Responses to Life-Threatening Medical Calls	6	3	2	8	56
Response to Gas Leaks	1	3	3	8	51
Rescue Operations	2	2	3	7	56
Inspection and Fire Code Enforcement	1	3	5	7	47
Hazardous Materials Operations	4	1	2	5	48
Fire Station Tours, Fire Truck School, Visits	4	2	2	7	48
Fire Prevention Public Education Programs	2	4	4	5	51
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	1	3	6	5	41
Fighting Fires	2	3		8	61
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	2	2	7	7	36
City Emergency Preparedness Program	3	4	4	8	40

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**4.50**	**90.00**	**1.04**	**226**	**22.3%**
Fighting Fires	4.66	93.24	0.89	12	13.0%
Rescue Operations	4.61	92.29	0.91	14	15.2%
Response to Gas Leaks	4.59	91.82	0.89	20	21.7%
Hazardous Materials Operations	4.53	90.67	1.10	22	23.9%
Inspection and Fire Code Enforcement	4.52	90.48	0.94	22	23.9%
Fire Prevention Public Education Programs	4.50	90.00	1.05	19	20.7%
Fire Station Tours, Fire Truck School, Visits	4.48	89.52	1.12	21	22.8%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	4.46	89.29	1.00	29	31.5%
Responses to Life-Threatening Medical Calls	4.40	88.00	1.22	11	12.0%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	4.35	87.04	1.07	30	32.6%
City Emergency Preparedness Program	4.32	86.44	1.17	26	28.3%



Hamilton

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Question
17

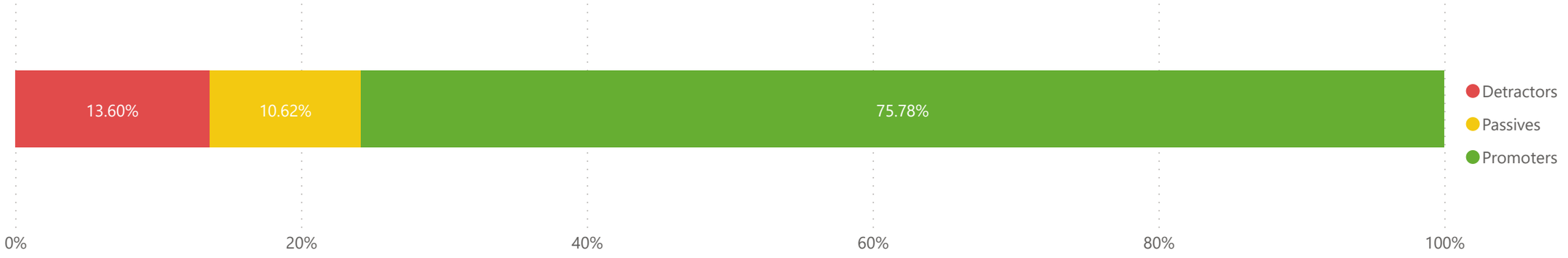
Net Promoter Score

Typically the Net Promoter Score is used to measure customer loyalty.

How likely would you be to recommend these services to others?

Responses
706

Respondents
78



Service Area	σ	NPS	Detractors	Passives	Promoter
All Service Areas	**20.87**	**62.18**	**96**	**75**	**535**
Responses to Life-Threatening Medical Calls	24.44	60.00	11	8	56
Response to Gas Leaks	17.74	66.67	7	8	51
Rescue Operations	18.30	70.00	7	7	56
Inspection and Fire Code Enforcement	18.81	60.32	9	7	47
Hazardous Materials Operations	22.05	68.33	7	5	48
Fire Station Tours, Fire Truck School, Visits	22.50	63.49	8	7	48
Fire Prevention Public Education Programs	20.96	62.12	10	5	51
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	19.99	55.36	10	5	41
Fighting Fires	17.79	75.68	5	8	61
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	21.48	46.30	11	7	36
City Emergency Preparedness Program	23.42	49.15	11	8	40

Likert choices less than 4 are considered 'Detractors' while 5s are considered 'Promoters' and 4s are 'Passive'. Respondents who opted out by not answering or selecting 'Can't Say' were removed from the sample. Net Promoter score is calculated by subtracting (% Detractors) from (% Promoters). σ (Standard Deviation) is calculated in percent, the same units as the Net Promoter Score.

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Question
18

Value for Money

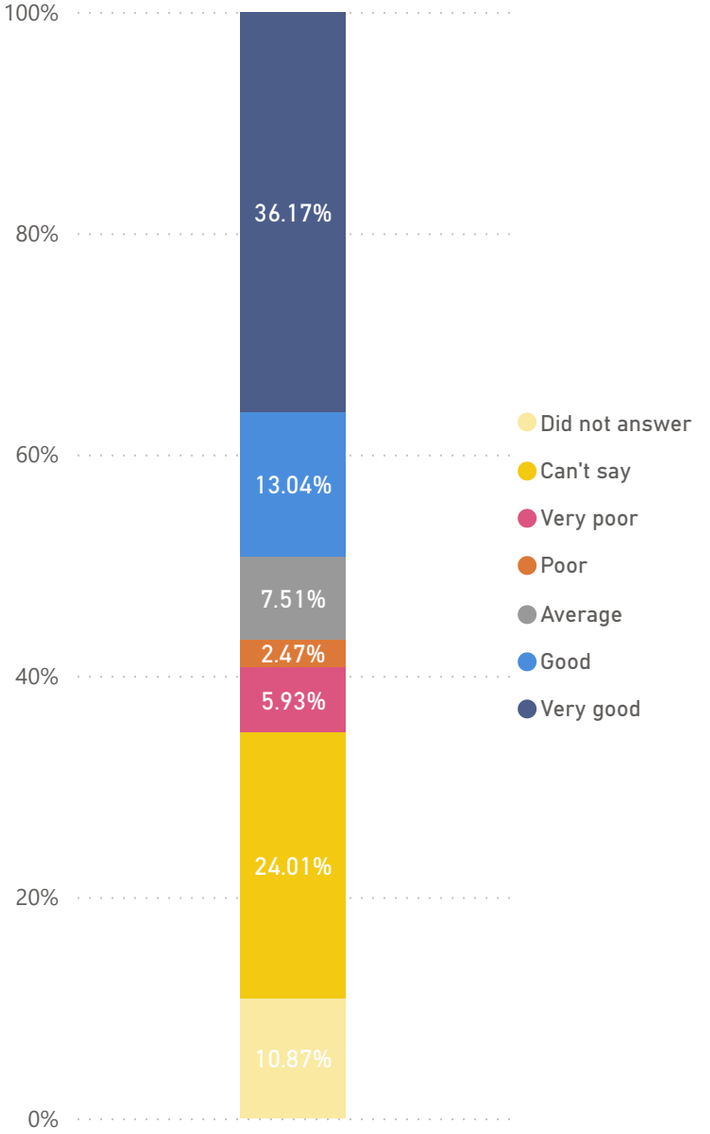
Based on the chart above and any additional knowledge or experience you have, how would you rate the Hamilton Fire Department in providing good value for the services provided to your community?

Responses
659

Respondents
74

Service Area	Very poor	Poor	Average	Good	Very good
Total	**60**	**25**	**76**	**132**	**366**
Responses to Life-Threatening Medical Calls	8	3	4	20	38
Response to Gas Leaks	4	2	7	14	35
Rescue Operations	2	3	4	15	43
Inspection and Fire Code Enforcement	6	4	7	11	29
Hazardous Materials Operations	5	1	5	15	31
Fire Station Tours, Fire Truck School, Visits	6	1	8	9	34
Fire Prevention Public Education Programs	7	2	11	8	32
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	6	3	9	6	26
Fighting Fires	3	2	4	16	48
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	6	1	6	9	24
City Emergency Preparedness Program	7	3	11	9	26

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**4.09**	**81.82**	**1.28**	**243**	**24.0%**
Fighting Fires	4.42	88.49	1.01	10	10.9%
Rescue Operations	4.40	88.06	0.99	15	16.3%
Response to Gas Leaks	4.19	83.87	1.16	21	22.8%
Hazardous Materials Operations	4.16	83.16	1.21	24	26.1%
Fire Station Tours, Fire Truck School, Visits	4.10	82.07	1.31	23	25.0%
Responses to Life-Threatening Medical Calls	4.05	81.10	1.31	10	10.9%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	3.96	79.13	1.38	35	38.0%
Fire Prevention Public Education Programs	3.93	78.67	1.38	23	25.0%
Inspection and Fire Code Enforcement	3.93	78.60	1.36	25	27.2%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.86	77.20	1.41	31	33.7%
City Emergency Preparedness Program	3.79	75.71	1.40	26	28.3%



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Question

19

Service Level Changes

Are there any services being provided that you feel need a service level change?

Responses

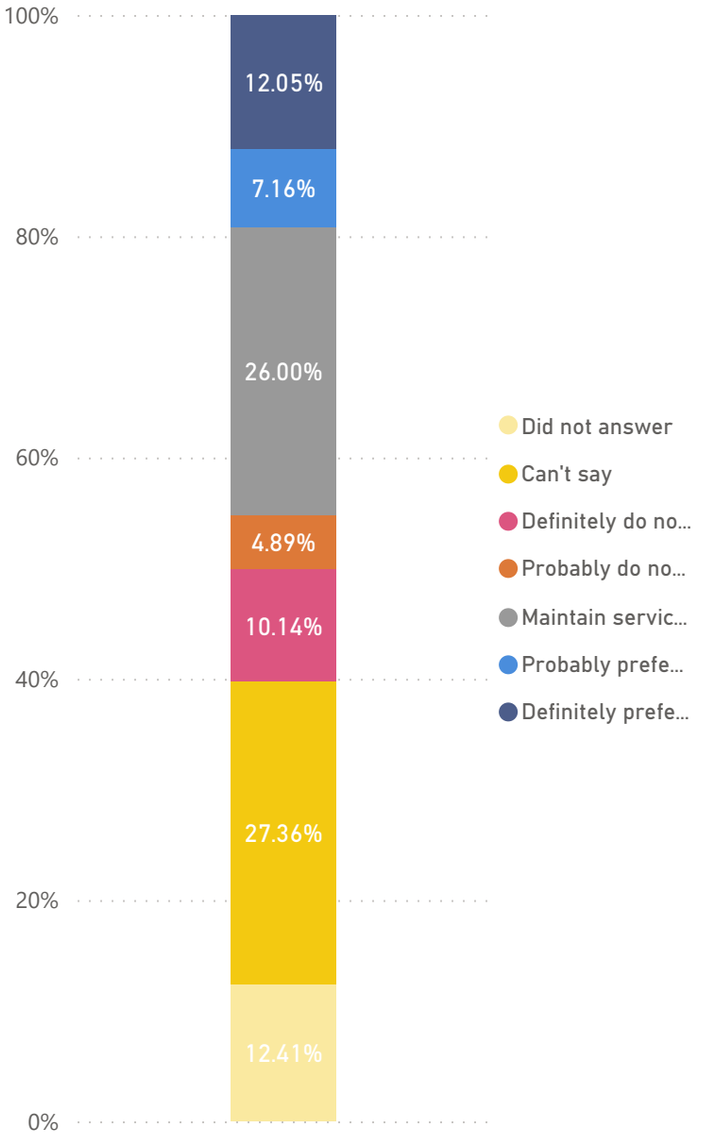
665

Respondents

78

Service Area	Definitely do not prefer service level change	Probably do not prefer service level change	Maintain service level	Probably prefer service level change	Definitely prefer service level change
Total	**112**	**54**	**287**	**79**	**133**
Responses to Life-Threatening Medical Calls	14	3	22	5	17
Response to Gas Leaks	13	7	44	19	34
Rescue Operations	12	7	24	7	10
Inspection and Fire Code Enforcement	7	8	22	6	12
Hazardous Materials Operations	11	2	27	5	7
Fire Station Tours, Fire Truck School, Visits	7	5	26	7	8
Fire Prevention Public Education Programs	8	5	25	8	10
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	7	5	25	4	9
Fighting Fires	19	3	25	6	8
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	6	4	25	5	8
City Emergency Preparedness Program	8	5	22	7	10

Service Area	Avg.	Avg. %	σ	Opt Out	Opt Out %
Total	**3.10**	**62.02**	**1.29**	**302**	**27.4%**
Response to Gas Leaks	3.46	69.23	1.27	51	27.7%
Inspection and Fire Code Enforcement	3.15	62.91	1.27	25	27.2%
Responses to Life-Threatening Medical Calls	3.13	62.62	1.47	19	20.7%
Fire Prevention Public Education Programs	3.13	62.50	1.23	24	26.1%
City Emergency Preparedness Program	3.12	62.31	1.27	27	29.3%
Fee-Based Services (i.e., Inspections: Daycare, Commercial, Film Services)	3.10	62.08	1.16	32	34.8%
Fire Station Tours, Fire Truck School, Visits	3.08	61.51	1.16	26	28.3%
Fire Permits (i.e., Open Air Burn Permits, Family Fireworks Sale Permits)	3.06	61.20	1.21	30	32.6%
Rescue Operations	2.93	58.67	1.30	21	22.8%
Hazardous Materials Operations	2.90	58.08	1.23	27	29.3%
Fighting Fires	2.69	53.77	1.35	20	21.7%



Hamilton

Definition and Ranking of Consistency and Confidence

Data Grading Scales

Grade		Data Consistency Standard Deviation (σ, Consistency of Responses)	Confidence Level Margin of Error (at 95% Confidence in Sample Size)
A	Very High	0 to 0.5 - results are tightly grouped with little to no variance in response	0% to 5% - Minimal to no error in results, can generally be interpreted as is
B	High	0.5 to 1.0 - results are fairly tightly grouped but with slightly more variance in response	5% to 10% - Error has become noticeable, but results are still trustworthy
C	Medium	1.0 to 1.5 - results are moderately grouped together, but most respondents are generally in agreeance	10% to 20% - Error is a significant amount and will cause uncertainty in final results
D	Low	1.5 to 2.0 - results show a high variance with a fair amount of disparity in responses	20% to 30% - Error has reached a detrimental level and results are difficult to trust
E	Very Low	2.0+ - results are highly variant with little to no grouping	30%+ - Significant error in results, hard to interpret data in much of a meaningful way

Here we attribute a lower value of consistency of response (Standard Deviation) to a higher confidence grade, but it does not necessarily mean that the data is "better". In reality we receive more insight in the data regardless. With a high consistency we can tell that respondents more often come to the same conclusion on a response for a question, whereas with low consistency we would see a split in people's opinion, some with a very high rating and others with a very low rating. Knowing this and then understanding why is the most important thing.

$$\text{Margin of error} = z \times \frac{\sigma}{\sqrt{n}}$$

The margin of error is calculated using 3 factors:
z - z-score, σ - standard deviation, n - sample size
The margin of error mainly tells us whether the sample size of the survey is appropriate. This is because in the calculation above, sample size would be the largest factor and thus have the biggest impact. The margin of error is represented as a percentage and indicates the range above and below the calculated average the true value is likely to fall. A smaller margin of error indicates a more precise estimate and vice versa.