

## Appendix B

### Excerpts from 2020-2025 Fire Master Plan Support for Station Options Report

#### FIRE SUPPRESSION/OPERATIONS DIVISION

The basic organization and orientation of all fire departments is primarily directed towards fire suppression. While the fire service may place an emphasis on fire prevention, public education, risk reduction and hazard abatement, its ability to respond and control fires is an operational priority. The ability to respond to the life safety and property protection needs of the local community is the common denominator in fire department operations.

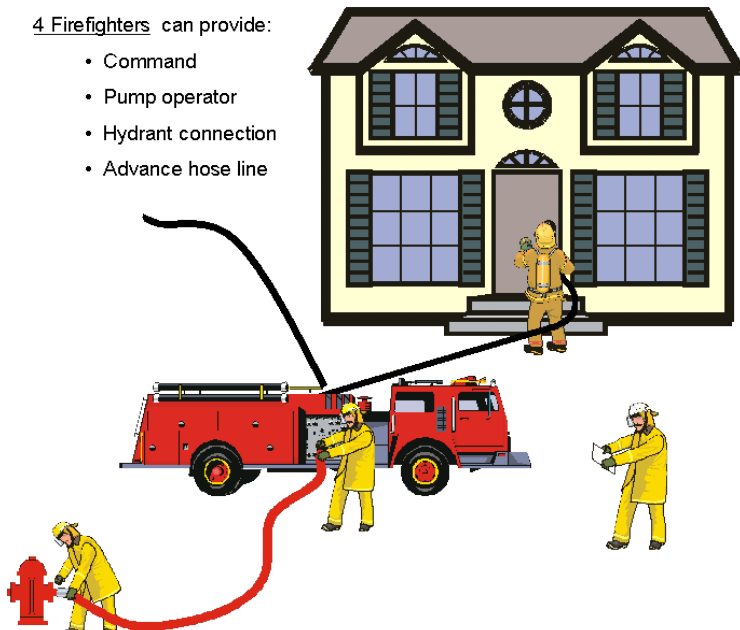
The success of a firefighting operation depends on the ability of a fire department to effectively and efficiently use the available resources to protect life and property.

#### Staffing levels:

Today it is recognized that an understaffed fire department operates under a handicap at each emergency and the officer in charge must decide on which duties are to be postponed or left undone. Unfortunately the consequences can be life threatening.

Research conducted by various fire safety agencies i.e. National Fire Protection Association (NFPA), Federal Emergency Management Agency, Insurers' Advisory Organization (I.A.O.), International Town Management Association, NIST National Institute of Standards and Technology; related publications, educational institutions; and major individual fire department studies, indicate that optimum performance for the average single family dwelling fire is achieved through the use of crews comprised of four fire fighters including a direct supervisor (company officer).

Able to commence *limited* rescue or fire fighting with 4 firefighters



Responding with less than a crew of 4 reduces efficiency and would also have an adverse effect on the safety of the fire fighters.

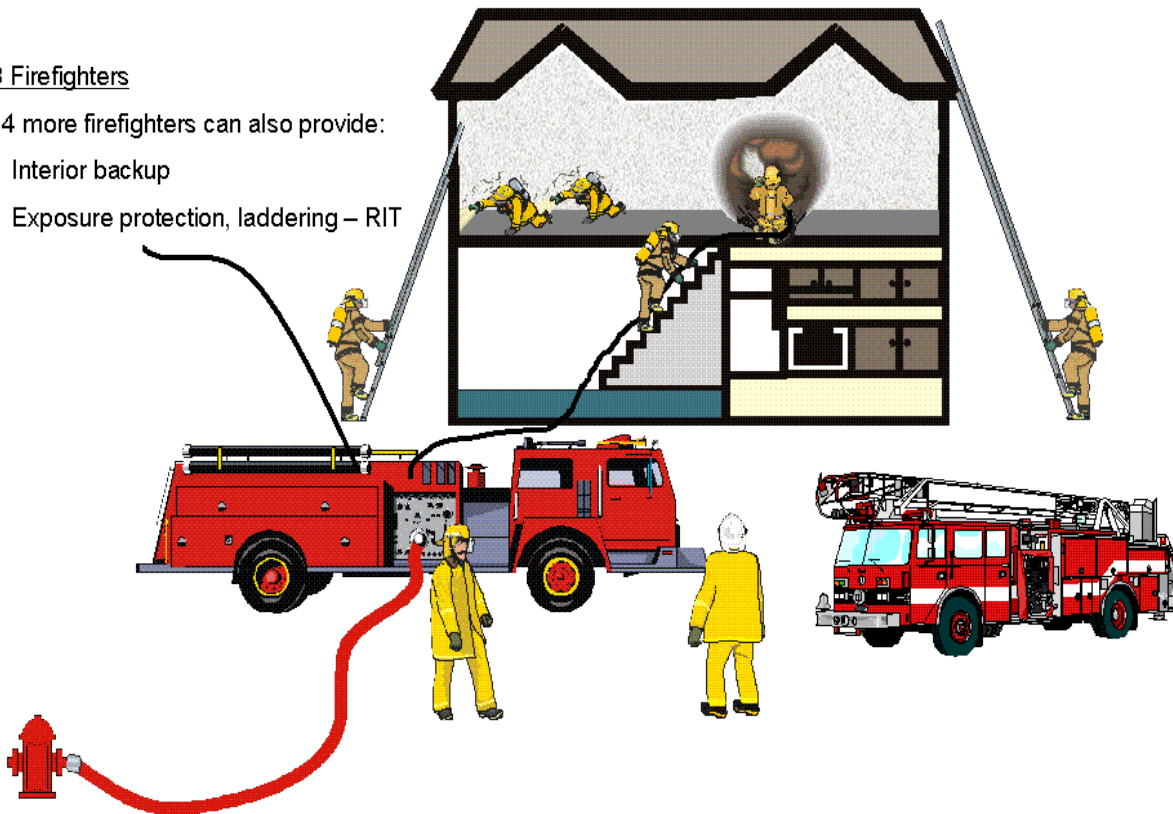
Minimum levels of fire protection leave much to be desired by the property owner who suffers the loss and the fire department whose morale is often affected by its inability to successfully control and extinguish the average fire.

Able to *commence* interior rescue or fire fighting with 8 firefighters

#### 8 Firefighters

4 more firefighters can also provide:

- Interior backup
- Exposure protection, laddering – RIT



**Ideally, a minimum 10 person response team should respond to a typical day-to-day fire. The number of fire fighters required may increase as the fire escalates.**

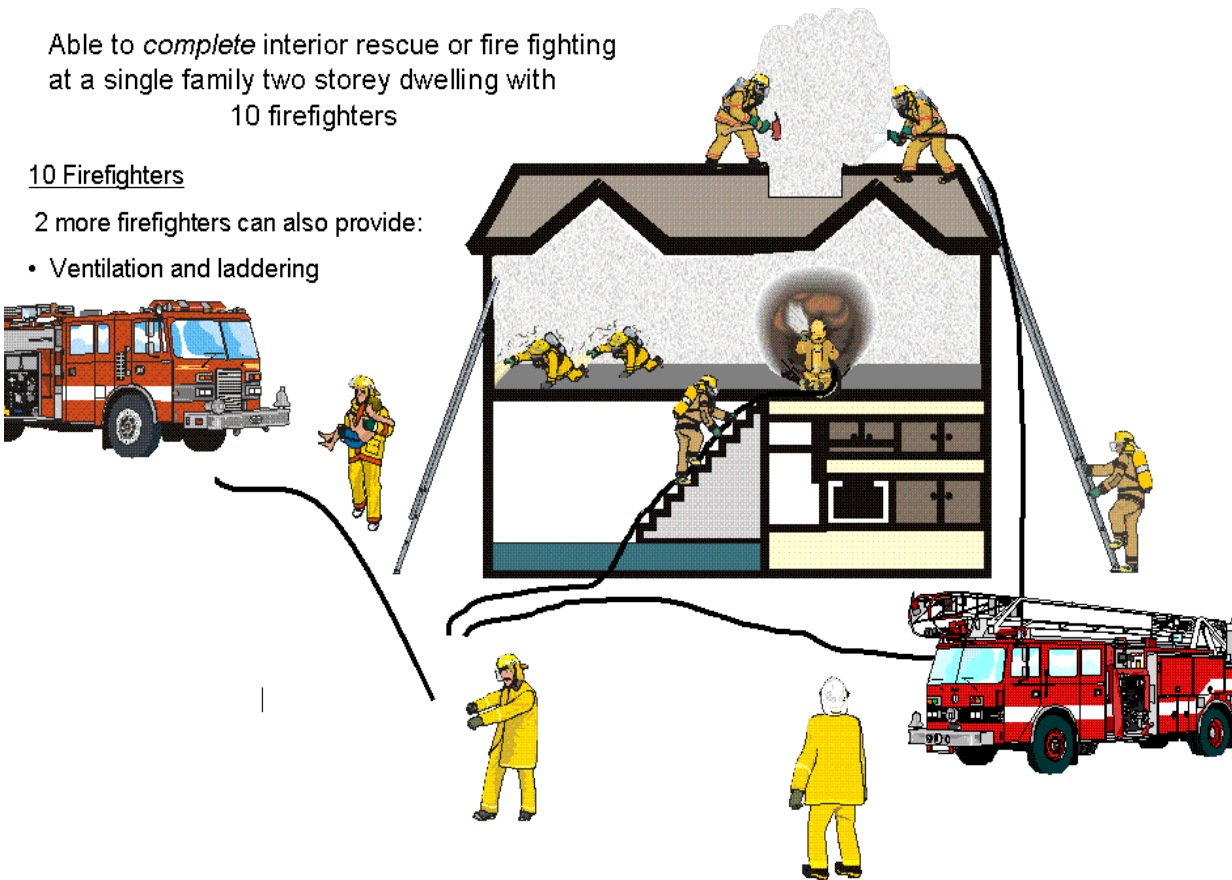
A single family dwelling fire requires a minimum 2 vehicle response, whether it is 2 pumpers for urban response or a pumper and a tanker for rural response.

Able to *complete* interior rescue or fire fighting at a single family two storey dwelling with 10 firefighters

#### 10 Firefighters

2 more firefighters can also provide:

- Ventilation and laddering



Two fire fighters are required to drive the responding apparatus. They must remain with their vehicles in order to supply water, operate the pumps, distribute equipment, provide assistance to the fire fighters with self-contained breathing apparatus and operate the radio equipment.

Four additional fire fighters are required to advance hose lines and attack the fire. Four other fire fighters are required for laddering, forcible entry, ventilation, rescue, connecting hose lines to fire hydrants or other water supply operations as well as advancing and attacking the fire with a third hose line. Two of the above mentioned fire fighters should be direct supervisors (company officers) and one as the Incident Commander.

Apparatus such as aerial devices, squads, rescue vehicles and water tank trucks must be sufficiently staffed to perform the tasks for which they respond.

The number of fire fighters responding with apparatus should be appropriate for the realized fire demand in order to form an "on scene" fire attack team.

Responses to occurrences for medical assistance, vehicle extrication, grass fires and/or other emergencies may require a lesser complement of fire fighters.

Fires in larger attached structures such as industrial, commercial or institutional occupancies, high rise, etc. will require additional personnel.

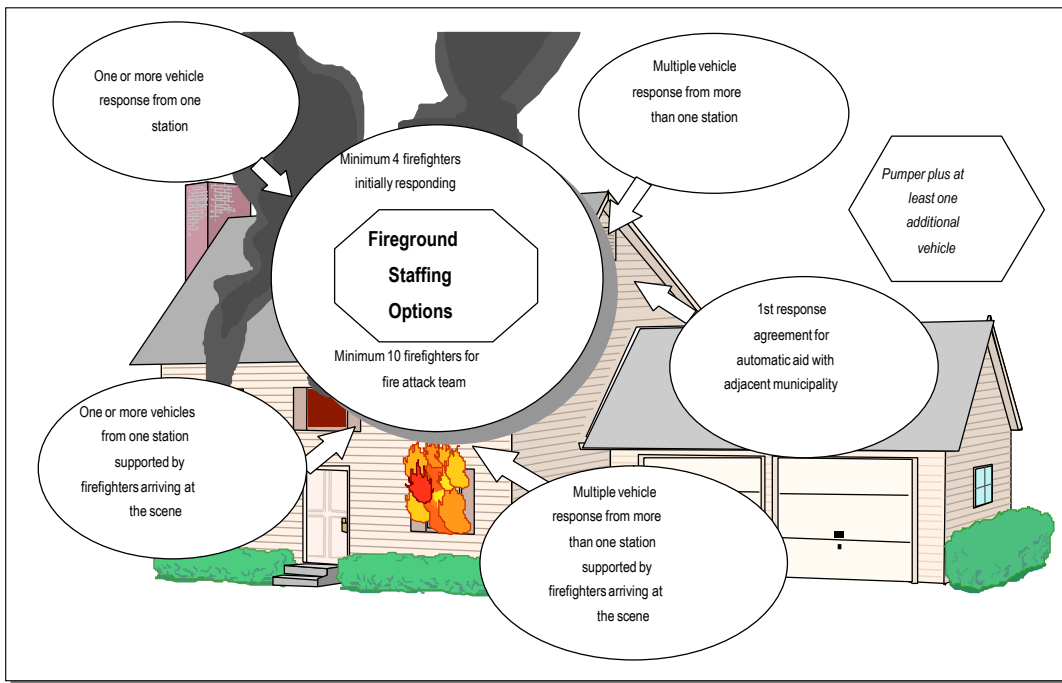
### **Assembling the "on scene" fire attack teams**

Traditional methods of assembling "on scene" fire attack teams include the following:

- a) Full-time fire fighters responding with apparatus,
- b) Full-time fire fighters responding with apparatus supplemented by off duty full-time fire fighters who have been called back,

- c) Full-time fire fighters responding with apparatus supplemented by volunteer fire fighters,
- d) All volunteer fire fighters responding to the station and then on the apparatus to the scene,
- e) Some volunteer fire fighters responding to the station and then on the apparatus to the scene while other volunteer fire fighters respond directly to the scene, and
- f) Multiple vehicle and/or station response.

Any one or any combination of the above is normally considered satisfactory provided that the "on scene" fire attack team is operational within a "response time" accepted by the municipality. The Ontario Office of the Fire Marshal has produced Public Fire Safety Guidelines, to provide information and a process for Municipal & Fire Officials to determine appropriate services and levels in accordance with local needs and circumstances.



## PFSG 04-08-12

### Response time

The question of adequate average response time is subject to too many variables to dictate an absolute time frame that all departments should comply with. There are, however, response times accepted by recognized organizations which can be used as guidelines when determining the "response time" to be accepted by the municipality.

I.A.O.<sup>1</sup> recommends from 2 minutes (severe hazards in large area buildings) to 7.5 minutes (very small buildings widely detached). NFPA recommends a maximum "response time" of 10 minutes to rural fires.

In the event of excessive "response time" consideration should be given to:

- a) increasing the number of fire department personnel, including volunteer fire fighters and full time fire fighters,
- b) responding additional apparatus,

<sup>1</sup>-I.A.O. response time means response travel time, i.e. after dispatch and turn out

- c) providing additional fire stations,
- d) improving the fire department emergency communications system.

Vehicle staffing is not standardized and is dependent on time of day and time of year throughout all response districts. It should be noted that our single Full-time staff since 2017 now respond to all calls in all response areas of the town, therefore providing a guaranteed response to incidents.

Since amalgamation in 1998, development within the town and fire risk has increased substantially:

- 2,484 new homes have been built most with light weight construction features,
- 1 new elder care facility
- several multi-residential buildings
- big box stores
- Libro Centre

Anticipated in the next five (5) years is the development of

- 2 Hotels & 1 Condominium
- Waterfront re-development
- Additional residential development on Boblo Island
- Several hundred new residential properties including multi-residential
- New High School

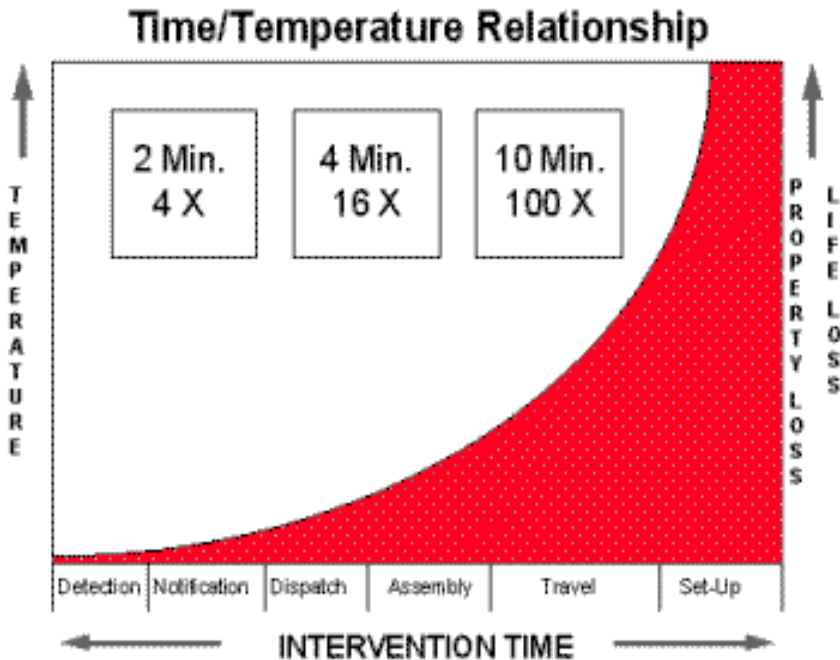
Staffing Considerations should be made following a review of the “Results Impacts and Options” contained in the fire-master plan and based on an analysis of our Force of Attack situation.

Of the past three years of Priority-One calls, the average total number of firefighters that could be expected in totality of an alarm in each response district is 12.

N.F.P.A. 1720 which is the Town of Amherstburg service level established in the Establishing and regulating by-law 2017-67 document indicates that: ***After assembling necessary resources at an emergency scene, the Fire department should have the capability to safely initiate the initial attack with Four (4) Firefighters within 2 minutes, 90 percent of the time.*** This has proved challenging at best, most of the time.

## Risk vs. Response Standards

To effectively mitigate fires and emergencies, response time with appropriate staffing is critical. An exponential increase in loss of life and property is associated with increased response time as illustrated in the following:



*Time/Temperature Relationship Graph*

*Ontario Fire Marshal PSFG 01-02-01  
"Comprehensive Fire Safety  
Effectiveness Model"*

AFD strives to meet NFPA 1720, (NPFA 1720 standard is the standard which Volunteer and small composite fire departments generally use as a guideline to the delivery system.)

Recent studies and articles from organizations such as the National Institute of Standards and Technology (NIST) and the National Fire Protection Association (NFPA) have identified the need to provide additional guidance to determine an effective fire ground response for buildings that are more complex and of a higher risk. This guide, in conjunction with an overall risk management program, will provide information for councils to make informed decisions in meeting their legislative responsibilities regarding the delivery of fire protection services.

The National Fire Protection Association standard 1720 Table 4.3.2. indicates:

Demand Zone	Demographics	Staffing & Response Time	Meets Objectives Percentage
Urban area	>1000 population /mi <sup>2</sup>	15 FF/9 min.	90%
Suburban area	500-1000 people/mi <sup>2</sup>	10FF/10 min.	80%
Rural area	<500 people/mi <sup>2</sup>	6FF/14 min.	80%
Special Risks	AHJ	AHJ	90%

Currently AFD has a minimum on-duty staffing level of 1 Career Fire fighter, and each station is additionally staffed with 20 Volunteer (Paid on Call) firefighters (total 60).

When a station is called out (paged) an average of 12 Fire Fighters (including a District Chief) respond to support the lone on-duty firefighter.

- ❖ **A review of the past calls indicates that in the Urban Demand Zone although response time is frequently within the 9 min. target, the staffing requirement of having 15 firefighters on scene is almost never achieved.**
- ❖ **The only time is when the incident occurs when Training is taking place on a Thursday evening between 1830 & 2030 hours.**
- ❖ **Consideration of remedies did involve considering changing the response assignment to two stations, however neither second station is within the proximity to achieve a 9 min response time. Second Stations are dispatched regularly on working fires but often manpower arrives later in the call.**
- ❖ **Our ability to achieve both the Suburban and Rural Demand Zone targets are frequently met with some challenges during daytime hours 0800-1700 and some long weekends throughout the year.**

Incidents involving occupancies larger than a single family residential structure such as a high-rise, commercial, industrial or institutional require a larger proportionate number of firefighters to mitigate the situation. This requires more firefighters and equipment which must travel further distances (from other stations) and increase response times to complete; evacuation, rescue, fire suppression and ventilation of a large structure. Historic events have required the commitment of on-duty staffing and the requirement to call out (Page) off-duty career staff and 2nd or 3rd station complements/and periodically mutual aid to assist with the emergency and/or provide coverage to the other areas of the Town. It should be recognized that incidents that involve rescue and suppression or mitigation tasks should be considered as two simultaneous incidents requiring adequate and additional staff for both incidents.

NFPA 1720 provides for full interior attack and rescue with aerial operations as required.

To determine the resources required to effectively handle an emergency at higher risk occupancies the OFM previously developed the **Critical Fire Ground Task Matrix**.

The matrix table assigns a lower effective response level (LERL) and an upper effective response level to (UERL) to occupancies of varying risk. Use of the critical fire ground task matrix only identifies the resources required for response to a single incident.

- ❖ **It is essential that during any emergency, there be available, a tactical reserve of personnel and emergency vehicles to respond to a simultaneous emergency elsewhere within the municipality.**

Adequate resources must be delivered in a timely manner to reduce the impact and severity of fires and other emergencies.

Fire ground Critical Tasks		Low Risk		Moderate Risk		High Risk		Extreme Risk	
		LERL	UERL	LERL	UERL	LERL	UERL	LERL	UERL
<b>Incident Response</b>  (Note: Where zero or no number has been assigned, the task may be performed at the direction of the incident commander.)	Incident Command*	1	1	1	1	1	1	1	1
	Pump Operator	1	1	1	1	1	1	1	1
	Attack Line (Confine & Extinguish)	2	2	2	2	2	2	2	2
	Additional Pump Operator(s)	0	0	0	2	2	4	4	6
	Additional Attack Line (Confine & Extinguish) + Backup	0	0	0	4	4	8	8	12
	Search & Rescue	0	0	2	4	2	6	2	8
	Initial Rapid Intervention Team (RIT)	0	0	4	6	8	16	12	22
	Ventilation	0	2	2	2	2	4	2	8
	Water Supply – pressurized	0	1	1	1	1	1	1	2
	Water Supply – non-pressurized	0	3	1	4	2	6	4	8
	Forcible Entry Team	0	0	0	0	0	1	0	1
	Utilities	0	1	1	1	1	1	1	1
	Laddering (Ground Ladders)	0	2	0	2	0	4	0	6
	Laddering (Aerial or elevating device operator)	0	0	0	2	0	2	0	2
	Exposure Protection			0	4	2	6	2	6
	Incident Safety Officer			0	1	1	1	1	1
	Accountability			1	1	1	1	1	1
	Entry Control			0	2	1	4	1	4
	Rehabilitation			0	1	1	1	1	1
	Salvage			0	2	2	2	2	2
	Lighting					0	2	0	2
	Directing Occupants					0	4	0	4
	Scribe					1	1	1	1
	Sector Officers					1	4	1	4
	Air Management (air refilling station, etc.)							1	2
<b>Other or Additional Response Considerations</b>	Logistics Officer								
	Administrative and/or Finance Officer								
	Planning Officer								
	Evacuations (large scale)								
	Communications (dispatch)								
	Public Information Officer								
	Overhaul								
	Additional Firefighters								
<b>Summary</b>	Incident Response Range	4	13	16	43	36	83	49	108
	Total Fire Department Including External								
	Fire Call Incident Response Range (+,-, within)								
Notes: LERL = Lower Effective Response Level & UERL = Upper Effective Response Level, [together form the critical staffing range] <ul style="list-style-type: none"> <li>This tool provides a range of staffing requirements only. Actual numbers may vary depending on the fire risk that exists in the municipality. Tasks performed on fire ground based on decisions made by Incident Commander.</li> <li>Planning moderate, high and extreme risk occupancies/locations will further validate staffing requirements to ensure the optimum level of protection for the municipality</li> <li>Simultaneous events will require further consideration due to additional personnel requirements beyond the scope of this matrix.</li> </ul> * Incident Command will assume responsibilities for the accountability and entry control tasks when no person has been assigned, or until a person has been assigned the task.									



- ❖ **The current staffing level barely meets the lower effective response level for Low and moderate risk occupancies. The staffing levels result in AFD being unable to assemble adequate resources for an emergency occurring in high risk and extreme risk occupancies.**

Any reductions contemplated would seriously impact the ability of AFD to assemble moderate and low risk required resources in an effective timely manner and will also impact reserve requirements for simultaneous calls for service, negatively affecting firefighter and public safety.

The NFPA Table of Effective Response indicates that first response times should be:

- 2 - 3.5 minutes is required for Institutional, Hospitals, and Nursing Homes
- 4 minute response times for Industrial Commercial
- 5- 6 min initial response time for residential occupancies

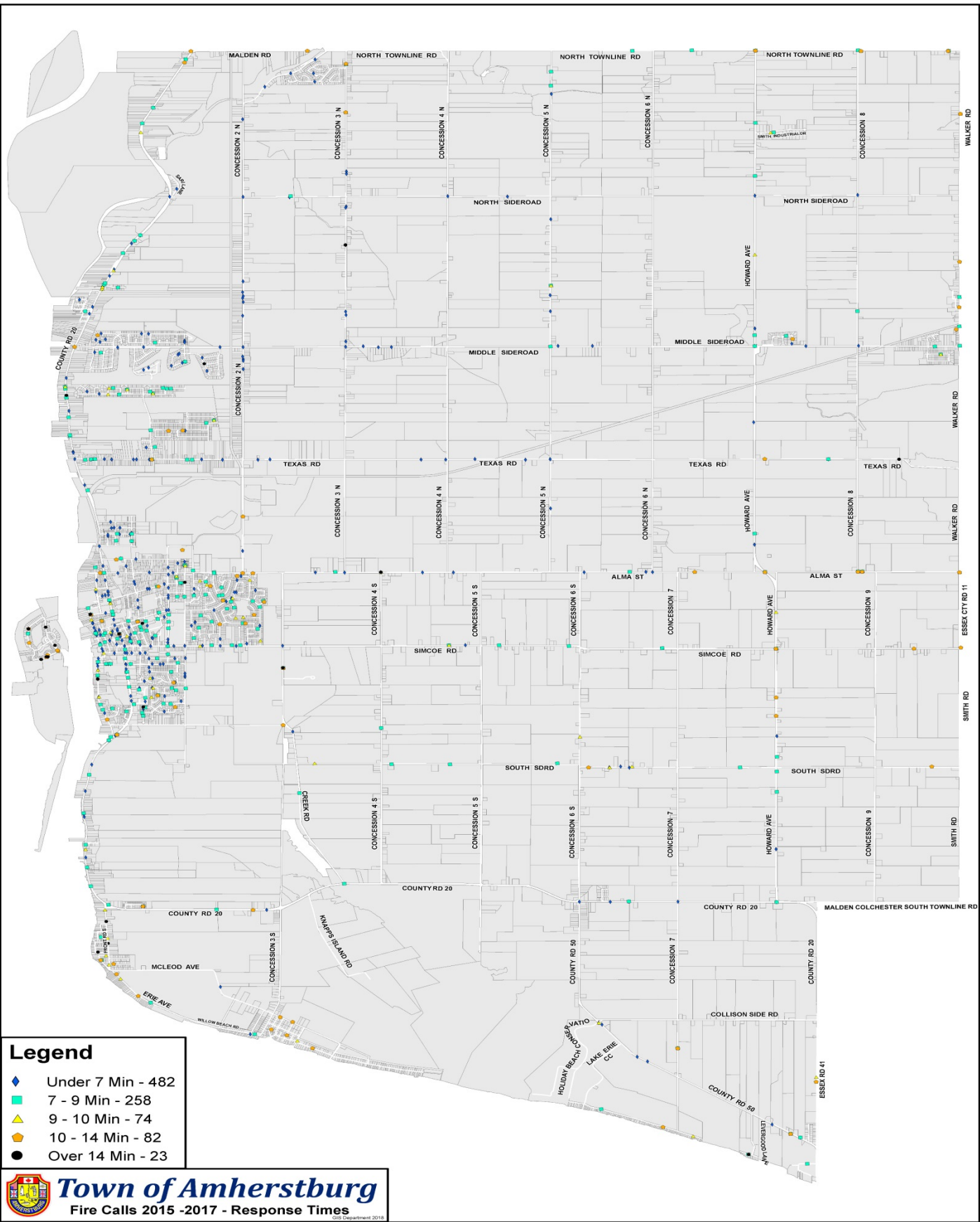
The 2007 Fire Master Plan identified requirements of response in both the NFPA 1710 standard and the NFPA 1720 standard and encouraged the department to have a 8 minute road response to structure fires and alarms sounding, 90% of the time. In 2015 The Establishing and Regulating by-law was amended to a desired road response time that includes consideration of population density, critical tasks required, and continued the percentile (%) fractals. These were maintained in the more recent update to the Establishing and Regulating By-law in 2017. That being 15 FF in 9 min. 90% of the time for Urban Density, 10 FF in 10 minutes 80% of the time for Suburban density and 6 FF in 14 Minutes 80% of the time for Rural density.

## **CURRENT STANDARDS OF RESPONSE**

A manual call by call review process was required to gather response data because of the inability of the current Computer Aided Dispatch (CAD) system to capture the response times as required. Staff used the following criteria to ensure adequate and sufficient data required to complete the response calculations;

- AFD/OFM structural fire types (OFM Code 1) were used to identify which calls historically were responded to as a “level 1” response (the highest emergency priority) and a full three years of data was utilized.
- Data was filtered to exclude responses under 20 seconds and over 20 minutes. This ensures that no anomalies were included.

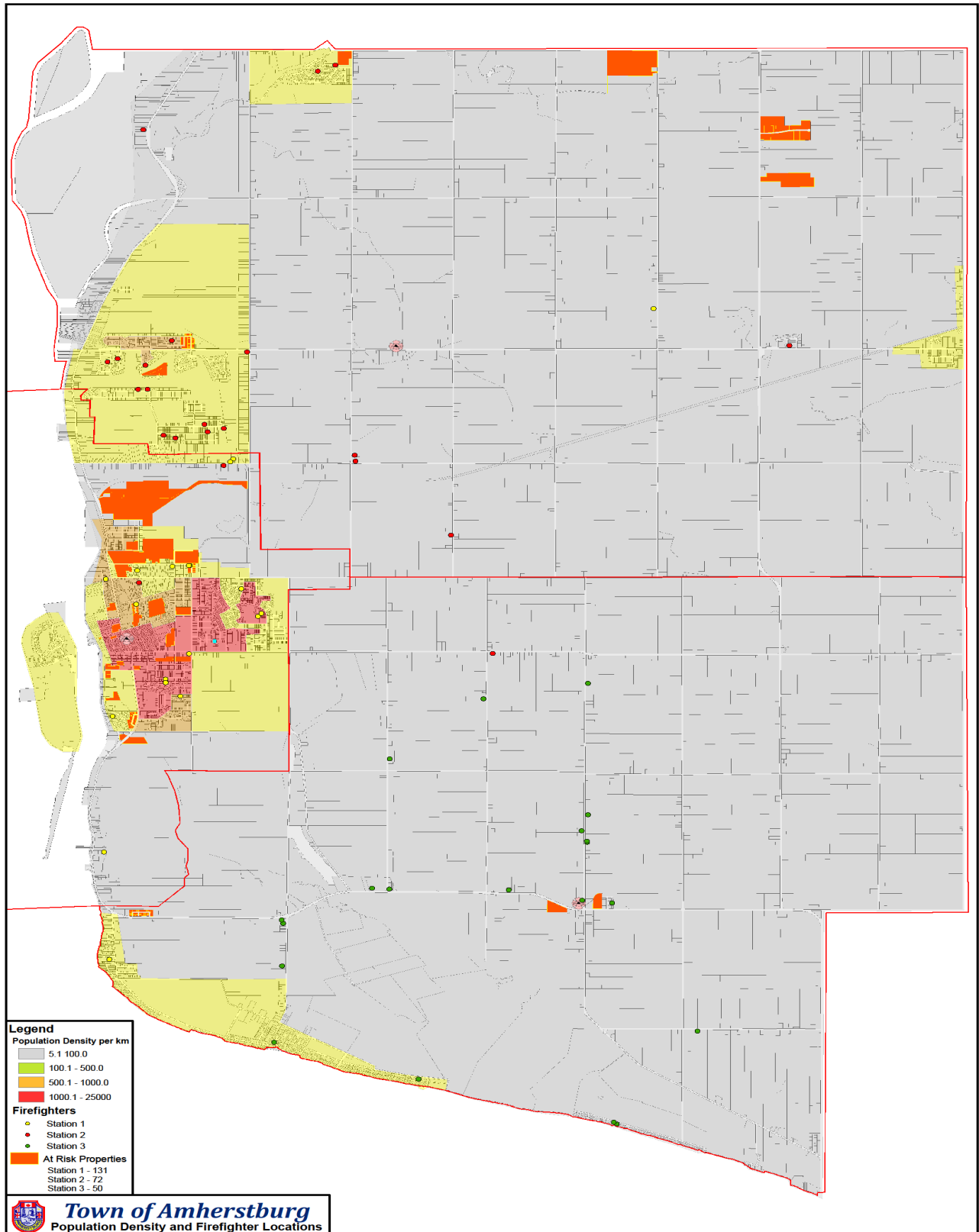
The map below shows the location of responses and illustrates by colour and shape the total first response time range achieved.



### **Fire Risk Map**

The results of the Fire Risk Assessment show areas of the Town of Amherstburg defined by high, medium and low risk & Population Density per Sq/km. These rating have been determined by combining the five components of; risk, historic, economic, property and life. This map depicts the total "At Risk Properties" in the Town of Amherstburg.

Additional Considerations in the determination of Options is the location of where responding fire fighters live in relation to their assigned stations. This will have an impact on Turnout Time which contributes to total response time. This map also illustrates the Location of Current Fire Fighter Homes.



## Fire Station Data

The fire station serves as the heart of the fire service. As goes the station, the equipment and facilities contained therein, so goes the pulse, the morale and the performance of the persons making use of the facilities.

In a small village or town the location may not be as critical for response times and distances. However, in geographically larger municipalities response distances of under 8 km and response (Travel) times of less than 5 minutes are desirable.

Currently The Town of Amherstburg is served by three (3) Fire Stations. Each constructed by the former Municipalities prior to Amalgamation 20 years ago in 1998. These stations were built and located to meet the needs of much smaller municipalities.

Station #3 in former Malden Twp. was built in the Early 1960's and Station #2 in former Anderdon Twp. were built in the early 1960's as well, with an additional vehicle bay added in 1974. Both buildings are more than 60 years old, and do not meet the needs of a modern fire service preparing for 2030 and beyond. In fact, the current vehicle bays will not accommodate modern Truck Chassis sizes and as a result significant building renovations are required before any additional vehicles are replaced as new vehicles will not fit into the bays.

Station #1 in Former Amherstburg village was built as part of the Municipal Complex (Town Hall) in 1993. It is 27 years old and has begun to significantly show its age. Additionally the Fire station training area, Kitchen and other administrative areas have in recent years been converted to share space with town hall operations limiting the fire departments use.

There are significant Accessibility issues at all locations.

Fire stations are constructed to house fire fighting apparatus and accommodate the fire fighters staffing the apparatus. They should be located in reasonably convenient areas to give quick response to emergencies, having regard to the distances to be travelled, response times and whether it is an industrial, commercial or residential area to be protected. When volunteers are used for staffing, their availability and their access to the station should be considered as they are relied upon to bring apparatus and equipment to the emergency scene.

Provision should be made in fire stations to accommodate all firefighting apparatus assigned as well as to allow flexibility of operations, allowing apparatus to be assigned from one station to another as the development of areas proceeds or deployment changes are necessary. Also, space should be provided for living and training accommodations for the career fire fighters manning the station and/or for Volunteer Fire Fighter use in flexible ways to accommodate limited availability of staff to perform required duties and activities.

In the case of a headquarters fire station, in addition to the apparatus, living and training accommodation, space should be provided for the administrative, training, and fire prevention staff of the department.

Response distances up to 8 km may provide insurance savings to residents within the area protected from a fire station.

The location and physical design of fire stations, and their successful ongoing management, are prime determinants of a community's ability to respond to fires. Having the right type and number of fire stations, located in the right places enables the policy makers and appointed managers of a jurisdiction to house fire fighters, apparatus, and equipment in a rational way for maximum use of resources. Doing this successfully may be a key test of managerial ability (both inside and outside the fire department) in a local government setting increasingly more marked by competition for scarce

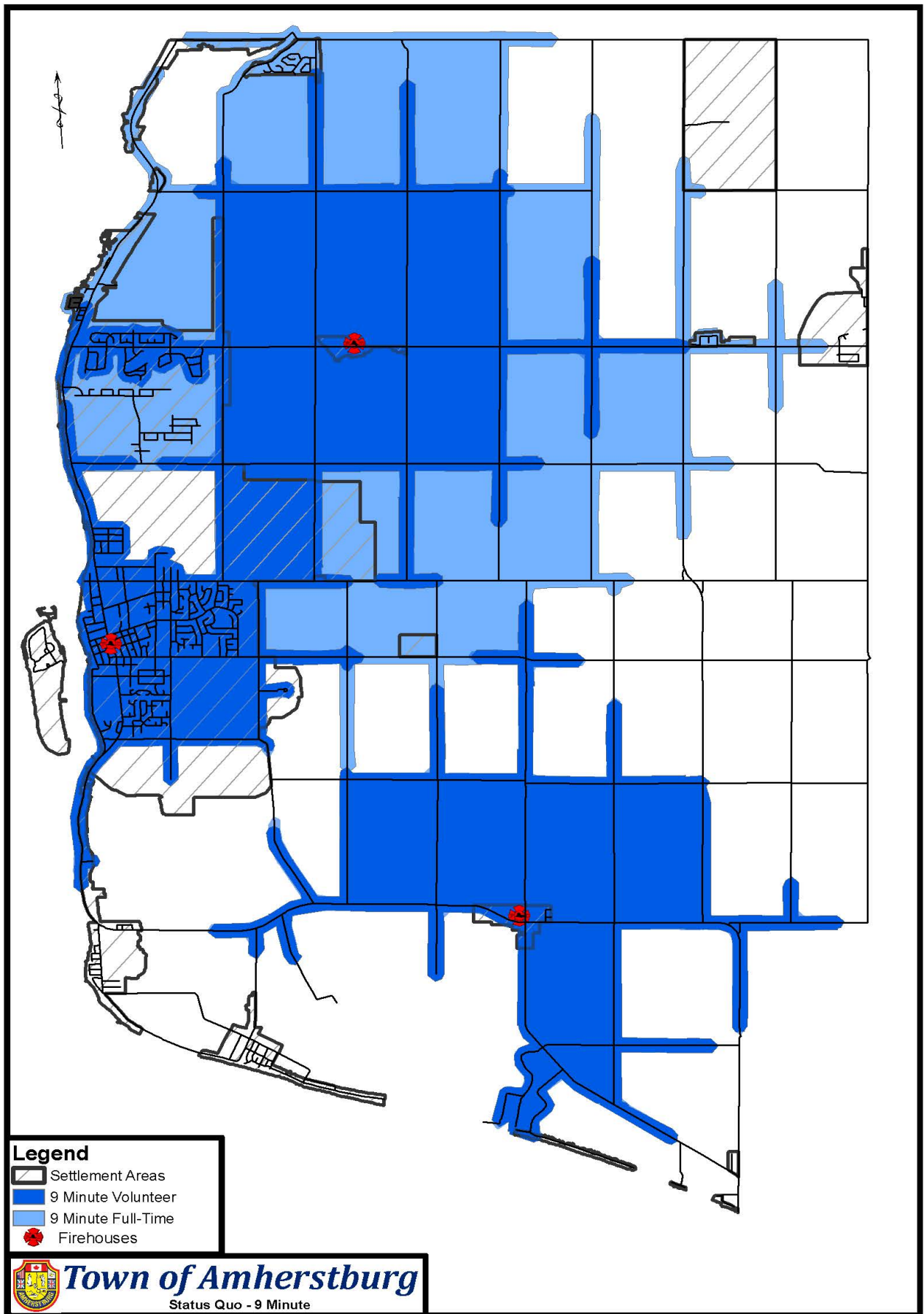
resources. Fire stations are a major capital expenditure and municipal improvement. The buildings are in use for many years. The size of the station should be compatible, not only with the present requirements, but for the future maximum anticipated number of personnel, apparatus and equipment.

For each of the three (3) fire stations, detailed data on the first response vehicles or fire apparatus in the station and a description of the number of responding staff for the stations are provided.

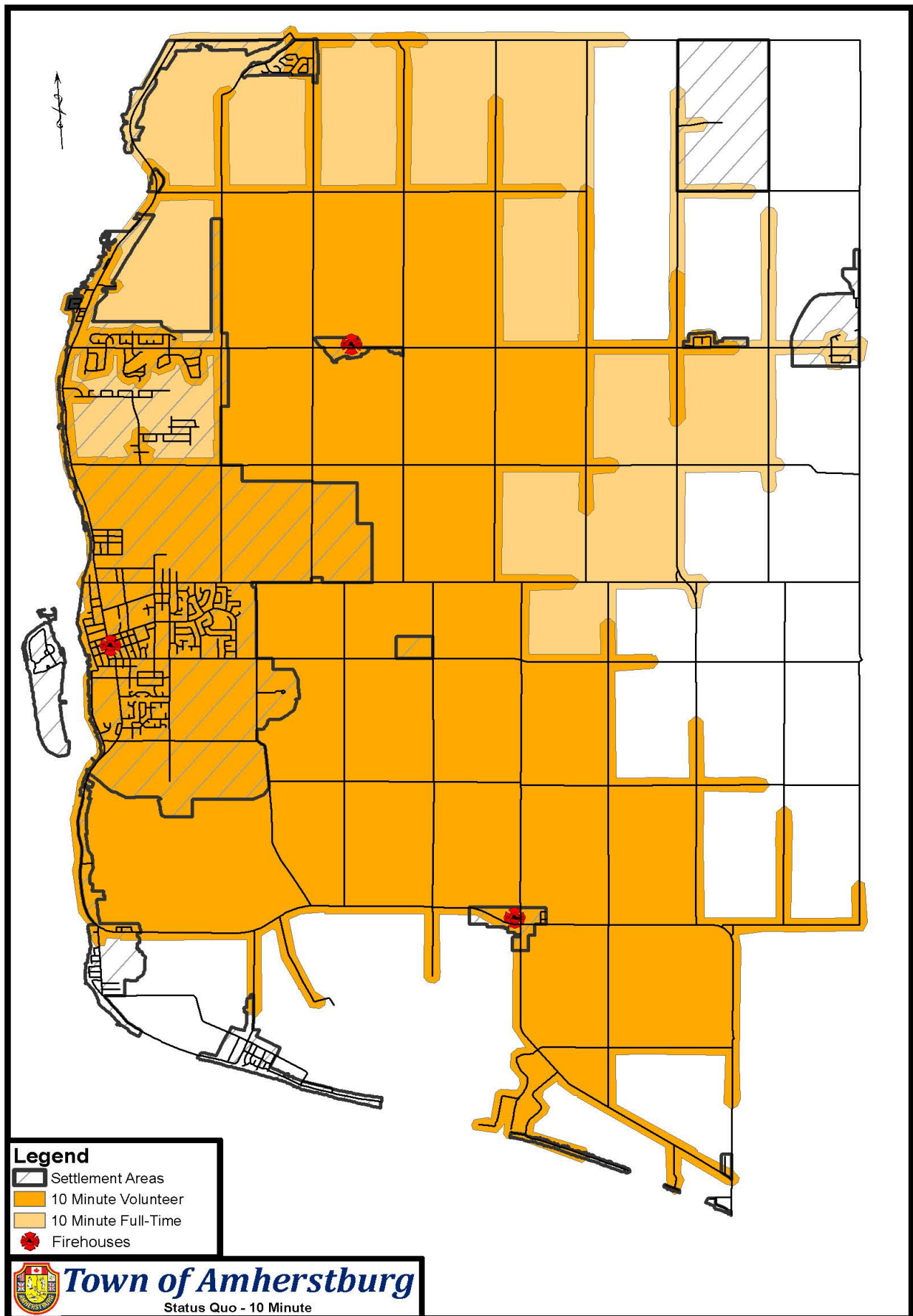
<b>Station #</b>	<b>Location (Address)</b>	<b>Major Apparatus Assigned</b>	<b>Staffing</b>	<b>Special Services</b>
1	271 Sandwich St. S	2009-75' Ladder 2018-Rescue pumper 2018 Support Unit	4 Non-Union Staff 20 Volunteer FF	Water Rescue Auto Extrication
2	3400 Middle Side Road	2018 Tanker pumper 2012 Pumper 2018 Support Unit	4 Career Firefighters 20 Volunteer FF	Water Rescue Auto Extrication Water Shuttle
3	6744 Concession 6 south	2000-Tanker truck 2011- Pumper 2018 Support Unit	20 Volunteer FF	Auto extrication Water Shuttle Off-Road Services

## Levels of Response Time

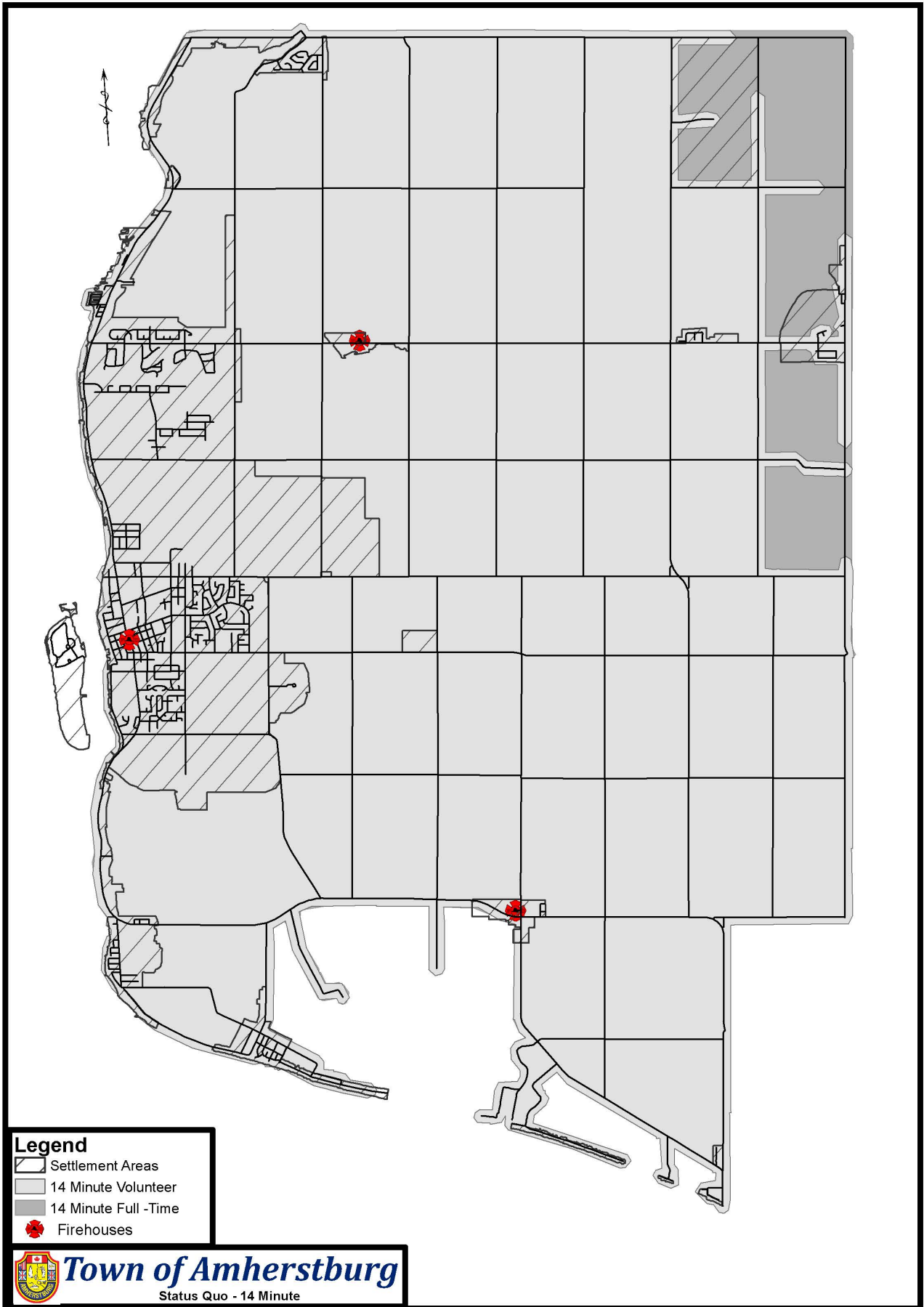
These Maps illustrate the current levels of response time for all of the fire stations within the Town of Amherstburg. The process developed and utilized data provided by the CriSys database and internal GIS data. Also included are the “Areas of Concern” where response time can be met but the number of firefighters that can assemble in the respective Demand Zones cannot be achieved.



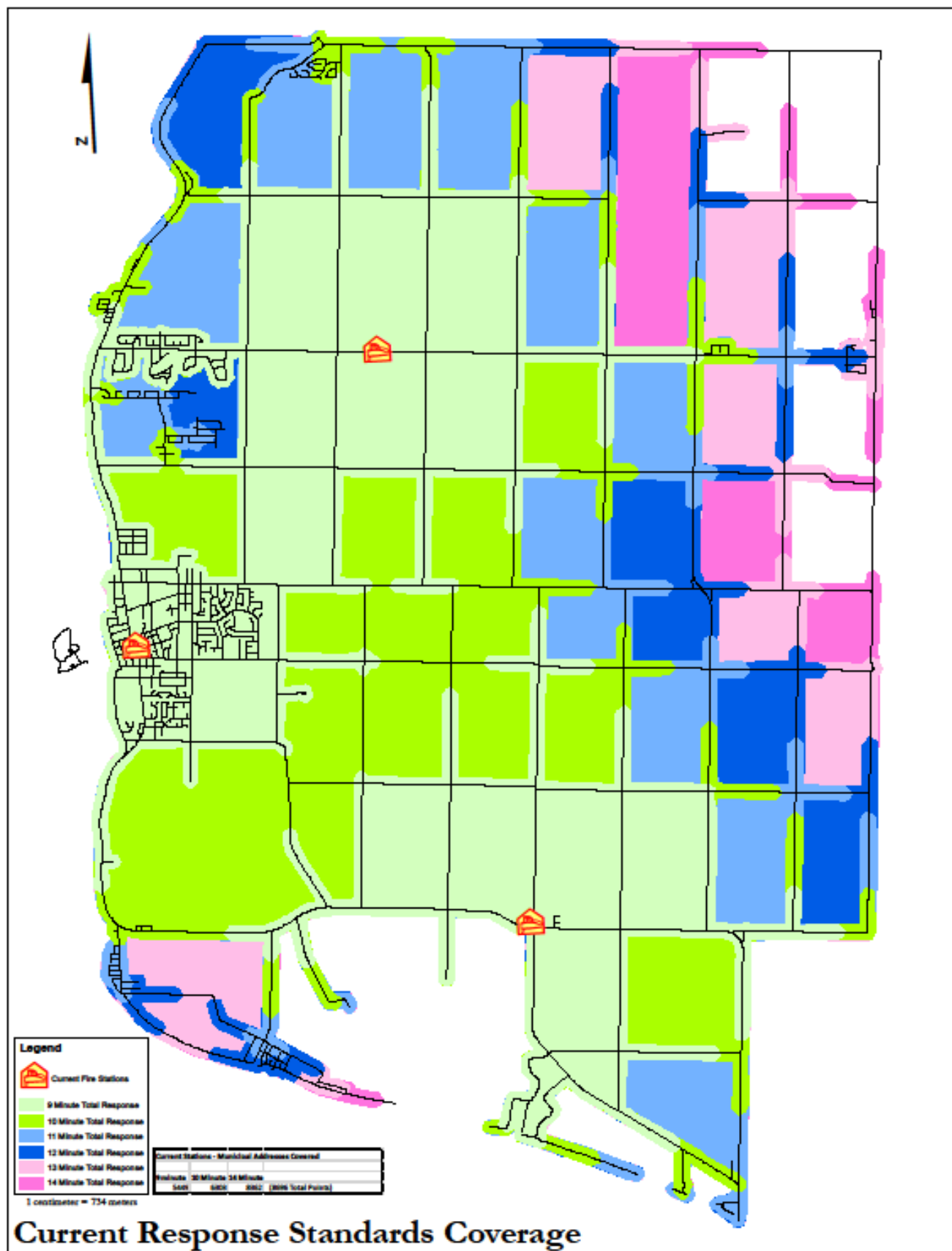








The Current Level of Response are illustrated by shaded road networks, indicating those streets and areas that are currently achieving the NFPA guideline of 9 minutes, 10 minutes and 14 minutes for single family residential occupancies.



## Station and Deployment Triggers

The following station and deployment triggers (the action that results in a change in resources being deployed to the area) used in identifying the deployment of fire service resources in the Town of Amherstburg are:

- Growth
- Construction
- Response Level
- Risk
- Land Use

The Fire Management Team expects that several triggers would act together to cause an action to be required.

### Calculation:

Using available Town of Amherstburg data and resources can demonstrate how the change to land use significantly affects risk, response level or Capacity. Based on the identified risk value, the appropriate resources should be deployed in the area to meet the approved level of service.<sup>2</sup>

The basis for these triggers can be referenced in the following documents:

- Commission on Fire Accreditation International, Inc. 4th Edition, Creating and Evaluating Standards of Response Coverage for Fire Department
- Network for Environmental Risk Assessment and Management Basis Frameworks for Risk Management
- OFM Public Fire Safety Guidelines
- Comprehensive Fire Safety Effectiveness Model Considerations

**At Present the 3 station deployment model and three benchmark Demand Zone service level standards provides protection to the number of properties indicated below;**

	Municipal Addresses Covered			
Time	9 Minutes/15 FF	10 Minutes/10 FF	14 Minutes/6FF	
Target	2881	3501	3111	
Actual	0	2797	3111	

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<sup>2</sup> “The approved level of service to be determined by Council” in an Establishing and Regulating By-Law