

# Final Report

## *City of Fitchburg Fire Station and EMS Unit Location Study*

Fitchburg, Wisconsin



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# Final Report

City of Fitchburg Fire Station  
and EMS Unit Location Study

Fitchburg, Wisconsin

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We are grateful to City staff for their leadership of the project and coordination of numerous complex data requests and analyses from the City's Geographic Information Systems Division and Fire Department, as well as participating in the analysis.

The study would not have been possible without the outstanding effort of personnel from the City's Geographic Information Systems (GIS) staff, Planning Department, Fire Department, Fitch-Rona EMS, and the Town of Madison. With the availability of GIS data and the ability to export run data from Firehouse Software, SEH managed to go further with the analyses than was envisioned at the outset of the study, which allowed a more refined analysis to be undertaken.

Despite all the cooperation noted above, the evaluation and recommendations are those of the SEH project staff. Principal members of the study team and their prime responsibility were as follows:

Dr. Norman Arendt – Project Manager

Jon Schwichtenberg – Demand Projection and Station Location Analysis

Paul Chellevoid – Project Support

## Executive Summary

The City of Fitchburg, Wisconsin is an urban metropolitan area that has witnessed steady growth over the past decade from 20,501 in 2000 to about 23,420 in 2008, projected to be 25,477 in 2010. The City plans to consolidate with part of the Town of Madison in 2022, which will result in an additional 2,000 being added to the population base, all of which are focused in the northeast corner of the City.

While the services rendered by the Fitchburg Fire Department have been adequate throughout most of the City, there are problems of coverage along the periphery, and they are likely to get worse without some redeployment and additions of some resources. Currently Station 2 is west of Verona Road near the west border of the City and Station 1 is in the north center of the City. Currently as an example of the periphery, the southeast corner of the City is covered by an automatic mutual aid pack with the Village of Oregon.

To help plan for maintaining city-wide service levels in the projected growth areas of the City and in the area of the Town of Madison to be acquired, and to evaluate the efficiency and effectiveness of existing resource deployment, the City of Fitchburg competitively contracted with Short Elliott Hendrickson Inc. (SEH<sup>®</sup>) of Madison, Wisconsin to undertake an objective, third-party study of the fire station and EMS unit locations as part of this overall picture. The goals of the study were to project demand for fire services, evaluate station locations, and develop cost-effective sequencing for the future. New growth in the City is requiring a relocation of the City's existing fire stations, and based on City growth projections, if the two repositioned stations are sited properly, the need for a new third station would be some twenty to thirty years in the future. The decision to add the third station earlier could be based on a desire by the City to improve overall average response times citywide given the large geographic area that would be covered by a south station.

In addition to supporting the goal of improving overall response time service levels, the condition of the existing two stations is an issue. If the relocation to new stations is delayed for any appreciable amount of time, the City will need to consider investing significant amounts of money in updating and expanding the current buildings, which would ultimately represent a poor investment.

Below are the highlights of the findings and recommendations. The reader is encouraged to look at the color maps throughout the report, which graphically show the current coverage, study alternatives, and the benefits of the final recommendation.

### Current Operations

Overall, the citizens of Fitchburg are being well served by their Fire Department. The average response time of just under five minutes puts Fitchburg among those at the leading edge of cities its size. However, there are areas on the periphery of the City where the department has problems meeting the response time goal, and additionally some small problem pockets within the City. The current station configuration is allowing fire units to arrive on scene in under five minutes from time of dispatch 51% of the time. A separate issue is the response time for Fitch-Rona EMS that currently utilizes firefighters and their equipment as first responders and houses one of their two on-duty units at Fitchburg's Fire Station 2. The second on-duty unit is housed at a station located on Venture Court on the south side of the City of Verona. The Verona Fire Department is located on Lincoln Street on the Eastern side of the City. Fitch-Rona EMS units arrive on scene in under five minutes from the time of dispatch 13% of the time. The City's goal is for fire and EMS units to be on scene in under five minutes 90% of the time.

The Fire Department, along with those in many other cities its size, has been evolving from its original purpose of fighting fires to its current much wider mission of providing a range of sophisticated fire and safety services. This second category of the fire department activity today is for emergency medical response assistance, working closely with Fitch-Rona's paramedic ambulances.

The Fire Department was instrumental in implementing a unique automatic aid agreement with the fire departments around Fitchburg, specifically Oregon, Verona, and the Town of Madison. This reciprocal agreement ensures that on any structure fire call in any of the four communities; at least one unit from a neighboring community is dispatched along with the required units from the community where the fire is occurring. This arrangement helps improve the response time in the peripheral areas of Fitchburg, but it should be noted that due to the drive time required, Oregon and Verona are limited in being able to assist Fitchburg with response times in the southeast and southwest quadrants of the City. It is also important to note that none of the automatic aid Departments is positioned to provide improved response times to the northeast quadrant of Fitchburg, and, coincident with the City of Fitchburg taking over responsibility for a portion of the Town in 2022, the Town of Madison Fire Department will cease to exist and no longer be able to provide improved response times in the north central part of the City.

The City has also created a unique combination of responses not commonly found in cities of this size, in that fire trucks at both stations are used both for EMS calls and for fire fighting. The firefighters assigned to these fire units often operate as first responders on EMS calls as a means to reduce the response time for EMS calls originating from either Fitch-Rona at Fitchburg's Fire Station Number 2 or from their station on Venture Court in Verona. This has been a very effective practice, made possible by not having to perform emergency medical transport, which is still handled by the Fitch-Rona EMS service.

## **Demand Projections**

A range of demand projections were made out to 2030. Both optimistic and pessimistic projections were made. The optimistic model projected per capita service demand rates at the current levels, so that demand grows in proportion to population. The pessimistic model assumes continued increase in per capita demand as well as in population, resulting in considerably higher demand. The calls range was from about 900 calls to 1295 calls in 2008. The call volume showed an increase of 25 percent from 2002 to 2003, which was driven by the start of "Priority Medical Dispatch" in Dane County, which made the automatic first response by fire resources to life threatening medical situations possible, and therefore should not be extrapolated as any kind of trend in service demand. 2008 shows a 6 percent increase. EMS Assist calls through the study period account for about 35 percent of the Fire Department responses today. Projecting into the future we considered a sensitivity analysis of an additional 10 percent in demand starting in 2012 for planning purposes, to account for the annexation of the Town of Madison area in 2022. This gives us a projected 2010 call volume of 1500 for the Fire Department and a 2012 call volume of 1850. Of these, approximately 600 will be EMS Assist calls. (We increased the call volume starting in 2012 by considering that as the Town of Madison moves towards annexation, their volunteer base will disappear.)

The results of the demand analysis are quite good news for the citizens of Fitchburg: the current system of fire units can absorb the expected future demand above and beyond what it currently is handling in terms of workload per unit. The two current on-duty units are spaced geographically for coverage reasons, but are not heavily loaded at present, and no units are projected to exceed the 3,000 response level by 2010 (3,000 is a national figure used to equate to maximum usage of vehicles. This number is a per unit number and it is important to remember that multiple vehicles

generally respond on calls to obtain the necessary staffing for the call). While response times will slightly degrade as call volume increases because of the increased frequency that the first-due (nearest) unit is not available when called, the current system could handle many more calls than it does now. However, because much of the growth in population and calls will be occurring at the north and east periphery and through annexation of part of the Town of Madison, there is a spatial problem – longer drive times from the existing stations than would be satisfactory for providing adequate response times. The current 50-year development plan which is included for review emphasizes development to be restricted to the north and east quadrants. Should this plan deviate and development begin in the southwest quadrant or even more development in the southeast, then the recommendations here will change accordingly. The upshot right now is the reduced need to add one to two additional stations to handle the increasing geographic spread of the population if the current two stations are repositioned correctly. This will also improve the overall efficiency of the City's delivery service system.

## Recommendations

There is no single optimum arrangement of stations because of the uncertainties in demand, the complexity of the overall response network and the lack of adequate mathematical tools to deal with the problem. A set of station locations must be analyzed as a whole, because moving some stations opens up other holes, and adding stations can create overlaps with existing stations. The overall idea is to maximize the use of units to (a) get the best first-due response times, and also (b) have a robust enough system to provide good second- and third-in unit responses for fires and major emergencies and to fill gaps when other units are committed on other emergency calls while at the same time limiting impact on the EMS system and Fitch-Rona.

**Station Locations** – SEH and the City staff reached a consensus on the following set of recommended new stations and/or relocations. We recommend moving the two existing stations, with the added option of adding a third station in the southern part of the City, if that area is developed, over the next twenty to thirty years. The relocation of the two existing stations by itself would allow the Fire Department to improve its *on scene in five minute average* from the current 51% to an estimated 88%. The addition of a third station would further improve the *on scene in under five minute average* from 88% to between 95% and 97% based on the location selected.

If a third station were added, there would need to be a net increase of on-duty positions, which if filled totally through adding career employees would require 14 new employees over 10 years, which is an additional issue the City would need to address if these recommendations are implemented. These additional positions are anticipated to only be needed should a third station be constructed as indicated in the study report.

This is a relatively modest package to keep up with demand over the next 20 years. We believe the redeployment recommended will make better use of the existing resources. The order in which any new stations should be added should be a function of the time frame in which the various areas of the City are anticipated to develop; as areas are developed, those with the highest response times and non-trivial call volume (or larger number of population served) should be addressed first. The decision to add a new station earlier than 20 to 30 years could be based on a desire by the City to improve overall average response times citywide given the large geographic area that would be covered by a south station.

Also it should be noted that the computer analysis placed stations at specific locations to meet the recommended response criteria. SEH analyzed existing City or vacant land to determine what land is available in or near the computer-generated locations.

It is our recommendation that the current northwest station (Station 2) be moved east of Verona Road to an area near McKee Road and Seminole Highway. In looking at available land in the area suitable for a fire station and with optimum access to transportation corridors to minimize response time, we recommend locating the station on the vacant land on the north side of McKee Road where the railroad tracks used to be, bordered by the access road to Thermo Fisher and the bike trail. It is anticipated that this would be the first station relocated and constructed. There are some trees in this area that would need to be analyzed for value if this location is chosen.

Next, the existing central station (Station 1) should be moved to a northeast location near the intersections of Syene Road and East Cheryl Drive as placed by the computer. Again, looking at available land in the area, the City owns land very close to the intersection of Syene Road and West Clayton Road, but that land is not currently planned for development under the new Comprehensive Plan. The City will need to look at its options for land in the recommended area.

Finally, a third station could be constructed at some point in the future on either the site of the former City Hall on South Fish Hatchery Road or near the intersection of Whalen or Byrne Road with Caine Road. A site near the Whalen or Byrne Road location would optimize response time more evenly across the City, especially into the County Highway MM corridor, but the old City Hall site would be more advantageous for providing enhanced second-due coverage into the northwest and north central portions of the City where a higher volume of calls occur. It is anticipated that this station would not be needed for twenty to thirty years, depending on the level of service the City chooses to provide to the more rural parts of the community, and on how soon development occurs in the City south of Irish Lane. The decision to add a third station earlier could be based on a desire by the City to improve overall average response times citywide given the large geographic area that would be covered by a south station. As noted above, repositioning of the northwest and northeast stations is expected to improve response times, allowing the Department to be on scene in under five minutes 88% of the time. Adding the third station would allow the Department to achieve between 95% and 97% depending on the site selected.

One of the two relocated stations will need to include a replacement for the administrative and division offices of the Fire Department currently located at the Lacy Road station, and the administrative offices of Fitch-Rona EMS currently located the King James Way station. We recommend the City continue to locate Fire Department and Fitch-Rona administrative offices at one of the new stations to ensure administrative personnel can continue to assist in filling tactical positions needed during emergency responses. While any of the three stations could accommodate the administrative needs, the northwest and northeast locations make the most sense. Of those two locations, the northwest location offers the most amount of easily developed land to include the administrative offices, and is the most logical for Fitch-Rona EMS. The northwest location also offers the best layout to include a limited training facility to accommodate local training needs. In all cases, three potential stations should include within the facility a multi-use community room that can also be used to accommodate department training and public education needs, polling needs, and offer additional space available for community and neighborhood meeting needs.

The proposed station changes and their likely priorities in time are shown in the table below. The rationale for each are discussed in detail in the text, and illustrated with response time maps.

**Table 14**  
**(from the discussion to follow)**  
**Summary of Recommended Station Location Changes, 2008-2030**

<b>Station Change</b>	<b>Project Start</b>	<b>Open Station</b>
Relocate Station 2 to McKee Road Corridor	2010	2011
Relocate Station 1 to Syene Road Corridor	2011+	2013
Add Station 3 at South Fish Hatchery Road or Whalen and Byrne Roads	2030 projected	2032 projected
<b>Total:</b>	<b>3 stations to be built: 2 relocated, 1 new station added</b>	

The proposed station moves attempt to take advantage of the cost savings associated with building on existing City-owned land or on vacant land the City can easily acquire. This is the optimum position. It is also imperative to note that, in order to achieve the improved distribution ensuring acceptable response times, the stations need to sit directly on the major transportation corridors described. To locate the stations near the areas described, but buried somehow off the major transportation corridors, begins to dramatically increase response times, thus limiting the effective areas the stations can cover, and increasing the number of stations required.

Although not directly part of the study, the Fitch-Rona EMS service will also be affected by these proposed station relocations. At the same time it would be advantageous for the EMS service to consider how this service can work towards meeting the criteria established by the Mayor's Emergency Services Study Committee. It is recommended that Fitch-Rona, to meet the criteria from this committee, consider at least one additional EMS unit to be co-located in the new northeast station once constructed. Currently, Fitch-Rona runs two active EMS units with a third unit in reserve used only for major events such as the Iron Man, large school events, etc. This third unit could be co-located as indicated and provide the needed response for the criteria established by the committee. The decision on when to place an additional EMS unit in service could be driven by run volumes or by a desire to improve the overall average response times within the City. Based on current run volume trends, the additional EMS unit would not be needed until at least 2030 based on call volumes only. The decision to add an additional EMS unit prior to that time could be based on a decision by the City aimed at improving overall average response times.

Going into the future, the City should continually monitor its response characteristics using better measures of data than are available today. Not only should first-in response units be measured, but also the average time for the second-in unit, and the time to get a complete response to the scene. Individual unit workload statistics should be monitored to see if any excess workloads are developing. If there is an overload, the first strategy considered should be to share workloads among existing co-located units, e.g., have a squad or ladder truck pick up some of the EMS calls of an overloaded engine as first responders. If a particular area of the City develops unexpectedly heavier demand than can be handled by the units in the stations, such as the southeast quadrant area, then an additional station may be required and the relocation of Station 3 to perhaps the southeast quadrant should be considered instead of the location on South Fish Hatchery Road or on Caine Road. This may necessitate a station to be considered in the southwest quadrant in this future time frame. However, no future third station is anticipated until further growth to the southeast does occur.

It is also assumed that under the above scenario, the Lacy Road Station (currently Station 1) could remain active until the new south central station is totally ready for occupancy. It is however not beneficial to maintain Station 1 longer than necessary due to the lack of NFPA and OSHA required air quality systems, and the energy inefficiencies and aging, deficient condition of the structure. A new facility would be compliant with all current air quality standards, energy-efficient, and would have an efficient layout, improving response and morale. While decommissioning the Lacy Road Station is not anticipated immediately, the City does need to be sensitive to the need to dramatically rehab the structure, which will be avoided by implementing these recommendations; but if for any reason the eventual decommissioning of the Station is delayed much more into the future, the City will need to look at substantive rehabilitation to the current structure. After vacating Station 1, the City would need to determine what to do with this property, for which there are many options.

One possibility for the property would be to demolish the current structure and subdivide available portions of the land, although the site is also home to a water well and the City's

primary public safety radio communications tower. Another possibility would be for the City to rehabilitate the current facility and consolidate/relocate other City services to this facility. The Parks Department and Historical Society would be impacted if the new third station is built on the site of the old City Hall, and the Recreation Department is limited in available space within their current quarters at the current City Hall. These two departments might be ideal tenants for a rehabilitated facility.

The King James Way Station (currently Station 2) property is in a prime commercial development area and we have been informed that there are currently interested buyers. The sale could help offset some of the construction costs of the new station. Relocating Fitch-Rona EMS to the new northwest station (McKee Road) would improve response times for the EMS units within the City of Fitchburg as well as fire response times by having fire respond as fire units first, and as first responders only as needed when an EMS unit has been previously dispatched. However, this building could also be remodeled and used as a community building in lieu of selling. This would be a topic for future discussion and is not part of this study.

**GIS Capability** – A significant by-product of this study was to enhance the analytical capability of the City's data for undertaking fire department deployment analyses. The City's Geographic Information System (GIS) and input from the Fire Department helped produce the various maps contained in this report, and many others used in the analysis. The Fire Department and GIS staff should use this new capability to periodically update and refine the analyses in this report to explore the pros and cons of various station locations as the City's expansion and street network development continues.

All in all, the citizens of Fitchburg have been fortunate in the level of service they receive from their Fire Department. They can anticipate a continued high level of service if a relatively modest increase in resources is made to keep up with demand.

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# Final Report

## City of Fitchburg Fire Station and EMS Unit Location Study

Prepared for the City of Fitchburg, Wisconsin

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### 1.0 Introduction

The City of Fitchburg is steadily growing in population size, and also in geographic area through annexation of part of the Town of Madison. Its population is now about 23,240, and is projected to reach 30,431 within the next 10 years (2020). The number of fire service calls also has grown and the mix of calls has changed significantly over the past decades, as it has in most communities. Emergency Medical Service (EMS) assist calls now comprise 35 percent of all emergency calls responded to by the Fire Department. False alarms, mostly from automatic alarm systems, considerably outnumber actual fires. However, most of this can be considered as the result of new alarm installations and as the “bugs” are worked out of these systems the number of false alarms should decrease.

As a result of these continuing changes, the City is proactively looking at evolving its plans for the Fire Department in both the immediate future and in long-range planning.

Similar to most cities, the cost of fire service in Fitchburg is driven by the number of firefighters in suppression. That number, in turn, is driven by the number of stations, the number and type of units per station, and the staffing of each unit. The deployment of resources has many options. It is not a precise science, even with the many tools that now exist to improve quantification of the choices.

In mid-2008 the City competitively selected Short Elliott Hendrickson Inc. (SEH<sup>®</sup>) of Madison, Wisconsin, to provide an objective, third-party evaluation of the fire stations locations, and in so doing determine the best scenario for cost-effective deployment options for the future. SEH has conducted similar fire station location studies for many like-size communities throughout the upper Midwest.

### 1.1 Scope

This study evaluates the level of service provided by the current set of stations and deployment of resources, and whether the number and location

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of stations and the mix of units is most cost-effective, and in so doing also emphasizes that whatever course of action the City takes, personnel will be an issue. The study considered alternatives for the future in light of the anticipated continued growth in population and area.

More specifically, the study was asked to address the following questions raised in the RFP:

- For *current* service demands, how many fire stations should the City have and where should the stations be located, or relocated, for the most cost effective and efficient service?
- For *anticipated* service demands, how many fire stations should the City have and where should the stations be located for the most cost effective and efficient service?
- If the recommendation is for more than the current number of stations (2), what are the specific benefits of each additional location (response time, increase in percent of fire containment, decrease of station alarm volume, and other cost-service benefits)?
- Are the current physical resources, most effectively and efficiently deployed? If not, recommend improvements.
- Is the equipment adequate for the anticipated growth of the City? If not, what are the shortcomings and recommendations with a cost benefit analysis?
- What other fire response options and strategies might be suitable to the culture and environment of the City?

The study focused on Fire Department operations – the delivery of firefighting and EMS. Not included were support services and prevention, the other major components of fire departments. Also not included was the quality of EMS medical care (as opposed to its response times). EMS was analyzed strictly from a run perspective using Fitch-Rona’s main station at Fitchburg Fire Station Number 2 and also the staging of their second ambulance at 416 Venture Court in Verona.

## 1.2 Study Criteria

The City has used a response time criteria of 5 minutes total time average for the first-in unit and 4 minutes for the actual en route to on the scene. The average total times are measured from the time a unit is dispatched by the 9-1-1 center to arrival on the scene. (For the future, we recommend the use of percentile versions of response time criteria, e.g., 95 percent of calls responded to in 5 minutes or some other selected target.) It is beyond the current state-of-the-art to validly estimate the impact of changes in response time or the size of complement responding on the percent of fires contained to the room of origin or other containment measures, but the other factors can be addressed quantitatively. An average can mask a situation in which a significant number of calls have high response times but are averaged with a number of calls close to the station. Averages are also much more susceptible to data errors; a single incident recorded as having a 15-minute response

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instead of a 5-minute response could distort the measure, but would have much less impact on a percentile measure.

The study also was predicated on maintaining at least the current level of safety practices for firefighters. This translated into considering the OSHA “two-in/two-out” requirement and the adequacy of staffing for various types of incidents, as well as the soundness of operation practices in general.

Finally, the RFP for the study specified the criterion that the department maintain at least its current staffing levels. The overriding criterion was a desire to increase cost-effectiveness.

### **1.3 Methodology**

SEH staff started the project by visiting Fitchburg and observed its stations, apparatus, and operations. Meetings were held with the chief and most of the paid and volunteer firefighters available during the visits, the GIS staff, and the Planning Department. Discussions were held in the stations with a variety of firefighters and officers. At the end of these visits, the project staff triaged the issues, identifying the key areas of focus and the methodological approach.

The Fitchburg Fire Department (FFD) provided considerable background data on its operations both before and during the initial visits.

The heart of the study was a number of station location analyses undertaken by the SEH GIS staff under the guidance of SEH project analysts. Using the network of streets in the GIS and locations of stations, a variety of analyses were made of existing response data and of coverage obtainable with different patterns of station locations.

The analytical part of the study started with projections of demand. Demand was projected based on trend analysis of calls per capita and population projections. Demand was then disaggregated by area of the city to estimate impacts on different station scenario locations. Then the response times from various locations were analyzed. These factors were then combined and led to recommendations about the number and location of stations. This methodology will be discussed in much greater detail in later sections of this report.

An initial draft report was reviewed in detail by the City, and further analyses were made. The resulting recommendations on station locations represent a consensus of SEH project staff and City officials. The other recommendations are those of SEH, after considering constructive comments from various reviewers.

#### **1.3.1 Fire Department Response Time Considerations**

In considering sites for the construction of new or relocated fire stations within a community, acceptable response times within the fire station’s geographic responsibility zone, along with many other issues, are one of the most important factors in the final decision. To achieve an acceptable response time, a careful analysis should be conducted that includes more than simply evaluating the distance from the proposed fire station to the borders

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of its farthest limits. Certainly, the distance factor is very critical to response, however, other important factors which should be considered in this review are the following:

- The site should be located on, or adjacent to, a main artery that provides good access, egress, visibility for responding fire department and EMS equipment, and adequate public alerting of the incoming and departing fire and EMS equipment.
- The site location, and its proximity to a main artery, should also provide acceptable access to secondary streets that will allow the Fire Department and Fitch-Rona EMS to effectively respond throughout its responsibility zone.
- The main response artery should have adequate street width or shoulder construction for private automobiles, trucks with trailers, buses, etc. to safely pull to the side when a fire or ambulance apparatus is coming up behind them.
- The main response artery should not be a funneling point for industrial traffic for loading or off-loading supplies, products or employees.
- The main response artery should not include an overabundance of traffic controls such as stop signs or stop lights that could cause delays as a result of local traffic trying to find a safe place to get out of the way of responding fire/ambulance apparatus.
- The main response artery should not have significant commercial development where consumer traffic congestion could hamper emergency response and commuter safety.
- The main response artery should not have schools, churches, or other population dense developments that are located on it which may present a safety hazard for fire vehicles and the general public.
- The site selected should provide rapid response to community target hazards that have been developed by the Fire Department. (target hazards can be defined as buildings which pose extreme threats from significant delays in response such as sites that use, store or handled extremely hazardous materials, buildings which because of their construction or materials which are stored at the location lead to rapid fire development, facilities which house community members who have health or age related issues which may require fire department intervention in escape, areas of the community where water shortage or inadequate water volume and/or pressure could overwhelm fire departments ability to extinguish a fire, and areas of the community where construction of older buildings with common fire walls are located).

An ad hoc Mayor's Emergency Services Study Committee made up of citizens and fire and EMS subject matter experts convened in 2000 at the request of then Mayor Mark Vivian. This committee established several guidelines and benchmarks to determine acceptable response times within the City based on the percentage of fire and EMS calls responded to within certain timeframes. The table below indicates the guidelines to be used to

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satisfy this committee’s criteria. Later in this report this will be discussed further, as well as the advantage to look at percentile rather than percentages.

**Table 1**  
**City of Fitchburg Guidelines**

<b>Minutes after Page</b>	<b>Percent Calls Responded To</b>
3.5	35%
4.0	75%
5.0	90%
6.0	99%

**1.4 Organization of this Report**

The next section discusses the organization and operation of the Fire Department today, as a baseline. Section 3.0 addresses the demand forecast. Section 4.0 presents a series of station analyses with associated maps. The maps, reduced to a size suitable for a report document, are better viewed in full size, and are available from the Fitchburg GIS Department. All GIS maps can also be found in the appendices to this report. Appendix A has the location study GIS maps and Appendix B has the Future Urban Development Areas (FUDA) maps.

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## **2.0 The Current System**

### **2.1 Fitchburg Fire Department Background Information**

The city of Fitchburg Fire Department is comprised of 82 sworn members and serves a population of approximately 24,000 (2008 estimate). It provides both emergency and non-emergency services out of two fire stations. The main station and administration headquarters is located at 5791 West Lacy Road and a second station is at 5415 King James Road.

The Fitchburg Fire Department offers a wide variety of services to the community, including fire protection, vehicle rescue, ATV rough terrain rescue, EMS assist support, mass casualty response, wild land fire fighting, hazardous materials support, public fire education, plan review, fire prevention inspections, and an active Explorer Post program.

The department's present response geographic area is approximately 35 square miles, which consists of a mix of residential, agricultural, commercial, and industrial uses. The department has automatic mutual aid agreements with three neighboring jurisdictions designed to improve on the length of time it takes for the first fire unit to arrive on the scene of an emergency, and to improve on the number of resources that arrive early on during an emergency to effect a better and safer outcome.

### **2.2 Fitchburg Fire Department Fire Apparatus Resources**

(Pictures by Fitchburg Fire Department Lieutenant Todd Toussaint)

The Fire Department's fleet of apparatus is in extremely good condition and the pride of ownership is evident throughout the condition of the apparatus and the station facilities.

The ten emergency response apparatus, staff vehicles, and miscellaneous equipment such as the ATV, mass casualty trailer, and County Emergency Management Incident Command vehicle, have been located at both fire stations in a manner dictated by the frequency of their use and in the case of the command vehicle, storage availability. In addition, the Fitch-Rona EMS Department has one of its two ambulances located in the Fitchburg Fire Department Station #2. The second ambulance is located in a station on the south side of the City of Verona.

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## Staff Vehicles



- Car #21 and Car #24 – Chevrolet Suburban
- Car #25 – Chevrolet Tahoe
- Car #22 – Chevrolet 1500 pick-up truck
- Car #23 – Ford Crown Victoria

## ATV Vehicle



- John Deere all-terrain vehicle (ATV) capable of performing fire fighting and rescue activities

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## Brush Vehicle



- Brush #1
  - 1999 Ford F-450 chassis

## Tanker Vehicles



- Tender #1 and #2
  - 2009 Kenworth T-300 Chassis

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## Utility Vehicle



- Utility #1
  - 2004 Kenworth T-300 Chassis

## Squad Vehicles



- Squad #2
  - 2000 Spartan Gladiator Chassis

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## Ladder Truck



- Ladder #1
  - 1993 105' Seagraves

## Engines



- Engine #1 and #2
  - 2006 Spartan Gladiator Chassis

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## County Command Vehicle (CV1)



### 2.3 The Department

This section describes some key aspects of the department and its operations, evaluates the current level of service, and provides a few recommendations for improvement in management, organization, and communications.

#### 2.3.1 Overview

The City, located in Dane County, has a diverse economy that includes agricultural services, manufacturing, wholesale trade, retail trade, and professional scientific and technical services. The City serves a large employment base in Dane County. The City owes some of its growth to its ongoing program of quality City services and the future consolidation of the Town of Madison areas under a joint agreement with the Town and the City of Madison. The City's population is expected to exceed 25,000 by 2010.

The City's population is expected to grow at about twice the County's growth rate. City forecasts were developed using data from the Wisconsin DOA – Demographic Services Center population projections for Dane County from 2000 to 2030.

The Fire Department now covers 35 square miles of the City. When the consolidation with the Town of Madison takes place in 2022, the Fire Department will protect an even larger area and a larger population. This creates a challenge of maintaining service levels in the face of increased demand over a larger area. The Department provides a full range of fire, rescue, hazardous materials, and other services.

All but a few Fire Department personnel are trained at the basic life support level (including automatic defibrillation). The Fire Department is the first responder to almost all life threatening EMS incidents in the City. EMS transport is provided by the Fitch-Rona EMS. The Fitch-Rona ambulances

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are staffed with two paramedics. Occasionally the Fire Department provides a third or fourth person, and assists the paramedics in many ways when two paramedics are not enough to handle the incident.

The Fire Department has a staff of 86, most of whom are assigned to Operations (see Table 2 below). The Administration employees include chief officers, division heads, and clerical and vehicle maintenance staff.

**Table 2**  
**Fitchburg 2009 Fire Department Staffing**

<b>Assignment</b>	<b>Number of Positions</b>
Career Firefighters	12
Paid On Call Firefighters	60
Intern Firefighters	8
<b>Total Sworn Firefighting Staff</b>	<b>80</b>
Support Staff *	6
<b>Total – All Staff</b>	<b>86</b>

\* Business Manager/Accountability Team

The long-term trend data on activity levels is given in Table 3 with the long-term EMS totals in Table 4. While incidents rose from 907 in 2002 to 1295 in 2008, the Department's staff has remained constant at around 80 firefighters and officers. This pattern, while not unique to Fitchburg, indicates that existing resources are staying constant for this level of activity. It should also be noted that county-wide the situation is the same and it is predicted that volunteers will be more difficult to find in future years. However, a mitigating factor is that the nature of the service mix also continues to change, with more rescue (EMS) calls and fewer fires. The rescue calls require fewer units and fewer personnel per call than fires.

Fire incidents in the chart below include everything that is not EMS related. EMS calls include both EMS and rescue where there is not a fire present or that is not law enforcement or traffic crash related. Usually the EMS related calls are where the Fire Department personnel are responding as first responders.

**Table 3  
Trends in Fire Incidents**

<b>Data Year</b>	<b>Fire Incidents</b>	<b>EMS Incidents</b>
2002	907	290
2003	1198	482
2004	1207	454
2005	1254	469
2006	1259	454
2007	1244	444
2008	1295	540

EMS calls are for fire department response.

\* Records prior to 2002 were maintained manually and would be difficult to sort out

**Table 4  
Trends in EMS Incidents**

<b>Data Year</b>	<b>EMS Total Calls</b>	<b>EMS Calls - Fitchburg</b>
2003	2060	1316
2004	2065	1320
2005	2078	1330
2006	2234	1430
2007	2320	1483
2008	2513	1588

EMS calls for Fitch-Rona EMS response from both stations.

\* Records prior to 2003 were maintained manually and would be difficult to sort out

Table 4 above shows Fitch-Rona’s EMS calls and also those calls only in the City of Fitchburg. Fitchburg Fire Department First Responders also respond to most EMS calls in the City. The EMS run totals (Table 5) do not separate out those that Fitchburg Fire responded to first. Fitch Rona Unit 44 responds to 13% of the calls in Fitchburg within a 5 minute time frame. Fitch Rona Unit 45 does not reach the City of Fitchburg within 5 minutes. Calls that are not life threatening generally are not responded to by Fitchburg Fire as first responders, only the life threatening calls are. These are those calls that when paged out indicate a potential life threatening situation where time is of the essence.

**Table 5  
EMS Unit Runs**

Year	EMS Unit	EMS Runs
2005	R44	1240
	R45	1028
	R46	8
2006	R44	1302
	R45	928
	R46	4
2007	R44	1382
	R45	933
	R46	5
2008	R44	1524
	R45	987
	R46	2

R44 is Fitch-Rona Rescue 44 stationed in Fitchburg at Fire Station #2  
R45 is Fitch-Rona Rescue 45 stationed in Verona on Venture Court  
R46 is Fitch-Rona Rescue 46 used for special events throughout the district

The Fire Department operates from two stations with a normal on-duty crew of four in each station, on-call volunteers staffing of 60 personnel. The Department has an overall response time objective of 5 minutes on average for the first arriving unit. The average response time for first-due units from dispatch to arrival on scene (i.e., including turnout and drive time) has stayed somewhat constant at around 5 minutes for the last seven years. When call processing and dispatch time are added, which average about two additional minutes according to the 9-1-1 Call Center, the average overall response time (from receipt of call to arrival at the scene) is approximately 7 minutes. The two-minute delay at the Dane County 9-1-1 Center affects all departments except for the cities of Monona, Middleton, and Sun Prairie in Dane County which still dispatch some of their own calls for service. The Department is not able to track second-arriving unit response times. For the Fitch-Rona EMS calls, without Fire Department first responders the response time can exceed ten minutes (see Figures 1, 2, and 2A, Appendix A.) The EMS unit located at Fitchburg Fire Station #2 can cover the entire City in an average of about twelve (12) minutes. The southeast corner experiences the longest response times. The EMS unit from the Verona Station on Venture Court is able to respond to calls in Fitchburg in about fifteen (15) minutes on average, with the northeast corner the City being the most difficult for this unit to get to. Figure 2A also shows coverage from both City of Madison Station 6 and the Village of Oregon.

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The fire risk levels vary throughout the city from low to high. Urban service areas in the northern third are equipped with fire hydrants, but the southern more rural areas do not have fire hydrants, creating additional challenges for firefighting.

### **2.3.2 Safety**

OSHA and NFPA guidelines and standards are playing an increasingly large role in firefighter safety, regardless of whether the state or local jurisdiction formally follows OSHA rules. There is a liability issue that is unclear but growing as to whether these rules constitute a professional standard. The current Fitchburg Fire Department practices are generally in compliance with the OSHA/NFPA guidelines (called the two-in/two-out rule) by designating two personnel from the initial alarm to act as a rescue team in the event personnel inside the fire building need emergency assistance. The idea is to have two firefighters in full protective turnout gear including self-contained breathing apparatus (SCBA) ready to enter a burning building to rescue any personnel in trouble. An exception can be made when it is known that civilian lives are in danger.

### **2.4 Dispatching**

Radio communications rapidly emerged as a major issue in our visits to the City. At present, the Department is dispatched by the Dane County 9-1-1 Center. This Center also receives the 9-1-1 calls for Fitchburg Police, as well as Dane County Sheriff, and most other police and fire departments within the County (about 60 different agencies). Fitchburg Station 1 serves as the backup County Dispatch Center and has been used on occasion for this purpose. This equipment can also be utilized by the City when needed as their backup system.

In the past concerns were raised by the Fire Department about the quality of dispatches, particularly when staging various other fire departments' personnel and equipment. This problem revolves around tracking unit status and location and when to relieve other agency units. The problem was solved by the County with a policy for calling in a chief from a county department that has not been dispatched to the 9-1-1 Center to assist with the staging and unit assignment. The County dispatchers maintain the locations and status of units in their CAD system. Because of the complexity of fire department operations the called-in chief assists with when to dispatch or when to return units to their own jurisdictions.

A technology that improves dispatching and data entry and offers other capabilities is the Mobile Data Terminal (MDT). Units in the City are able to enter their status by pushing a button in the vehicle that automatically updates the dispatch computer, without involving the dispatcher. The MDTs also allow basic administrative and operational data and messages to be sent from dispatch, and between or to fire companies, without additional radio traffic. This allows report preparation to start immediately. (MDTs are also highly useful for code enforcement personnel, who can record notes in the field and query a database.)

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MDTs provide responding apparatus with the incident address, possible hazards, and sometimes response routes/directions. This eliminates needless radio transmissions reconfirming addresses, and reduces the possibility of errors. It does more than the pagers do.

If any future upgrades to the County dispatch system are made, such as automatic vehicle location devices, then the Fire Department should also consider those upgrades.

## **2.5 Current Service Levels**

One of the purposes of this study was to assess the adequacy of the current service levels. The need to assure both cost-effectiveness and efficiency was identified as a key concern. The study identified several criteria for determining future station and unit needs: maintain or achieve an average first-due unit “response time” of 5 minutes; second response within 8 minutes (i.e., 3 minutes after the first unit arrives, a reasonable goal), and maintenance of current overall staffing and safety practices.

An average response time of 5 minutes means that a significant share of calls may not be reached within 5 minutes in the southwest or southeast areas of the City. The southwest area south of Irish Lane is mainly rural. The City will have to make a determination of the need to service this area in 5 minutes or less. The southeast portion of the City is responded to with an automatic mutual aid pact with the Village of Oregon. An issue to consider is the potential for the Village to be on a call elsewhere when there is an incident in this sector. Note that even the Village of Oregon has difficulty reaching this area within the 5-minute response timeframe. The existing average response times are shown in Figures 2A and 3 and Oregon and Verona Fire/Fitch-Rona are shown on Figure 6 in Appendix A.

The City’s Insurance Services Office (ISO) rating was determined to be a “3” in the urban area with hydrants, a “7” in the rural non-hydrant areas that are within 5 road miles of a fire station, and a “10” in the rural non-hydrant areas that are greater than 5 road miles from a fire station. These numbers were originally to be included as part of the study criteria, but were not considered further because the City’s most recent study was completed in the mid-1990s, and the rating schedule has since changed. Rather than perform a complete analysis of the City along the lines of the ISO Rating Schedule, we applied our judgment to make what we felt were changes in line with the City’s objectives and good practice.

As mentioned earlier, the FFD attempts to maintain an average first-due turnout plus drive time of 5 minutes to all alarms. This response time has remained almost unchanged from 1999 to 2008, which are the limits of the available data. If call processing and dispatch time were included, the average total response times would be more than 7 minutes (Dane County receives all emergency calls at the 9-1-1 Center. The Center is attempting to determine what the actual dispatch time is from “call received” to “department dispatched.” The best numbers they can come up with are about a 2 minute average, varying from 1 minute to over 4 minutes by time of day and activity in the 9-1-1 Center.)

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The turnout time (the time from receiving the dispatch notice to leaving the station) was reported to be 47 to 50 seconds on average, based on several national studies of several years ago. This is quite satisfactory. The general accepted standard is less than a minute on average. (It may be faster during the daytime and slower at night.) These numbers are factored into the analysis of the response times.

**Response Times** – The fire response time performance for 1999-2008 is shown for the City on Figure 3 in Appendix A. The four-minute existing response (Figure 3) indicates that under current conditions only 51-percentile of the calls are responded to within that allotted time and the 5-minute existing response time (not shown) indicates that only 68-percentile of the calls are responded to within the allotted time. These numbers are based on both Stations 1 and 2 being fully staffed and able to respond. The percentages above illustrate that using average response times does not provide a true picture of the total response.

The figures referenced in this section were prepared by the SEH GIS Department in consultation with both Fitch-Rona EMS and the Fitchburg Fire Department. The maps plot actual response times taken from the Fire Department's and Fitch-Rona EMS's incident reports and information received from the Town of Madison.

Ideally, 95 percentile of calls should be within 5 minutes response time, which is similar but not identical to a 4-minute average fire response from the existing stations. Many cities (e.g. Colorado Springs, Colorado for one, which is a city similar in size to Fitchburg) use 90 percent within 8 minutes as their standard of coverage. The 8 minutes used here is the total time from call received at the 9-1-1 Center in Colorado Springs to actually on scene. Fitchburg is using a similar but more challenging criterion that is consistent with high performance for fire suppression and emergency medical response.

Overall, coverage is good in most of the City. However, the expansion of the City's urban service area has created several areas of less than satisfactory coverage. As the City's urban service area continues to expand, it will lead to diminishing response times citywide and unacceptable response times to increasingly built-up areas.

As one would expect, coverage is best in the center of the City, and poorest in some of the fringe areas of the City. The areas of deficiency with regard to first due response times are in the southwest, the southeast area near the Village of Oregon, the northeast area east of Highway 14, and part of the City's eastern boundary, as can be easily seen on any of the response time figures (see Figures 5 and 6 in Appendix A for Fire and Fitch-Rona EMS existing call locations).

Many of the areas of marginal response times are the areas likely to have marginal response times in the future without station relocations. Some areas will continue to challenge the City Fire Department even with station relocations and will continue to require automatic mutual aid. One way to judge the importance of providing coverage in order to meet response

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guidelines is to consider the population protected and/or the number of calls in these currently marginal areas subject to slow response times.

(See Figures 2A and 3 in Appendix A for existing 4-minute and 5-minute response times.)

In addition to being remote from existing stations, the rural areas in the City rely on tanker operations. Combined with slower response times, this creates a higher than normal chance of a significant loss in the event of fire. There are plans to improve water supplies in these areas but not for several years into the future. Fortunately, the recent commercial development in these areas is equipped with fire protection systems and automatic sprinklers, which greatly reduces the risk. Likewise, the International Code Council recently adopted a residential sprinkler code which could result in residential sprinklers becoming more common in new homes, further reducing the number of fire calls but increasing the number of false alarms. This is one of the reasons the City's Comprehensive Plan sees the creation of a compact urban community that is visually and functionally distinct from its agricultural community (Comprehensive Plan p. 2-2, goal 2).

To examine coverage from another viewpoint, Figures 2A and 8 in Appendix A show the areas that are nominally within 5 minutes response time for the City of Verona Fire, Fitch-Rona EMS, City of Madison Station 6 and Village of Oregon for both EMS and fire. Areas that are within the red boundaries are within 5 minutes of the automatic aid departments. As can be seen on the figure there is a very limited area of the City that is within 5 minutes of the Verona Fire Station or Fitch-Rona EMS number 2 station on Venture Court. The Village of Oregon can reach the intersection of Hwy 14 and County Road M within 5 minutes. However the subdivisions north of this intersection on Syene Road are not reachable within 5 minutes from either the Village or the City. The 5-minute boundaries are derived by assuming fire vehicles can travel at the posted speed limit on each link in the street network until the 5-minute time limit is reached. Typically, fire units average 25 to 30 mph in cities (National Average). The boundary between station coverage areas in Figure 8 is determined by which station can get to a given point within the allotted time.

Figure 3 shows that there is good coverage in most of the center of the City, which is consistent with the actual response times. But there are many developments, mostly on the periphery, that cannot be reached within 5 minutes. Comparing this to the automatic aid boundaries does not improve the responses as there are still created large gaps in coverage within the response times of either 4 or 5 minutes. Because fire units are used as first responders to all types of calls, the map applies to EMS responses as well as fire responses.

As might be expected, the theoretical coverage which is shown on Figure 7 in Appendix A and will be discussed later, with two relocated stations, is more optimistic than the existing actual coverage; most of the area in the north and central boundaries of the City are nominally within 5 minutes response but the southern half of the City has almost all their calls above the 5-minute threshold. More precisely, the GIS Department uses actual drive

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times based on existing speed limits. The Fire Department thought the assumption about driving at about the speed limit was a reasonable approximation. It varies by time of day, but was a reasonable average approximation.

Note that many calls are close to each station and can be reached in less than 5 minutes. Only the peripheral of the City east and south exceed the 5-minute response time as it currently exists.

**Structure Fire Responses** – Another component in assessing the effectiveness of current resource allocation is to consider the location of structure fires in relation to resources needed to respond to them. Figure 5 in Appendix A shows where structure fires occurred in 1999-2007 in terms of actual calls. The not surprising finding is that actual structure fires are concentrated in northwest and central Fitchburg. There is also a pocket of actual fire calls located along Syene Road. Per year, most of the areas of highest structure fire incidence are near existing fire stations. In the remainder of the protected area, structure fires appear to be fairly uniformly distributed; every part of the City has some structure fires.

**EMS Response Times** – EMS also aims for a 5-minute total response. Dane County has published a map indicating the anticipated response time for Fitch-Rona. GIS plotted the actual calls and SEH analyzed the results. The actual data compares very favorably with the data used by the County. Figure 2 in Appendix A shows the County data and Figure 1 in Appendix A shows the data developed from the actual run data. Figure 4 shows the EMS calls within the corporate limits in the study period. Both indicate that with EMS units only parts of the City currently have an approximately 12 to 15-minute response time. The center of the population area can be covered in 8 minutes with EMS only and if fire is used as first responders this can be reduced to 5 minutes. The data that is available for both fire and EMS indicates that the ambulance from Fitchburg Station 2 reaches only 13% of the medical calls within the 5 minute time frame. Fitchburg Fire and the Town of Madison EMS respond first to the rest of the medical calls that are within the 5-minute time frame arriving prior to the arrival of Fitch-Rona EMS.

**Reserve Apparatus** – Reserve apparatus is used when a front-line piece goes out of service for mechanical problems or in the event of a major emergency in which additional crews are called to staff additional equipment that did not respond on the first page. The reserve apparatus needs to be in a state of readiness. The Department has a number of reserve apparatus and they maintain these apparatus with a full complement of equipment. Having a few reserve apparatus ready to go adds to the ability to keep the City protected during major fires or disasters.

## **2.6 Intercity Comparisons**

While fraught with dangers, intercity comparisons are interesting if only to ask questions about why there are differences. Tables 6 and 7 (page 21) present comparisons of Fitchburg against the three other cities in the area with similar population basis: Middleton, Monona, and Stoughton.

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In terms of firefighters per capita, Fitchburg is among the highest in the comparison group, at 3.3 per 1,000 population. One factor may be that Fitchburg uses its on-call firefighters to help staff on-duty crews, where Middleton, Monona, and Stoughton do not have any fire personnel on-duty in their stations. This requires a larger pool of paid on-call personnel to draw from. The City of Stoughton, with 2.0 per 1,000 population, has a much larger rural area than Fitchburg, which may account for the lowest per capita numbers, as it is much more difficult to recruit volunteer firefighters in rural areas.

The number of square miles served per department is an interesting comparison. The City of Monona serves strictly the City of Monona, a small urban enclave, while the other three departments in the comparison serve an urban area as well as a large rural area. The response times indicate that when only used as the average and not the percentile of calls they are responded to in roughly equal times. SEH suspects that if call percentiles were developed for these other departments they would be similar to Fitchburg, showing low percentiles of calls covered in 5 minutes and a low number of calls covered very quickly.

No flagrant issues jump out from the comparisons. The staffing level raises questions of the level of service relative to others, but cannot be taken as an indicator of a problem per se. The next sections delve more deeply into the state of current resources and their deployment, and how well they are likely to hold up as demand continues to increase.

**Table 6  
The Current System**

City	Population Served (2008)	FF	FF/1000	Full Time FF/Office	Number of Stations	Sq. Miles Served	Average Response Time	EMS Unit	Notes
Fitchburg	23,420	80	2.9	12	2	32.5	5 Min.	Separate Fitch-Rona EMS	Serves the City of Fitchburg
Middleton	30,000	74	2.5	3	2	69	4.5 Min.	Separate City of Middleton Ambulance Service	Middleton serves the City of Middleton and the Towns of Middleton, Springfield and Westport
Monona	8,148	31	3.9	7	1	3.5	2.5-3 Min.	FD/EMS	Serves the City of Monona 2 paid FF/EMT's on duty 24/7 with 1 paid Asst. Chief
Stoughton	19,000	38	2.0	3	1	90	5-6 Min.	Separate City of Stoughton EMS	Serves the City of Stoughton and four towns

Note that Stoughton Fire is separate from Stoughton EMS.

**Table 7  
EMS Coverage**

City	EMS Unit	Notes
Fitchburg	Separate Fitch-Rona EMS	Serves the City of Fitchburg, City of Verona, and Town of Verona
Middleton Fire District	Separate City of Middleton Ambulance Service	Middleton serves the City of Middleton and the Towns of Middleton, Springfield and Westport
Monona	FD/EMS	Serves the City of Monona
Stoughton	Separate City of Stoughton Ambulance Service	Serves the City of Stoughton and parts of Dunkirk, Dunn, Rutland and Pleasant Springs

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### **3.0 Demand Forecast**

Among the key tasks of this study was to estimate the future demand for fire department service throughout the City of Fitchburg over 10- and 20-year forecast periods out to the demographic forecast of 2030. The process and results of estimating future demand are described in this section.

As the City continues to grow both into the annex area of the Town of Madison and into the Northeast quadrant and development continues mainly along the existing commercial corridors, the demand for fire and emergency medical services obviously will be affected. The growth of the City in developing areas creates difficulties in response time, and the increasing population creates a higher demand for service for all types of incidents. As the City grows further, demand will be put onto the southwest area of the City for development. This area is mainly agricultural at the moment. If this area develops, it will put additional strain on the existing deployment both in terms of resources and locations.

The City of Fitchburg realizes the importance of managed and orderly growth and also recognizes that there is a limited amount of developable land inside the urban service area. The 1995 General Land Use Plan, without Appendix H, provided some limited guidance for any further expansions urban service area. It was the intent of the Future Urban Development Area Study (FUDA) to provide logical areas for potential urban service area expansion before the Comprehensive Plan was adopted. For the time period between the adoption of Appendix H and the adoption of the Comprehensive Plan, any expansion of the urban service area was to occur within one of the four identified FUDA neighborhoods. The FUDA provided a process to accelerate planning for potential urban service area expansions, by allowing a process to evaluate areas prior to the completion of the comprehensive plan. Appendix H, which was adopted by the City, does not assume or guarantee that an urban service area expansion will be granted within all or part of these four neighborhoods, nor does it replace any elements of the existing urban service area expansion process. For purposes of this study, the FUDA was used as a basis for station location analysis initially and assumes that the FUDA would be followed in future development by the Comprehensive Plan.

Seven neighborhoods within the City were identified as likely for development and the following briefly describes their location. The attached Comprehensive Plan maps found in Appendix B identify the neighborhoods and the planned development within the City. The descriptions of the neighborhoods that follow are from the Comprehensive Plan as adopted in March 2009.

#### **Northeast Neighborhood**

The Northeast Neighborhood is generally bounded by Nine Springs Creek on the north, US Highway 14 on the west, the Town of Dunn on the east, and Lacy Road and Swan Creek to the south.

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The continuation of Lacy Road/E. Cheryl Parkway east of the interchange will provide an east-west collector through the neighborhood and connect the Northeast Neighborhood to the developed areas of Fitchburg to the west.

### **McGaw Park Neighborhood**

The McGaw Park Neighborhood consists of an area generally bounded by the January 2004 Urban Service Area Boundary and Lacy Road to the north, the January 2004 Urban Service Area Boundary to the west, Swan Creek and US Highway 14 to the east, and the center of the existing power line easement to the south.

The Green Tech and Swan Creek Neighborhoods, as well as the Fitchburg Technology Campus, are planned north of this neighborhood. A portion of the existing Quarry Hill Subdivision is also located on the northern boundary of this neighborhood.

The continuations of Caine Road (to the southern boundary of the neighborhood) and Nobel Drive will provide a north-south and east-west collector, respectively, through the neighborhood, and connect the McGaw Park Neighborhood to the developed areas of Fitchburg to the north and west. Extensions of Curly Oaks Lane, West Hill Drive (to the southern boundary of the neighborhood), Mica Road, and Research Park Drive (to the southern boundary of the neighborhood) will all provide local roads within the neighborhood and connect to the neighboring subdivisions. Street connections from the southern boundary of the neighborhood to Irish Lane will be made only after development occurs south of Irish Lane.

### **North Stoner Prairie Neighborhood**

The North Stoner Prairie neighborhood is generally bounded by the January 2004 Urban Service Area Boundary to the north, west, and east, and Lacy Road to the south.

The Fitchburg Commerce Park and Fitchburg Business Park are developed industrial and commercial parks to the north of the neighborhood. Lacy Heights and Seminole Forest residential subdivisions, as well as Stoner Prairie Elementary School and Savanna Oaks Middle School, are developed to the east of the neighborhood. The Hammersley and Fitchburg Minerals lands to the west of the neighborhoods are currently undeveloped and predominately have Park and Open Space and Low Density Residential General Land Use Plan Map designations.

The continuation of Commerce Park Drive (to the southern boundary of the neighborhood) will provide a north-south connector through the neighborhood and connect the Commerce Park Expansion Area to the developed areas of Fitchburg to the north. Extensions of Bud's Way, Scarlet Drive, and Nutone Street will provide local roads within the neighborhood and connect with Commerce Park to the north, and Lacy Heights and Wildwood South to the east, respectively. Street connections from the southern boundary of the neighborhood will be made as development occurs. A long-term future connection to Grandview Drive can be expected if development reaches that far south.

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### **South Stoner Prairie Neighborhood**

The South Stoner Prairie Neighborhood is generally bounded by the January 2004 Urban Service Area and Lacy Road to the north, a line approximately 2,000 feet west of S. Seminole Hwy. to the east, the Town of Verona to the west, and a line approximately 1,300 feet north of Grandview Road to the south.

### **Greenfield Neighborhood**

The Greenfield Neighborhood is generally bounded by the North McGaw Neighborhood and Swan Creek to the north, Caine Road to the west, State Highway 14 to the east and Murphy Creek to the south. As this neighborhood develops, discussion of a fire station in this area needs to be addressed.

Part of this neighborhood is currently serviced by a public water system separate from the main City water supply system, but it is insufficient to provide water flow for fire fighting purposes. When it becomes part of the urban service area, the water service is expected to be upgraded and made part of the main municipal water supply system. There is no public sewer at this time in this neighborhood.

### **East Hwy 14 Neighborhood**

The East Hwy 14 Neighborhood is generally bounded by State Highway 14 to the west, a line approximately 1,300 feet north of Irish Lane to the north, Highway MM to the east, and the separation of gravity flow sewer to the south.

### **Southeast Neighborhood**

The Southeast Neighborhood is generally bounded by State Highway 14 to the west, the separation of gravity flow sewer to the north, the Town of Dunn to the east, and State Highway 14 and the separation of gravity flow sewer to the south.

### **Study Area Neighborhood**

The Study Area Neighborhood falls within an area of the City that currently cannot be serviced by gravity flow sewer. The neighborhood is generally bounded by State Highway 14 to the west, East Hwy 14 Neighborhood to the north, the Town of Dunn to the east, and the separation of gravity flow sewer to the south. Planning of this area will occur with either or both East Hwy 14 or Southeast Neighborhoods.

### **2030 Demand**

According to the City's Comprehensive Plan, a key component of approving neighborhood plans will be the staging of urban service extensions among all neighborhood plans approved for future development. The neighborhood boundaries cover a vast amount of developable acreage so as to provide for a thorough study of service expansions, natural resource impacts and to determine compatibility and consistency of the proposed changes with

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adjacent areas and existing plans. Staging of urban service area expansion along with development plans within the neighborhood are categorized for a 20-year period based on a maximum 75 acre per year development rate along with a 5-year flexibility factor. As new neighborhoods move forward with approval, the expansion of the service area, along with staging of development, needs to take into account all neighborhood proposals, needs, and the maximum average annual growth rate of 75 acres per year. The City understands that given the policy of urban service extensions that even after completion, some neighborhood plans will take numerous years to be brought into an urban service area; however a neighborhood plan is important to understand the infrastructure, services and land use on a neighborhood scale.

Figure 4-9 of the Comprehensive Plan portrays each 20-year time period as having 1,875 acres of developable land available (20 years plus a 5-year flexibility factor each at a rate of 75 acres per year). The figure assumes development will be occurring at a maximum annual average rate of 75 acres per year (375 acres per 5 years). The staging of urban service area expansion shows that there is enough land within the future urban growth neighborhoods to accommodate growth out to 2060 based on developing at the maximum of 75 acres per year.

Every five years the Plan Commission plans to review the staging of urban service area expansion and make adjustments to accommodate the maximum 375 acres per five year development. Excess acreage from the previous five years will reduce the current proposed 375 by that amount, pushing urban service extensions out past 2054.

It should be noted that there are two 75 acres per year policies. The first is the 75 acres per year for the urban service area expansion as noted above. The second is the maximum average of 75 acres per year of development. The two policies are calculated two different ways; however, they work together in accomplishing the vision of the Comprehensive Plan for preservation of agricultural land and compact development.

As stated above, the urban service area will be accommodated at 75 acres per year or 1,875 acres (which is 20 years and a 5-year flexibility factor at 75 acres per year). The 5-year flexibility factor is taken into account for landowners that may not want to develop their land at that given time period. Addition to the urban service area may exceed the 375 acres per 5 year average, but in no case shall there be more than 1,875 acres (20 years and 5-year flexibility factor) of available land in the urban service area or until the growth boundary is reached. If a situation occurs where the land brought in is greater than the 375 acres, the urban service area adjustment requests shall provide for a specific phasing plan such that no more than 375 acres is available for development in a 5-year period. Given this timing, it is possible that the urban service area boundary will meet the growth boundary by 2035.

The urban service area expansion is also controlled by other governmental agencies (Capital Area Regional Planning Commission and Wisconsin Department of Natural Resources as of 2009). Therefore, the land to be

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brought into the urban service area will need to be consistent with the established policies and decision making of those agencies.

The maximum average of 75 acres per year of development is calculated with the phasing of approved land divisions and rezoning and is controlled by the policies established within the Comprehensive Plan. Development is defined as residential, business, commercial, industrial, institutional uses, streets, stormwater systems, and parkland dedications. The phasing of neighborhood plans, land divisions and rezoning will control the maximum average of 75 acres per year of development. Planning staff will be calculating the average 75 acres per year of development on a rolling five year average based on approved land divisions and rezoning, along with future phasing plans. Realizing that some years may exceed that amount and other years will have less than that amount, overall the policy requires an average growth rate not to exceed 75 acres per year.

While the Comprehensive Planning process allows for accelerated neighborhood planning to determine land use capability, service analysis, and planning relationships, it is also important to have knowledge of 2030 growth demand. 2030 population and housing data has Fitchburg adding 14,885 persons and 6,673 housing units between 2000 and 2030. To accommodate this population, preliminary analysis would indicate a need for between 1,600 and 2,360 acres of land to be brought into an urban service area.

#### **A Note on Methodology**

The forecast uses several sources of data to develop an analysis of future trends in demand, the effect on unit workloads, and the probable need for additional units and stations.

The initial pass at making these forecasts was based on State estimates of Fitchburg's population. Additional forecasts were provided by the Planning Department as published in the City of Fitchburg's "Development Trends Report." These 2 to 3 percent changes do not affect the results significantly. SEH revised the initial tables in this section. Increasing the population decreases the per capita demand rates (same incidents, larger denominator). So the per capita rates would be lower than projected, but the total population would be higher, and projected demand is the product of these two factors. To be conservative, and as a sensitivity analysis, we added an extra factor to the later analyses that show an extra 10 percent in demand based in part on the anticipated growth as determined by the Comprehensive Plan and in part due to the consolidation of part of the Town of Madison.

### **3.1 Past Trends**

Table 9 (page 28) shows the number of incidents by type for the City of Fitchburg for the past seven years (2002 to 2008) with a column for updated data for 2008. The population of the City increased by 31 percent over the 10-year period 1990 to 2000, growing from about 15,648 to about 20,501. Much of this growth is attributable to development in the City. These areas are still being developed with mixed uses, including moderate density housing, shopping, and office complexes. A 2007 preliminary population estimate by the Wisconsin Department of Administration shows the City

with 23,240 (Table 8, below) or an increase of 14 percent over 2000. This is about a 2 percent increase per year. Pushing the population estimate to 2010 yields an increase of 24 percent over 2000 as a preliminary estimate. Although growth in the City appears to have slowed slightly, it is predicted to maintain this growth rate for the foreseeable future.

**Table 8**  
**Anticipated Population Growth**

US Census Year	1980	1990	2000	2008	2010	2020	2030
Population US Census	11,973	15,648	20,501	<b>23,420</b>	25,477	30,431	35,386
Percent Increase		30.7%	31.0%	<b>14.2%</b>	8.9%	19.4%	16.3%

From City of Fitchburg Demographic Forecasts: 2000-2030

Table 10 (page 30) indicates the call volume and anticipated change based on the population change. The call categories used here conform to the National Fire Incident Reporting System (NFIRS) definitions, with the exception of assist law enforcement, public service, and special types of alarms, the latter of which are unique to the City.

The number of incidents responded to by the FFD increased by almost 420 from 2002 to 2008, going from 907 to an estimated 1,328. That is an increase of 46.4% percent, almost four times the growth in population, which rose approximately 13.4 percent over the same time frame. Half of this increased call volume can be attributed to greater demand per capita, and the rest to increased population growth. Note that the dispatch procedures changed in 2003 when fire started responding to all “Delta” and “Echo” calls (EMS), creating an increase in calls but *not* in actual fire calls. Prior to this change (2002 and before) fire would only respond if requested by Fitch-Rona EMS. Now it is considered priority dispatch.

As Table 9 (page 28) indicates, most types of calls for service increased over the past seven years except in some of the special categories such as law enforcement assist. EMS (rescue) incidents, the second largest category, increased about 84 percent from 2002 to 2003, but since then has leveled off. Actual fire calls have fluctuated over the past seven years from 26 as a high in 2004 to 2 in 2006. They have fluctuated considerably year to year, indicating that there is not yet a clear trend. Both false alarms and still alarms have almost doubled since 2002, the second fastest growing category of calls.

We suggest that data on demand per capita in areas that are being annexed be captured in the future to see if these areas are proportionately greater or lesser burdens than the rest of the City.

**Table 9  
Fire Calls By Type**

<b>Run Type</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Structure Fires	12	23	26	12	2	9	2
Still Alarms	437	559	671	625	625	593	620
EMS Assist	290	482	454	469	454	444	540
Mutual Aid	11	6	6	8	6	2	3
Automatic Aid	*	*	*	13	33	67	46
Motor Vehicle Crash	84	77	63	98	120	142	67
Assist Law Enforcement	19	15	10	9	9	5	4
Public Service	21	26	9	13	10	12	13
Special	1	5	0	1	0	0	0
Haz Mat	0	1	0	2	0	0	0
<b>Total Runs</b>	<b>907</b>	<b>1198</b>	<b>1207</b>	<b>1254</b>	<b>1259</b>	<b>1244</b>	<b>1295</b>
<b>Avg. RT</b>	<b>4:54</b>	<b>5:15</b>	<b>4:52</b>	<b>4:58</b>	<b>5:30</b>	<b>4:46</b>	<b>4:59</b>
<b>% change</b>		<b>32.0</b>	<b>0.8</b>	<b>3.9</b>	<b>0.4</b>	<b>-1.2</b>	<b>0.5</b>

2008 statistics through June 2008

\*Automatic Aid not implemented until July 2004

At this initial stage of the analysis, we begin to see the direction of changes taking place in the City. Demand is rising, but gradually. This implies that future needs for added equipment may be driven primarily by the need to maintain coverage (adequate response times to newly developed areas), rather than because of excessive numbers of responses overloading individual units (more about this later).

### **3.2 Forecast Methodology**

Two sets of forecasts were produced in this study – a lower bound and an upper bound estimate. To estimate the number of calls for service going into the future, we started with basic information on historic demand, population growth, and population projections. We also examined the calls per capita over this same seven-year time period.

The population of the City increased by about 5,000 in the 10-year period from 1998 to 2008 (Table 8, page 27). The increasing demand must be considered in light of this changing population. Population reached 20,501 by 2000, and is projected to reach 25,477 by 2010, and 35,386 by 2030.

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The per capita rates show a fluctuation over time for almost all categories of calls. There was a general trend of increase for Rescue (EMS) and Still Alarms. There was a slow decrease in per capita calls for fires. Service calls per capita appear to be steady, or trending slightly upward, with considerable year-to-year fluctuation. Finally, hazardous condition calls are currently non-existent, a trend that is likely to change in the future to upward.

This pattern is not uncommon. The citizens are using EMS more as a matter of convenience and as a way to obtain medical care, probably because of the combination of a gradually aging population and increasing awareness of (and satisfaction with) emergency medical services, with some change due to socioeconomic reasons. Still (false) alarms are increasing as the number of automatic alarm systems increase with new construction covered by modern building codes. The reliability of alarm systems and their maintenance is a growing problem for the fire service in general that will decrease over time.

Use of this information allows differentiating growth in demand stemming from population increase from the growth caused by increased use of service. Growth in demand is caused by a combination of increased population and economic activity and from higher utilization of fire and rescue services from the public (people more willing to call the fire service or use EMS). It also comes from widespread adoption of automatic fire alarms, which produce more responses merely by their presence. Some of the increased demand per capita from residents may be caused by increased calls from commerce and industry. The trend in calls is illustrated in Table 9, page 28.

It would be useful to undertake an analysis to estimate the proportion of EMS calls coming from non-resident workers, visitors, and people traveling through. It can be based on the residential addresses given by patients. This data was not readily available but could be analyzed in the future even by hand, for a random sample of several hundred calls. It would indicate whether the non-resident portion of EMS is significant, and whether it is trending upward or downward. That would be of interest in itself, and help in projecting future demand.

**Table 10  
Projected Number of Calls**

Run Type	ACTUAL		PROJECTED		
	2005	2008	2010	2020	2030
<b>Population</b>	<b>22,989</b>	<b>23,420</b>	<b>25,477</b>	<b>30,431</b>	<b>35,386</b>
Structure Fires	12	2	14	23	18
Still Alarms	625	620	632	657	683
EMS Assist	469	540	560	870	983
Mutual Aid	8	3	8	8	8
Automatic Aid	13	46	40	80	70
Motor Vehicle Crash	98	67	129	152	180
Assist Law Enforcement	9	4	10	10	10
Public Service	13	13	15	15	16
Special	1	0	1	1	1
Haz Mat	2	0	0	2	3
<b>Total Runs</b>	<b>1254</b>	<b>1295</b>	<b>1409</b>	<b>1818</b>	<b>1972</b>
<b>% change</b>	<b>3.9%</b>	<b>3.3%</b>	<b>6.1%</b>	<b>29.0%</b>	<b>8.5%</b>

To compute the rate of growth in calls per capita over time, the rates of calls per 1,000 population were divided by the previous year's values to determine the percentage change from one year to the next where possible. These numbers were then compared to the actual fluctuations from previous years' calls to determine a logical sequence. The average rate of change in calls per capita from 1999 to 2007 was highest for still alarms and EMS Assist, which both increased in excess of 5 percent annually on a per capita basis. When viewing historic data, the fluctuations in numbers from one year to the next in all categories showed drastic fluctuations both positive and negative (see Table 11, page 31 for per capita calls). Note also that structure fires are insignificant as a per capita number. This implies a relatively safe community from a structure fire standpoint.

**Table 11  
Call Growth per 1000 Population**

<b>Run Type</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Population</b>	<b>21,000</b>	<b>21,501</b>	<b>22,032</b>	<b>22,989</b>	<b>23,114</b>	<b>23,240</b>	<b>23,420</b>
Structure Fires	0.57	1.07	1.18	0.52	0.09	0.39	0.08
Still Alarms	20.81	26.00	30.46	27.19	27.04	25.52	26.47
EMS Assist	13.81	22.42	20.61	20.40	19.643	19.61	23.06
Mutual Aid	0.52	0.28	0.27	0.34	0.265	0.09	0.13
Automatic Aid	*	*	*	0.56	1.43	2.88	1.96
Motor Vehicle Crash	4.00	3.58	2.85	4.26	5.19	6.11	2.86
Assist Law Enforcement	0.90	0.70	0.45	0.39	0.39	0.21	0.17
Public Service	1.00	1.21	0.41	0.57	0.43	0.52	0.56
Special	0.05	0.23	0	0.04	0	0	0
Haz Mat	0	0.05	0	0.09	0	0	0
<b>Total Runs</b>	<b>43.19</b>	<b>55.72</b>	<b>54.784</b>	<b>54.55</b>	<b>53.61</b>	<b>51.83</b>	<b>55.30</b>

\* Mutual aid started in 2004, 2008 statistics are estimates based on available data and best guesses.

### 3.2.1 Fire Incidents

The public sometimes mistakenly thinks that the major source of demand for the fire service is fires. “Fires” here include only working fires or incidents in which there was fire damage. They decreased slightly per capita over the past seven years. This is consistent with experience in other mature cities. We do not expect any major increase in fires per capita in the future. As a share of total responses, we expect fires to become a smaller share of the total call volume as other incident types continue to increase. However as the building stock in the City ages we anticipate a slight increase in structure fire calls.

### 3.2.2 EMS Assist

EMS Assist incidents include medical emergencies and automobile accidents with injuries where both fire and EMS are dispatched. Public education campaigns and general increasing expectations from the public have contributed to higher utilization of EMS in most fire and EMS departments. The EMS system also serves in some measure as the healthcare of last resort for the uninsured. The extent to which this is the case in Fitchburg is uncertain, but it does not appear to be a major issue. Because EMS calls are large in number, any increasing utilization of these services on a per capita basis has major consequences for the overall demand for service. We expect

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that EMS demand will continue to increase in the future. As shown above, rescue incidents had a positive rate of growth per capita in most recent years.

### **3.2.3 Hazardous Materials**

Hazardous materials calls are those incidents which could but do not cause a fire or medical incident, but require fire service attention on an emergency basis until they are resolved due to the type of material present. Hazardous materials include releases of natural gas, flammable liquid spills with no fire, and general hazardous materials incidents. Hazardous materials incidents are currently not an issue for the department but this could change in the future depending on the mode of transportation of the materials.

### **3.2.4 Public Service**

These are incidents in which the fire response vehicle is on the road and comes across a disabled vehicle in a ditch or a vehicle that it witnessed slide off the road in the winter. These are calls that are not dispatched but rather scenarios that the crew comes upon and provides assistance as needed. Special calls are those in which Dane County Command Vehicle CV-1 is dispatched and a Fitchburg crew member staffs the vehicle. This vehicle responds throughout the County to large fires, shootings, or other incidents where command personnel for either fire or police need to remain on scene for extended periods of time.

### **3.2.5 Good Intent**

Good intent calls are those for which a citizen reports an emergency, but on arrival of the fire services, the situation in question is not an emergency. Good intent calls tend to increase as people get “trained” to call the fire service to report emergencies. The presence of cellular phones makes reporting emergencies easier for the public, and probably has increased such calls. Cellular phones also increase the multiple reporting of calls, especially from a road accident. These types of calls are included in all categories.

### **3.2.6 Still Alarms**

These automatic detection system alarms are increasing due to a combination of two factors. Commercial development and new construction built to modern codes require built-in automatic alarm systems, which leads to more alarms in new buildings than in older buildings that did not require these systems in the short term. Second, as new alarm systems come into regular service, they undergo a period of adjustment during which it is not uncommon to experience numerous false alarms. Both mechanisms are likely at work here. The number of still alarms increased an average 17 percent on a per capita basis until 2004, has since decreased slightly, and then has remained relatively constant on a per capita basis. It is anticipated that as these systems age, the number of false alarms will increase until the systems are replaced. Most systems are designed for 20-year life cycles. Also, as new development occurs, newer technology will be used that will initially increase calls in those facilities but decrease false alarm calls over time. As a per capita basis therefore this number is expected to be stable.

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### **3.2.7 Motor Vehicle Crashes**

This type of call could fluctuate greatly over future years due to many factors including the type of fuel use. Biodiesel and ethanol fuels could lead to more car fires whereas some other types of fuel could lead to fewer. As people hang onto cars longer, the tendency to purchase new decreases. Older vehicles can have more mechanical problems that could lead to more crashes due to mechanical failures of the on-vehicle systems. Also, the lack of future fuels could dramatically decrease the use of vehicles as personal transportation, leading to greater reliance on mass transportation, and thereby reducing vehicle crashes.

### **3.3 Optimistic and Pessimistic Forecasts**

Because of the inherent uncertainty in predicting the future (due to both population change and per capita utilization of services), two forecasts were produced. These are termed optimistic and pessimistic. The lower bound or optimistic forecast assumes that the per capita demand for service will not increase over the forecast period; demand will increase just in proportion to population. This is an appropriate assumption in cases where delivery systems are mature and there is clear indication that per capita rates per incident type are stable (have leveled off) or are declining. While there is some instability in the rate of increase for certain types of incidents, the overall rate of growth in calls for service per capita in Fitchburg is fairly steady in the existing call area and in the future predicted development area.

The forecasts are based on population and per capita demand for service. The per capita figures include demand for service both by visitors and employees who work in the City but do not live there (per capita rates are computed as calls from all sources divided by resident population). Fitchburg planners do not expect a major change in the underlying ratio of business to residential population over the forecast period, meaning that past per capita figures should reflect business in the future to about the same extent as they have in the past, especially for the next several years. This is based on information contained in the FUDA and the Demographic Forecast 2000 – 2030.

For both the optimistic and pessimistic forecasts, the trend in each type of incident is predicted individually, and the resulting forecasts added together produce an estimate of total calls for service. The use of separate sub-forecasts allows for capturing the differential growth rates of different incident types, and permits a more detailed analysis of future demand in terms of resources needed. Both forecasts are used to determine equipment needs which in turn determine station size and budgetary costs.

In the optimistic forecast, we assume that per capita rates for each incident type are fixed at a rate based on the 2008 period. In the pessimistic forecast, we assume that there will be an increase in per capita demand for all call types except for those call types that had been decreasing or fluctuated greatly on a per capita basis in the past seven years, i.e., fires and hazardous materials. Those that showed fluctuations were predicted to fluctuate in the future as well.

Growth patterns are fairly well defined for the future. Data provided by the City Planning Department was used as the basis of future development and population trends. This reduces the uncertainty associated with the location of development and overall population levels.

**3.4 2008-2030 Forecasts**

**3.4.1 Pessimistic Forecast (No Growth in Per Capita Demand)**

The 22-year forecast assumed stable per capita demand for service. For some incident types, this assumption is probably not warranted. However, because this forecast is intended to provide a minimum or lowest likely demand scenario, it is appropriate.

The 2008 per capita figures were used for all incident types. This means that any increase in demand is attributable solely to population increase. Population figures were drawn from the latest planning data (Table 11, page 31).

**Table 12  
Pessimistic and Optimistic Forecasts**

<b>Run Type</b>	<b>2008</b>	<b>2010</b>	<b>2010</b>	<b>2020</b>	<b>2020</b>	<b>2030</b>	<b>2030</b>
	<b>Actual</b>	<b>Pessimistic</b>	<b>Optimistic</b>	<b>Pessimistic</b>	<b>Optimistic</b>	<b>Pessimistic</b>	<b>Optimistic</b>
Structure Fires	2	2	9	2	9	3	9
Still Alarms	620	671	603	824	635	1104	667
EMS Assist	540	501	453	630	485	867	517
Mutual Aid	3	8	2	8	2	8	2
Automatic Aid	46	16	69	27	76	46	83
Motor Vehicle Crash	67	104	146	126	157	167	169
Assist Law Enforcement	4	9	5	9	5	9	5
Public Service	13	13	12	16	12	19	12
Special	0	1	0	1	0	1	0
Haz Mat	0	2	0	2	0	2	0
<b>Total Runs</b>	<b>1295</b>	<b>1327</b>	<b>1299</b>	<b>1645</b>	<b>1381</b>	<b>2226</b>	<b>1464</b>

In this pessimistic forecast, the total number of incidents will increase by approximately 972 incidents between 2008 and 2030 – slightly over 77 percent but still well within accepted standards for number of calls per unit. As said before, this represents a liberal estimate, and assumes that no growth in per capita demand will take place and that historically there have been no fluctuations in call volume. The City population is estimated to be 35,386 in

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2030. These pessimistic estimates should normally be taken as an upper bound on demand that should not be expected to be exceeded.

### **3.4.2 Optimistic Forecast**

In the optimistic forecast, an assumption was made that per capita rates of calls would continue following the past trends of increasing, or stay the same if their rates had been declining or fluctuating. Judgment was used to establish this forecast as an optimistic or best case scenario. Each type of call was evaluated individually, based on its past performance and expected behavior in the future. These numbers were also shown on Table 12 (page 34) to indicate the possible future trend.

For most incident types, the seven-year average growth rate in per capita demand was used. SEH started with the base number of incidents defined by the 2007 per capita rates, multiplied by the annual rate of growth in rates, multiplied by the estimated population, to obtain the expected number of incidents. For each succeeding year, this growth rate was applied again, resulting in a compound growth rate.

The only incident types that did not rely on seven-year averages for annual growth in per capita demand were fires, hazardous materials, mutual aid, assist law enforcement, public service, and special calls, which had negative average growth rates over the seven-year base period. Instead, these call types were assumed to remain constant in per capita terms at their current (2007) level.

For still alarms, the high annual growth rate was assumed to have relatively leveled off recently which accounts for the moderate growth since 2007. This is designed to capture the likely reduction in system alarms once new systems have undergone a “break-in” period and existing older systems have been replaced, coupled with enforcement activity on systems with excess alarm activations. Carrying the pessimistic growth rate per capita out beyond 2010, as Table 12 (page 34) shows, produces unrealistically high numbers of system activations.

The effect of a slight continued per capita growth in demand is noticeable. Total incidents exceed 1,400 by 2030, an increase of almost 220 incidents (over 17 percent) from 2007 levels. Most of the difference in the optimistic and pessimistic forecasts is attributable to still alarms and EMS Assist calls.

The right-most column in Table 13, page 36, shows the pessimistic and optimistic projection with another 10 percent added for the years 2020 and 2030. This allows a sensitivity analysis to be made of resource requirements for the possibility of demand being even higher than the pessimistic projection. The extra 10 percent also provides a margin of error for what the revised per capita rate projections would have produced if we had computed them for the minor changes in population estimates made by the annexation of the Town of Madison area at the start of the analysis period. However, it is unlikely that demand would continue to increase at a compounded rate when population averages are not projected to increase at a rate equal to the rates used in the analysis.

The difference between the optimistic and pessimistic forecasts is sizable in relationship to the annual call volume for the City, over 760 incidents in 2030 (838 if the extra 10 percent prove correct), which illustrates the difficulty associated with estimating demand in the future, and its sensitivity to assumptions regarding per capita demand. There is also uncertainty in the population estimates; unexpected increases or decreases in population at a given time period may produce variations from this forecast. Because the demand estimates are the product of per capita demand multiplied by population, they cover a variety of scenarios, such as larger than expected population growth coupled with lower than expected growth in per capita demand, or vice versa. The main vulnerability in the future estimates is if population explodes more than expected along with much higher demand per capita. (That could happen, for example, if there were a surge in low-paying entry-level jobs and a huge influx of immigrants.) But that is unlikely, and the range in demand should span the actual demand that materializes.

**Table 13  
2020 and 2030 Projected Call Volume**

<b>Run Type</b>	<b>2008</b>	<b>2020</b>	<b>2020</b>	<b>2030</b>	<b>2030</b>
	<b>Base</b>	<b>Pessimistic</b>	<b>Optimistic</b>	<b>Pessimistic</b>	<b>Optimistic</b>
Structure Fires	2	2	10	3	10
Still Alarms	620	906	698	1214	733
EMS Assist	540	693	533	953	568
Mutual Aid	3	9	2	9	2
Automatic Aid	46	30	83	51	91
Motor Vehicle Crash	67	138	173	184	186
Assist Law Enforcement	4	10	5	10	5
Public Service	13	18	13	21	13
Special	0	1	0	1	0
Haz Mat	0	2	0	2	0
<b>Total Runs</b>	<b>1295</b>	<b>1809</b>	<b>1517</b>	<b>2448</b>	<b>1608</b>

Given the City’s experience over the past seven years and our understanding of the future development patterns (see Section 4.2), we expect that the actual experience probably will come closer to a combination of the pessimistic and optimistic forecasts, particularly over the next few years. The pessimistic forecast calls for continued growth in demand per capita consistent with more recent experience, while the optimistic forecast assumes that calls per capita will stabilize.

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### **3.5 Commentary on Forecasts**

These forecasts are estimates of the consequences of future growth in population and area served by the FFD. The steady growth experienced by the City lends a higher than average degree of confidence to this forecast.

#### **3.5.1 Still Alarms**

At present, the number of still alarms is increasing slightly, and is the highest growth area in terms of per capita demand for service to EMS Assist calls. As we explained previously, we do not expect the rate of annual growth to continue indefinitely. First, we expect the growth in number of these alarms to begin to decline as large numbers of recently constructed buildings with new systems get beyond their initial stage of higher than “normal” alarms. Additionally, we expect that the FFD’s enforcement efforts will be stepped up during the forecast period.

These automatic alarm systems should not be viewed solely as a detriment, because they offer early notification of a fire or smoke condition, and result in an earlier fire service response, resulting in reduced losses. In the case of automatic fire suppression systems, the fire in the vast majority of cases will be controlled or extinguished upon arrival of the fire service. The increased burden placed on responders must be weighed against the need for extended, labor-intensive, and dangerous firefighting operations that are averted through reliance on detection and suppression systems. In short, the City should continue to encourage the use of the automatic alarm systems, but provide incentives for building owners to make them more reliable and to maintain them better.

#### **3.5.2 EMS Demand**

The predominant demand for service is and will remain Rescue or EMS Assist calls. A key assumption in the long-term forecast was that rates per capita would continue to increase at their present rate throughout the forecast. EMS response in Fitchburg is delivered jointly by the FFD operating as the first response agency for life-threatening calls, with Fitch-Rona EMS providing transport and paramedic services. Any change in the relationship between these organizations or policy changes regarding the types of calls that receive a fire department response could have a major impact on rescue demand. These forecasts assume no major changes.

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## **4.0 Station and Unit Analysis, 2000-2030**

This section discusses the implications of planned development and the predicted increase in the number of incidents from 2000 to 2030. The section translates the forecast of total incidents into responses and makes suggestions for additional stations or station relocations.

### **4.1 Station/Unit Demand**

In order to determine how well the current system of stations and units could meet the forecast demand, it is necessary to consider demand at the unit level. The number of incidents forecast in Section 3.0 was translated into the number of unit responses by first determining the past trend in the ratio of responses to incidents. During 2002 to 2008, the FFD made approximately 1.4 responses per incident based on data from run reports. This ratio reflects the fact that most incidents are single unit responses. Although fire calls, automobile accidents, and other incidents commonly get a multiple unit response, they are in the minority.

For each forecast year, the number of total responses was estimated. Then these responses were apportioned among the units in service with adjustments made to account for growing demand. This was then adjusted for staffing and used as a tool in the analysis of the station locations. Using the national statistic of no more than 3,000 responses per unit, even at 1.4 responding units yielding 125 total responses per fire vehicle, Fitchburg is well within national standards for unit responses. This however, does not translate to the required percentile of calls within 5-minutes criteria. For this we need to look at the actual options available for station locations and determine the percentile of responses that meet the criteria. What this data does show is that the Fitchburg Fire Department, based on units available, has capacity for future demand built in.

#### **4.1.1 Forecasts 2000-2030: No New Units or Stations**

The number of responses indicates where the “busiest” parts of the City are in relation to Fire Department responses as well as the relative share of all responses in the City by the two existing stations. We expect that newly developing areas and any new stations will experience a growing share of total responses at the expense of areas that are built-out and may be stable in their number of responses.

The first part of assessing station and unit needs in the future is to see what would happen if no changes are made in resource deployment, that is, if no stations are added through 2030. This is useful as a test of the “worst case” scenario in terms of no additions to the Fire Department to keep up with growth. Response times are discussed later in the section.

#### **4.1.2 Optimistic and Pessimistic Forecast**

If we use a widely accepted threshold of 3,000 responses to indicate when a unit is effectively overloaded, meaning that it will be unavailable a sufficient amount of time so that response times in its area will degrade, and/or fatigue becomes a factor in the quality of response and firefighter safety, we can see that under the optimistic forecast, no units will exceed this level in the

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foreseeable future. The total number of dispatches and service responses does not total 3,000 for either station or any single piece of equipment.

The use of first responders – two-to-three-person quick response units – to handle many medical responses effectively reduces the responses for engine companies. They have been an excellent concept introduced by the Department to balance workloads and get good response times to Fitch-Rona EMS calls.

Even under the pessimistic scenario, which assumes steadily growing per capita utilization of fire and rescue services, no station would approach overload in the foreseeable future. In turn, this indicates that, in general, the current system is likely to be adequate to handle the workload for the next decade. However, handling the workload is not the same as having adequate response times, which is a spatial as well as a temporal problem. Response times must be considered to get a complete picture of the Department's ability to provide service as the City continues to grow both in area and population. These issues, workload and response time combined, will be discussed under new station recommendations later in this section.

#### **4.2 Development Patterns, 2000-2030 (Including Comprehensive Plan Study)**

The next area that must be considered to determine station needs is the likely pattern of development in the City. The City of Fitchburg is undergoing growth both in terms of population and area protected (rural area being developed). The City has a long history of plans to annex part of the Town of Madison and the annexation will be complete in the near future.

The population growth expected in the City is illustrated in the Figures in Appendix B from the Comprehensive Plan Report. The areas of highest growth are in the northeast corner, along the entire eastern border of the City, and in the southeast corner. The maps do not show total population, just the expected growth in population and location areas. The area's population growth will surround the older parts of the City.

The City's longer term development is defined by "New Growth" areas. These are largely located along the City's fringe and are either recently developed or adjacent to developed land. New Growth areas are considered long-term candidates for extension of urban-quality infrastructure and services. There currently are no plans to permit development in the southwest quadrant of the City south and west of Irish Lane. Should this area be developed, then this plan should be revised.

Figure 15 in Appendix B shows the planned extent of development by 2030. These maps indicate the directions of urban growth towards the southeast. Part of this area is in the automatic mutual aid response area with the Village of Oregon.

The City is in the process of executing the annexation of part of the Town of Madison. This annexation and development will occur in the following places: first, at the City's northeastern border, reaching to the City of Madison limits. And second, in the area northwest of the City where the

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existing Town facilities are located. The current agreement calls for the City of Fitchburg to acquire the existing Town of Madison facilities on Fish Hatchery Road in the City of Madison. This land could be sold to reduce the cost of the construction of the third station if this agreement does not change.

To summarize, the City of Fitchburg is expected to continue to grow, both directly and through annexation of part of the Town of Madison. The primary directions of growth are to the east and southeast. Development to the north and southwest is more limited. The City's population is expected to increase from its current estimated level of 24,511 to over 35,300 by 2030.

The geographic, political, and social environment and the steady and restrained pace of growth have permitted an orderly approach to future development. On a regional basis, the growth can be accommodated without major disruption to the fire service infrastructure already in place. The City's officials, its planners, and the public deserve credit for managing growth in a way that doesn't place excessive demand on the public sector. However, the planned growth and existing fire station locations do not match. The existing station locations did not account for future growth to the east and the southeast.

Given these predictions, *the changes necessary to provide service are relatively modest in terms of the new investment needed.*

The next section of this report will discuss options both for providing service to the areas of new development and annexation, and for improving efficiency or effectiveness of the overall system.

### **4.3 Station Needs**

The needs for new or alternative station locations were considered in two phases: first, the minimum changes necessary to serve the area of annexation to the northeast, and secondly, the changes necessary to improve response times or efficiency elsewhere.

The changes recommended are primarily to meet the needs for maintaining response times as the City's area expands with development at its periphery. The package of changes recommended here represents the culmination of several iterations of prospective changes that were evaluated by SEH and City analysts. They are based on information provided by the Fitchburg Fire Department, Fitch-Rona EMS, and Town of Madison Fire Department and are modeled by SEH's GIS unit. The proposed set of changes appeared to be the most cost-effective package among the options considered. As the City has grown, development patterns have not always coincided with the location of existing facilities. Also, older facilities do not meet current air quality standards, and are limited in terms of their size and ability to house modern fire apparatus, which has grown larger over the years, and in their ability to accommodate more personnel. As a result of these and other circumstances, adjustment of the location of existing resources can result in improved service.

To develop these recommendations, future population and development patterns and existing calls for service were used to identify potential areas

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where existing stations could be moved to achieve better coverage, especially first-due response times. After these moves are made, the balance of needs must be satisfied by construction of new facilities. Staffing redeployment was not considered but must be a consideration in any construction of new facilities.

As a baseline, see Figures 2A and 3 in Appendix A, which show the nominal 4- and 5-minute response time coverage from the existing stations. Note the areas of considerable overlap in first-due coverage, the spaces between the “rings” of coverage in some areas, and the lack of adequate coverage in some fringe areas. This map shows the entire area reachable within 4 and 5 minutes from each station. Some overlap in station coverage is useful when departments are busy, however, this is excessive. Neighboring departments can provide coverage with the Dane County Box Alarm System when the Fitchburg Department is out on a call, and still have reasonable response times within their own jurisdictions. The overlap also means that second-in response times will be better than in areas with little overlap. But when stations overlap in an area, one must ask whether one or more could be better used elsewhere.

The station location changes will be considered in the approximate chronological order of their recommended construction dates. There are a couple of alternatives. The exact order of any changes should depend on the pace of development and the ensuing demand profile. As the proposed construction schedule goes further into the future, the timing and location of stations becomes less certain, owing to uncertainty in the pace and precise locale of development. In considering station moves, special attention was given to stations that were going to have to be relocated. The logic was that if they were to be rebuilt, why not do so in a more favorable location? Figure 7 in Appendix A shows the first proposed station moves and new stations in one alternative, and Figure 9 in Appendix A shows an additional alternative that needs to be considered.

#### **4.3.1 Northwest Station, Alternate 1 (Figures 7, 8, and 9, Appendix A)**

Relocate the current northwest Station (currently known as Station 2) east along McKee Road to a lot near the intersection with South Seminole Highway. The ideal location would be along McKee Road just east of Seminole Highway. Given the lack of available land east of Seminole Highway, the practical location is the vacant land at the northeast intersection of McKee Road and the drive into Thermo Fisher Facilities about one quarter mile west of Pineland Trail. This change will allow this station to gain quick access to Verona Road, Seminole Highway, and McKee Road, allowing fast travel to the south and east. It also will provide coverage for some of the area currently served by Station 1 (which we recommend moving, below). The move will have negligible negative impact on response times in its current service area while improving the response times to the east and south. Given the location of the current station, it is reasonable to assume the current property will have good resale value or could be used as other City/Community Building. This discussion is not part of this study, although we are aware of multiple buyers who would be interested in the property if it were made available.

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As identified, this would be on Thermo-Fisher property just east of the existing entry drive and west of Badger Trail. The Comprehensive Plan identifies this land area as Industrial Commercial. A fire station would appear to be compatible with that location. However, the Comprehensive Plan (page 2-8, Objective 2 and related policy 2) also notes the need to preserve and protect mature trees and wooded areas. This site has heavy wood cover, but the quality of those woods is not known. The wood lot should be evaluated prior to purchase to determine if the wooded area, or some individual specimens within it, is worthy of some level of protection.

#### **4.3.2 Northeast Station, Alternate 1 (Figures 7, 7A, 8, and 9, Appendix A)**

Relocate the current Lacy Road Station (currently known as Station 1) to the area of Syene Road and East Cheryl Parkway in the northeast quadrant of the City. This move, taken in conjunction with the movement of the northwest Station, results in better coverage for the entire northern half of the City of Fitchburg, and reduces some of the overlap evident in Figure 3 in Appendix A between the existing two stations. The existing station is outdated, needs major repairs, and does not meet NFPA and OSHA air quality standards. It is also very energy inefficient. The existing Station 1 has been added onto over the years creating a maze of corridors. A new relocated station is needed. It would be the intention of this study to recommend that Station 1 be maintained until the new northeast Station is ready to be occupied. After the new station is built, the City will need to determine what to do with the existing structure. One possibility for the property would be demolishing the current structure and subdividing available portions of the land, although the site is also home to a water well and the City's primary public safety radio communications tower, which would complicate redevelopment efforts. Another possibility for the facility would be for the City to rehab the current facility and consolidate/relocate other City services to the facility. The Parks Department and Historical Society would be impacted if the new third station is built on the site of the old City Hall, and the Recreation Department is limited in available space within their current quarters at the new City Hall. However, this discussion is not part of this report.

The text indicates a site at Syene Road and East Cheryl Parkway, although the referenced figures show a location at McCoy and Syene Roads. The McCoy and Syene Road location specifically shown would not be suitable given its designation of open space in the Comprehensive Plan and was purchased by the County, with assistance from the City, as open space. However, the computer-generated best location is what is illustrated on the map.

Like the Northwest Station, this proposed station location will serve, within a 4-minute drive time, areas well north and east of future Fitchburg boundaries. Adjustments south, providing a location along Syene Road at or just south of East Cheryl Parkway (rather than the mapped location) will still cover the anticipated Fitchburg boundary more, and yet provide more effective coverage to the south, although there is no City-owned land in this area and property would have to be purchased. Further, the data indicates that much of the issue in the rural area is incidents along USH 14. Placement of the station near East Cheryl and Syene Road would place the station closer to the new

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interchange which will have the ramps providing access to the south. The south serving ramps of the USH 14/McCoy interchange will be removed as part of the USH-relocated Lacy interchange.

#### **4.3.3 Future South Central Station, Alternate 1 (Figures 9 and 10, Appendix A)**

The Old City Hall on South Fish Hatchery Road could be the site of this alternative for a new station which would be to improve response to the south half of the City. The land is currently owned by the City. Additionally, however, its location is poorer relative to the coverage needs in the southeast parts of the City. A location here would increase the coverage with these three stations to the 95 percentile of calls covered. This new position allows correction of existing response deficiencies and provides better support for second-due responses to northern Fitchburg. However, any new station must be staffed, and when a station is built in a more rural area the potential for volunteers decreases. The City would need to address the issue of staffing when and if this station is constructed. Additionally, although it does improve the response throughout the City, both the southwest and southeast corners remain unreachable within 5 minutes from this station. One new front line engine would be needed to equip this station. Also, it is desirable for any new station to be located within the urban services area to provide urban water and sewer, which this site does not have at the current time.

#### **4.3.4 South Central Station, Alternate 2 (Figures 11 and 12, Appendix A)**

Alternative 2 would be to locate a new station near the intersection of Caine and Whalen Roads. This station would provide better service to both eastern and southern Fitchburg than the Old City Hall location. The southeast corner of the City is served by automatic mutual aid with the Village of Oregon and this would improve the City response to this area. This is an area that currently is not served within response guidelines and this location would place the area within the guidelines. The station would also provide service to new developments in east central Fitchburg, in the vicinity of the South McGaw Park and Greenfield Neighborhoods, which have had several larger fires over the last few years. Currently neither the City nor the Village of Oregon can reach this area within the 5 minute response guidelines. Placing a station here would permit the City to exceed the 95<sup>th</sup> percentile of response coverage. The City would need to purchase property in this area to construct a station at this location. One new front line engine would be needed to equip this station. Also, this area is outside the current urban services area. This issue would have to be addressed when this option is discussed in the future.

#### **4.3.5 South Central Station, Alternate 3 (Figures 11 and 12, Appendix A)**

Alternative 3 would be to locate a new station near the intersection of Byrne and Caine Roads. This station would provide better service to both eastern and southern Fitchburg than either the Old City Hall location or the Whalen Road location. The southeast corner of the City is served by automatic mutual aid with the Village of Oregon and this would partially overlap with Oregon coverage to this area. This is an area that is not currently within the response time guidelines. The station would also provide service to new developments in east central Fitchburg, in the vicinity of the South McGaw

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Park and Greenfield Neighborhoods, which have had several larger fires over the last few years. Currently neither the City nor the Village of Oregon can reach this area within the 5 minute response guidelines. Placing a station here would permit the City to exceed the 97<sup>th</sup> percentile of response coverage. One new front line engine would be needed to equip this station. As noted for previous locations this is also outside the current urban services area.

#### **4.3.6 Southeast and Southwest Stations, Alternate 1 (Figure 13, Appendix A)**

The ultimate solution to maximum coverage for close to 100 percentile and all future development considerations is a four station scenario. Both the northwest and the northeast stations would be relocated as indicated above and then two new stations would be built, one in the southwest quadrant and one in the southeast quadrant. Neither of these two new stations would be located on land currently owned by the City. The advantage here is complete coverage of the City within the 5-minute response time goal. The major disadvantage is staffing and equipment allocation. Although there is adequate equipment for a third station, there is not adequate equipment for a fourth station. Likewise, staffing would be a really big issue. Currently there are times when it is difficult to provide adequate staff for the two on-duty crews utilized today. This situation would only get worse if this alternative were chosen. This does provide coverage over the complete southwest quadrant including the area south of Whalen Road that under existing development plans has limited potential for development to occur. Due to the cost of this alternative it was not considered further.

#### **4.3.7 Summary of Alternatives**

The option of relocating Stations 1 and 2 and adding a third central-to-south located station as future development occurs along the eastern corridor of the City at approximately 2030 is the best solution. This proposed set of stations is not the only solution, but would solve most of the current and foreseeable response time problems to 2030.

Adding stations virtually anywhere improves the robustness of the entire system by improving second- and third-due response times as well as first-due times. The new stations will not only improve response times in the future annexed area, but add to the capability of the whole fire system to respond and be within the 95<sup>th</sup> percentile. In other words, citizens throughout the City will benefit from the recommended changes, not just those in the areas of the changes.

All the southern locations mapped are outside of a future growth boundary, but are near the growth boundary, meaning that an alteration to each site, east and northeast, respectively, would place them within the growth boundary and a future urban service area. This may be more preferable than having the station outside of the urban service area. Land on the east side of Caine Road from Irish Lane south to the drainage channel (which is about 660' north of Byrne Road) is in the long-term growth boundary. The area, even in the growth boundary, is mainly designated as agriculture and open space, and will likely remain that way until a neighborhood plan is adopted. Utility and governmental facilities are a conditional use under the agricultural zoning

districts in the City. However, a neighborhood plan should be accomplished and, as part of the study, identify potential future fire station sites.

Toward the end of September 2008, while this study was in its final stages, SEH, the City Administrator’s office, Planning Department, and Fire Department reached a consensus on the set of recommended station location changes described here. This was a significant development, spurred in part by the process of analysis undertaken by SEH’s GIS and fire station location team under guidance from the City study team.

Maps showing response time locations are optimal locations. Any relocated or new facility would need to consider available land and the urban service area.

**Table 14**  
**Summary of SEH Recommended Station Location Changes, 2009-2030**

<b>Station Change</b>	<b>Project Start</b>	<b>Open Station</b>
Relocate Station 2 to McKee Road Corridor	2010	2011
Relocate Station 1 to Syene Road Corridor	2011+	2013
Future Station 3 at South Fish Hatchery Road or Caine and Byrne Roads	2030 projected	2032 projected
<b>Total:</b>	<b>2 relocated, 1 new future station added</b>	

The proposed set of changes may be viewed as a combination of a facility upgrade/replacement program and a station location improvement project. We believe that the recommended changes satisfy the general objectives for the long-range master plan and development plans of the City.

#### **4.4 Staffing and Unit Deployment Changes**

In the preceding section we focused on station locations. The next aspect of dealing with Fitchburg’s fire protection system is the deployment of units throughout the system and staffing of the units. This is not part of the study but is presented as it represents a thought process that must be included in the addition of any new stations.

The study team was given two constraints in preparing a master plan – that current safety practices must be maintained and that response times must not be reduced from their current level. Neither limited the analysis. The main goal was to improve the effectiveness of the existing system while maintaining and improving the response times throughout the City as the City grows.

Although we present several specific recommendations for station locations, the “big picture” should be viewed in terms of the guidelines for this study.

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There may be objections raised to various details; in most cases these can be accommodated without undermining the intended effect of the recommended changes. Fine tuning by the collective wisdom of City officials and the Fire Department would be desirable.

#### **4.4.1 Unit Deployment Principles**

At present, the FFD operates with a unique system that relies heavily on cross-staffed units for both EMS first response and fire fighting. This system creates a situation in which both the function of the units and the actual units sent to a given call may vary depending on a number of circumstances. A key aspect of the present system is the reliance upon first responders and cross-trained firefighters to provide both services on the fire ground and rescue response. We see this operational aspect continuing into the future due to the location of the Fitch-Rona EMS units. When fire companies are out of service because their cross-trained unit is not available, this creates a hardship for the department if there is an actual fire incident.

Given the City's geographic growth, the increased area that must be serviced, and the increased portion of the workload that is EMS Assist calls and small fires, or other services, we believe that it is important to proceed forward with a philosophy that calls for resources to be more evenly spread throughout the service area to maintain response times both at the first- and second-due levels.

Some additional unit resources may be warranted and some reallocation of existing units would be desirable. We based the unit redeployment recommendations on the following principle: that adding or relocating stations provides a more robust response system and allows for units to be out of service for training and administrative duties without the immediate need to address coverage concerns. The recommendations also improve the ability of the department to handle simultaneous calls in any area of the City. Most of the existing types of apparatus being used in the City are appropriate, given the Department's mission and operating practices.

#### **4.5 Implications of New Stations and Unit Deployment**

To more specifically explore the workload implications of the proposed new station and unit deployment plan, the projected number of responses was allocated among the stations. These estimates are less certain than the current deployment scenario presented at the beginning of this section because of the variation in the pacing of development and the timing of opening of new stations. Nevertheless, it is still informative to explore some potential scenarios.

Discussion has been held on a "What If" scenario to merger with the City of Verona Fire Department. This would not change any station locations for the City of Fitchburg and potentially could create more problems than solutions. The biggest issue for the City of Verona as of this date is volunteers. An additional issue is the rapid growth of the Epic Campus on the City's west side. An additional station in addition to the one that already exists on Lincoln Street in the City of Verona could be required which leads to many of the same staffing and resource allocation issues that the City of Fitchburg

is currently facing. It would be our recommendation to not merge with the City of Verona Fire Department at this time. This would be more of a plus for the City of Verona than for the City of Fitchburg. It is understood that the two cities will continue to explore alternative fire service delivery systems.

**Table 15  
Percentile Coverages**

<b>Option</b>	<b>Number of Calls Covered %</b>	<b>Number of Over Lap Calls %</b>	<b>Actual Percentile</b>
Existing Sta. 1 4-minute	28	13	51 *
Existing Sta. 2 4-minute	36	13	
Existing Sta. 1 5-minute	53	39	62 *
Existing Sta. 2 5-minute	53	39	
Sta. 1 Alt. 1	41	7	88 *
Sta. 2 Alt. 1	54	7	
Sta. 3 Alt. 1 Fish Hatchery	21	12	97 *
Sta. 3 Alt. 2 Caine & Byrne	8	1	95 *
Sta. 3 Alt. 3 Caine & Whalen	10	1.5	97 *
Sta. 3 Alt. 4 Southwest	5	<1	97 **
Sta. 4 Alt. 4 Southeast	5	<1	

\* Deduction for overlap included in number

\*\*Includes both southern stations

The optimistic forecast projected station workloads out to 2030. There is some uncertainty in predicting the workload consequences of all the changes, but we do not anticipate that any station will become overloaded. The pessimistic number of responses is shown in the same table and replicated below for simplicity of analysis.

**Table 12 (as shown earlier on page 34)  
Pessimistic and Optimistic Forecasts**

Run Type	2008	2010	2010	2020	2020	2030	2030
	Actual	Pessimistic	Optimistic	Pessimistic	Optimistic	Pessimistic	Optimistic
Structure Fires	2	2	9	2	9	3	9
Still Alarms	620	671	603	824	635	1104	667
EMS Assist	540	501	453	630	485	867	517
Mutual Aid	3	8	2	8	2	8	2
Automatic Aid	46	16	69	27	76	46	83
Motor Vehicle Crash	67	104	146	126	157	167	169
Assist Law Enforcement	4	9	5	9	5	9	5
Public Service	13	13	12	16	12	19	12
Special	0	1	0	1	0	1	0
Haz Mat	0	2	0	2	0	2	0
<b>Total Runs</b>	<b>1295</b>	<b>1327</b>	<b>1299</b>	<b>1645</b>	<b>1381</b>	<b>2226</b>	<b>1464</b>

The projected number of responses under the pessimistic forecast is shown above. Even with the demand 10 percent higher than the pessimistic estimate, no unit would be over the 3,000 response threshold.

If overloads occur at stations, (all calls coming from the same area of the City), the Department should consider whether there is a way to better share the call-load between stations, whether it is to relocate on a temporary basis equipment from one station to another, or encourage firefighters to assist by responding to a different station.

One last analysis that SEH performed was to analyze the budgets in relationship to cost per call per capita. We looked at the budgets, including payroll and benefits since 2005 and projected that out to 2030. Not included is any capital cost for additional or relocated stations as there are variables that have to be sorted out before numbers could be provided.

**Table 16  
Cost Per Run**

<b>Year</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
Budget	\$1,602,003	\$1,819,777	\$1,821,785	\$2,021,254	\$2,367,788	\$4,317,267	\$7,871,817
% Change		13.6%	0.1%	11.0%	17.0%	82.0%	82.0%
	22,989	23,114	23,240	23,420	25,477	30,431	35,386
Total Runs	1254	1259	1244	1328	1313*	1777*	2607*
Cost Per Run	\$1,277.51	\$1,445.41	\$1,464.46	\$1,522.03	\$1,803.34	\$2,429.53	\$3,019.49
Cost Per Run Per Capita	\$0.06	\$0.06	\$0.06	\$0.06	\$0.07	\$0.08	\$0.085

\*average of optimistic and pessimistic forecasts

What can be noted about the budget analysis is that the cost per run does not increase significantly over the study period when computed on a per capita basis.

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Overall, the current fire deployment system can absorb much of the growth going into the future by relocating the two stations and adding one additional station. This will provide sufficient coverage through 2030 to both the existing City and the consolidated Town of Madison area when that becomes part of the City no later than 2022.

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## **Appendix A**

### **GIS Study Maps**

Figure 1 – Response Time Boundaries – Existing EMS Station Locations

Figure 2 – Dane County Emergency Management EMS Response Zones – Fitch-Rona Site

Figure 2A – 5-Minute Response Time Boundary – Existing Station Locations

Figure 3 – 4-Minute Response Time Boundary – Existing Station Locations

Figure 4 – Call Locations – 2004 through Present – Fitch-Rona Call Locations

Figure 5 – Call Locations – 1999 through 2007 – Existing Station Locations

Figure 6 – Fitch-Rona Call Locations – 2004 through Present with 4-Minute Response Time Boundary

Figure 7 – 4-Minute Response Time Boundary – Relocated Station Locations with Oregon/Fitch-Rona

Figure 7A – 4-Minute Response Time Boundary – Existing Station Locations

Figure 8 – 4-Minute Response Time Boundary – Relocated Station Locations with Oregon/Fitch-Rona

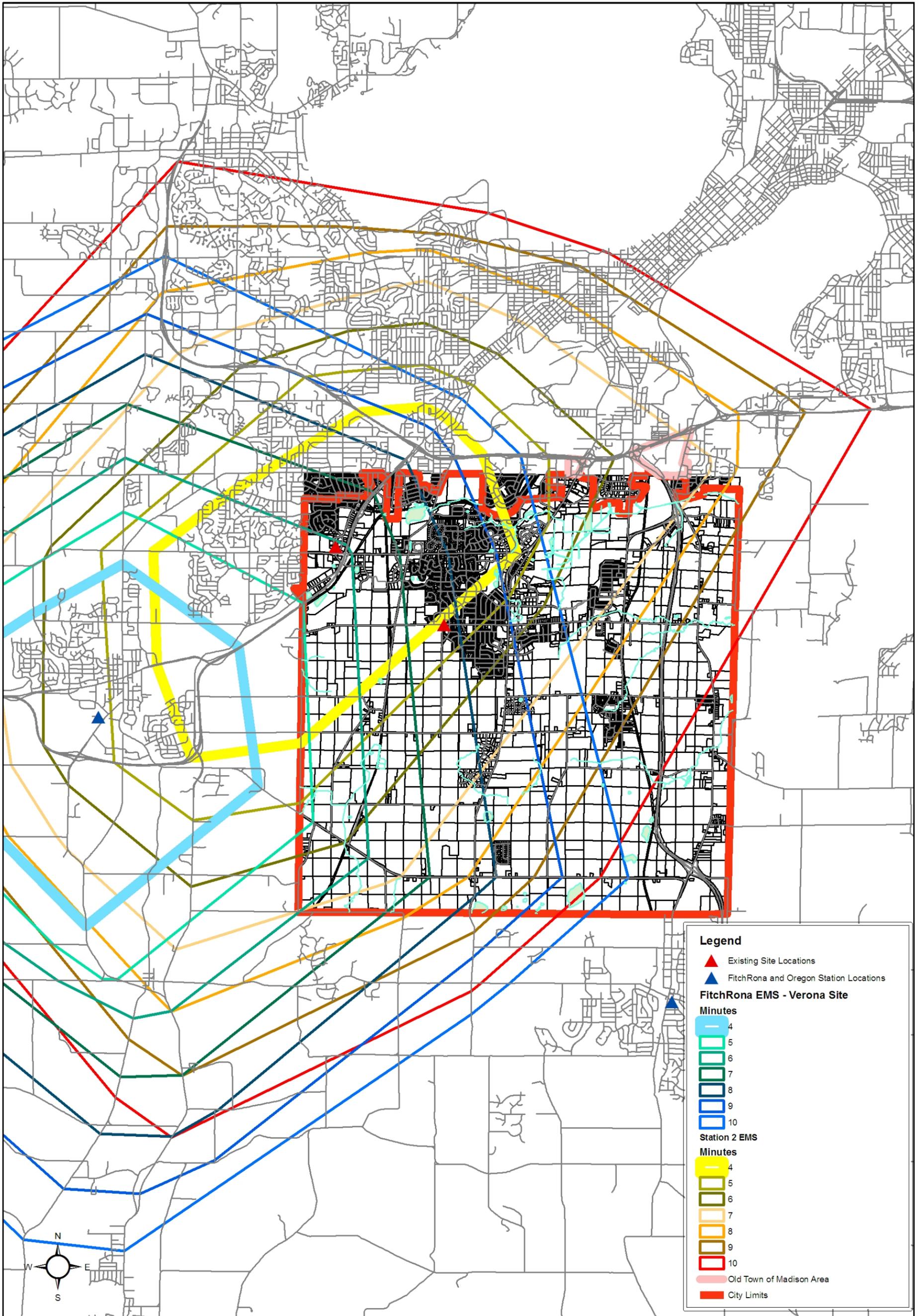
Figure 9 – 4-Minute Response Time Boundary – 3 Sites – Relocated Station Locations

Figure 10 – 4-Minute Response Time Boundary – 3 Sites – Relocated Station Locations with Oregon/Fitch-Rona

Figure 11 – 4-Minute Response Time Boundary – Other Station Locations

Figure 12 – 4-Minute Response Time Boundary – Relocated Stations with Other Station Options

Figure 13 – 4-Minute Response Time Boundary – 4 Optimal Station Locations with Oregon/Fitch-Rona



0 0.5 1 Miles

Response Time Boundaries  
Existing EMS Station Locations  
Fire Station Location Study  
City of Fitchburg, WI

FIGURE 1

1 OF 1

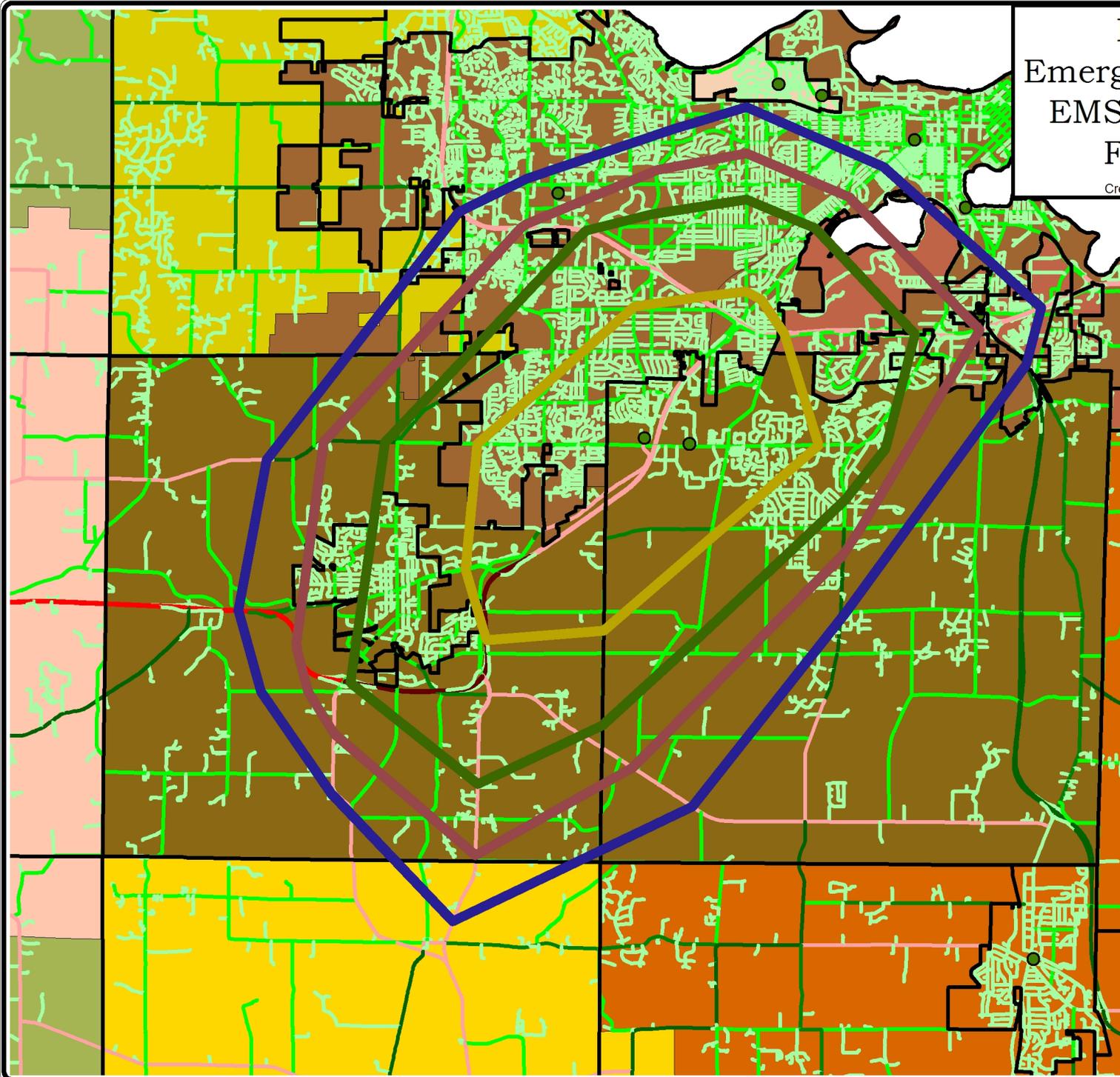
# Dane County Emergency Management EMS Response Zones FitchRona Site

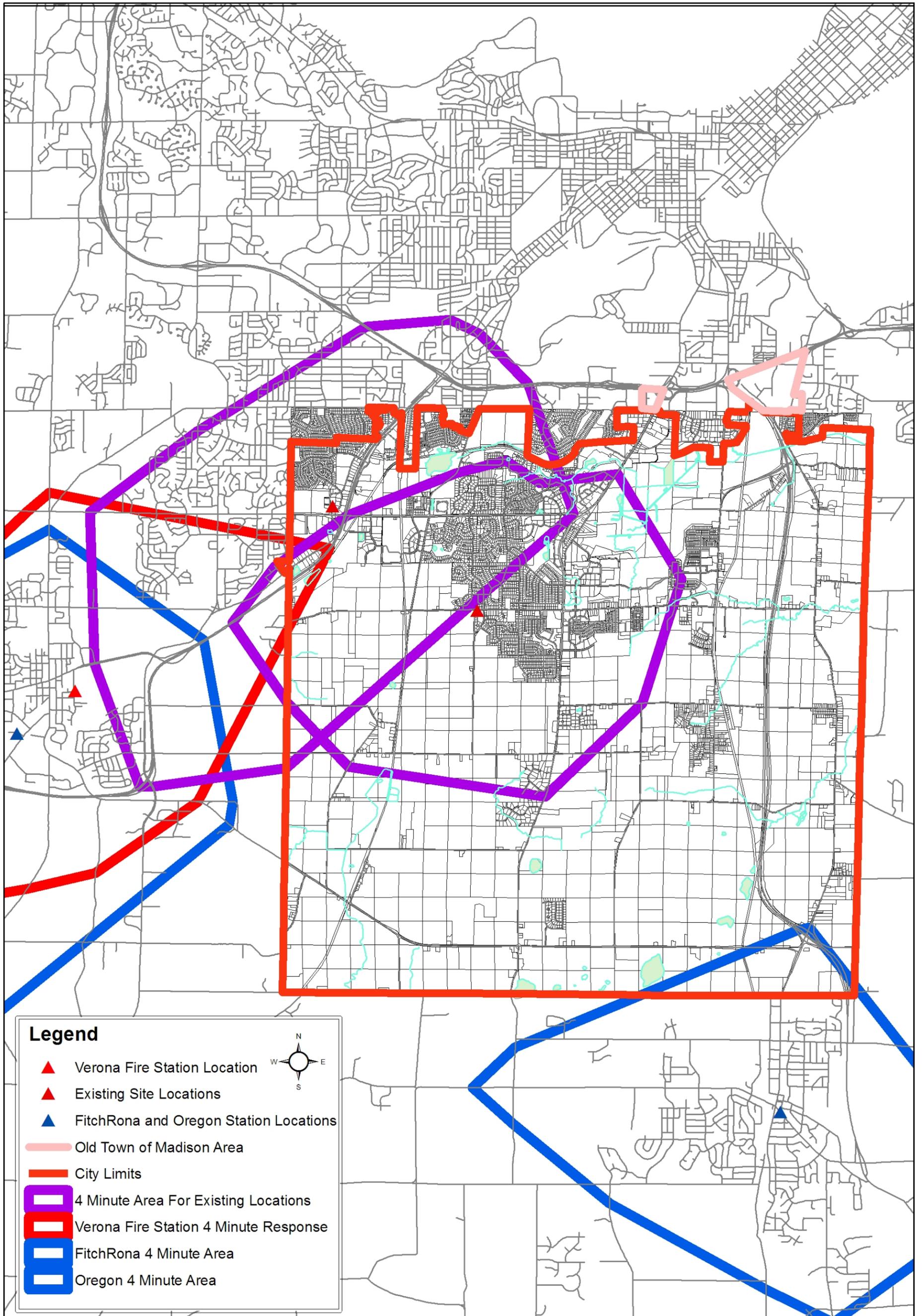
Created By Short Elliott Hendrickson Inc.



## Legend

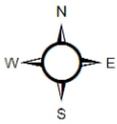
- Fitch-Rona EMS 4 Minute
- Fitch-Rona EMS 6 Minute
- Fitch-Rona EMS 7 Minute
- Fitch-Rona EMS 8 Minute
- Dane County EMS Sites
- 25
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- Belleville Area EMS
- Belleville Area EMS
- Blanchardville FD
- Blooming Grove-Burke-Map
- Brooklyn EMS
- Cambridge Area EMS
- City of Madison FD
- Cross Plains Area EMS
- Curtis (Edgerton) EMS
- DeForest Fire/EMS
- Deer-Grove EMS
- District 1 EMS
- Fitch-Rona EMS
- Heartline Medix - Columb
- Marshall EMS
- McFarland EMS
- Middleton EMS
- Monona EMS
- Mount Horeb VFD EMS
- New Glarus EMS
- Oregon Area Fire EMS Dis
- Sauk-Prairie Ambulance a
- Shorewood Hills EMS
- Stoughton EMS
- Sun Prairie EMS
- Town of Madison EMS
- Waunakee EMS





**Legend**

- ▲ Verona Fire Station Location
- ▲ Existing Site Locations
- ▲ FitchRona and Oregon Station Locations
- Old Town of Madison Area
- City Limits
- 4 Minute Area For Existing Locations
- Verona Fire Station 4 Minute Response
- FitchRona 4 Minute Area
- Oregon 4 Minute Area

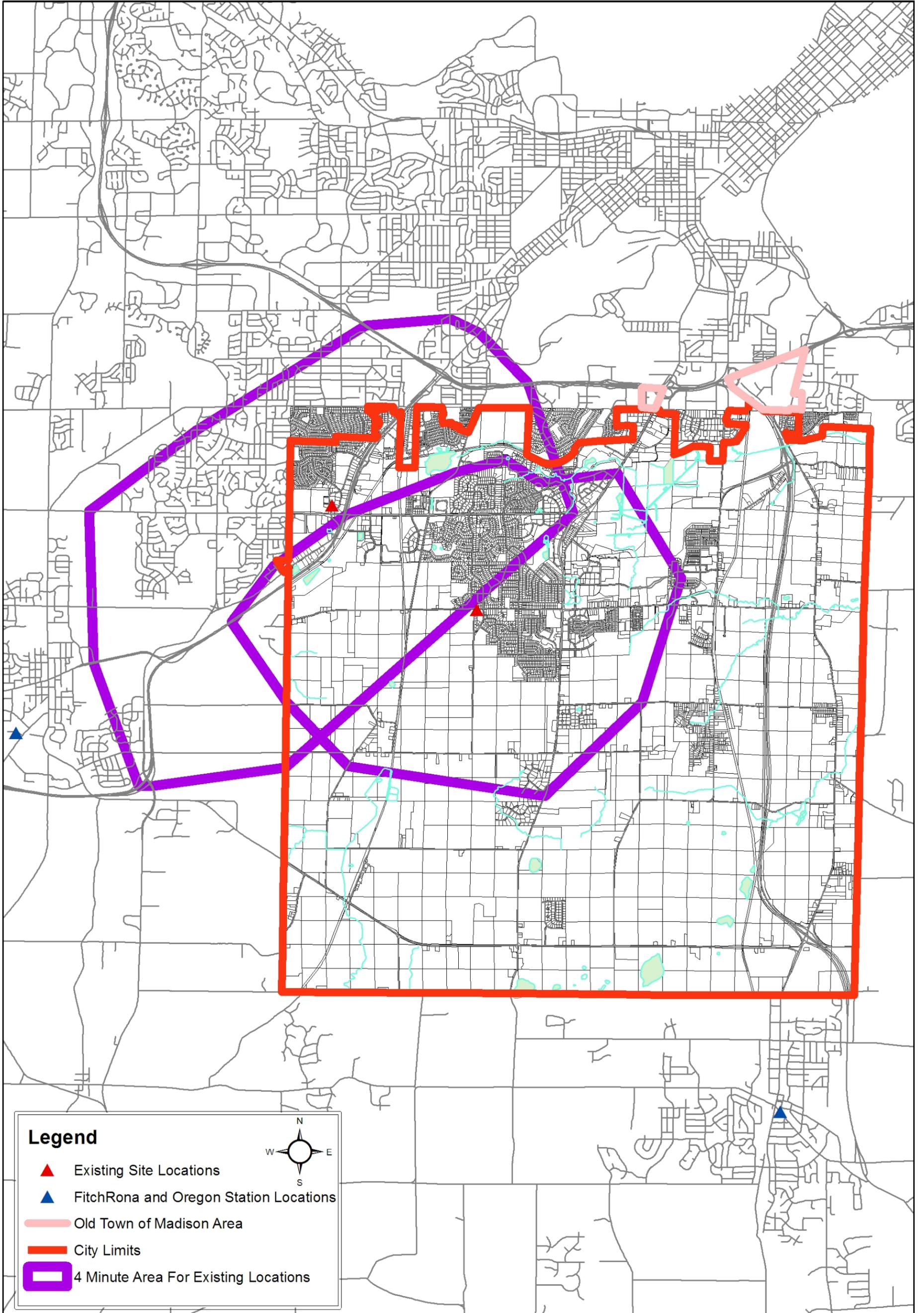


0 0.45 0.9 Miles

4 - Minute Response Time Boundary  
 Existing Station Locations  
 Fire Station Location Study  
 City of Fitchburg, WI

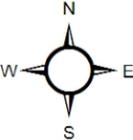
FIGURE 2A

1 OF 1



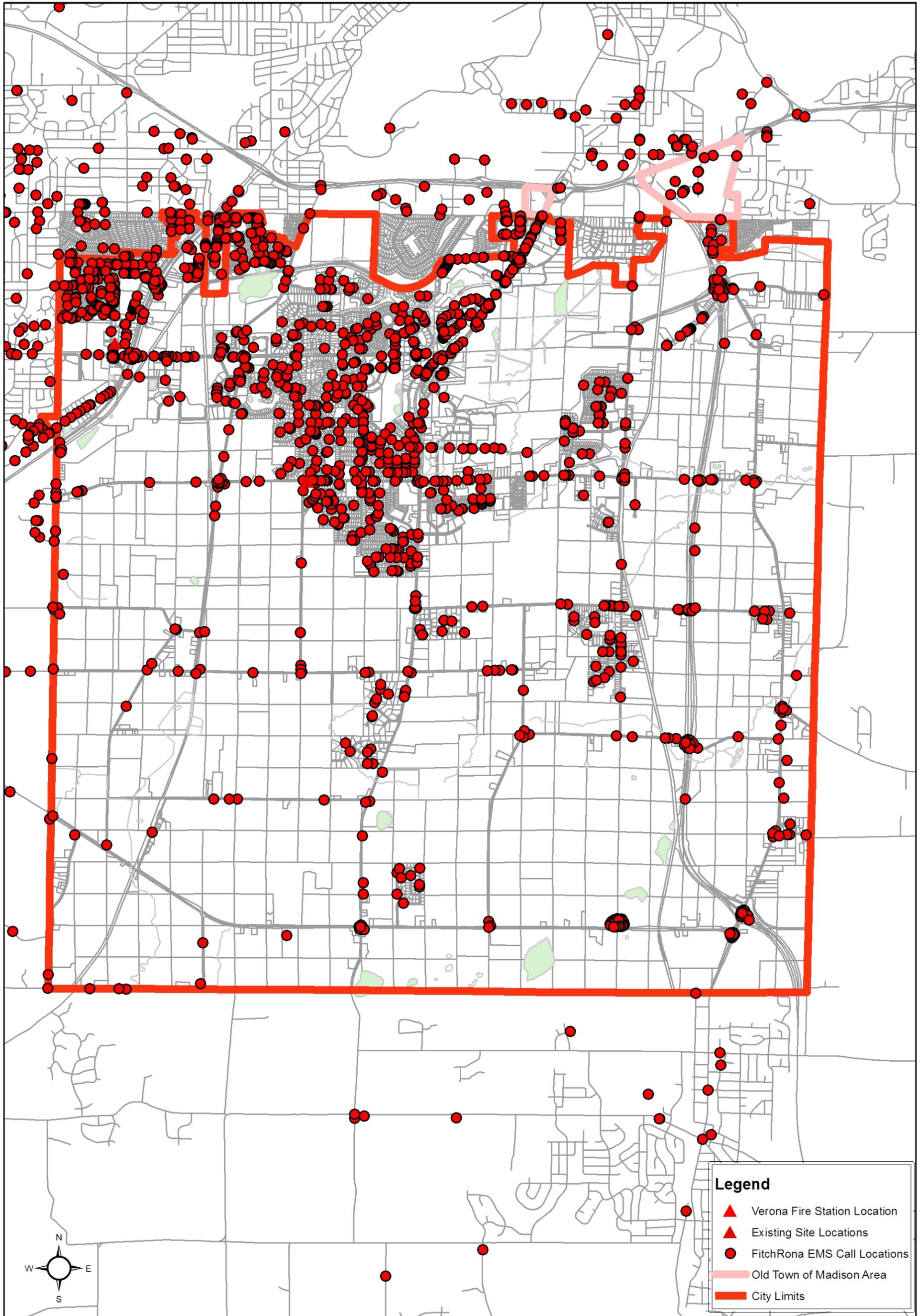
**Legend**

- ▲ Existing Site Locations
- ▲ FitchRona and Oregon Station Locations
- Old Town of Madison Area
- City Limits
- 4 Minute Area For Existing Locations



0 0.5 1 Miles

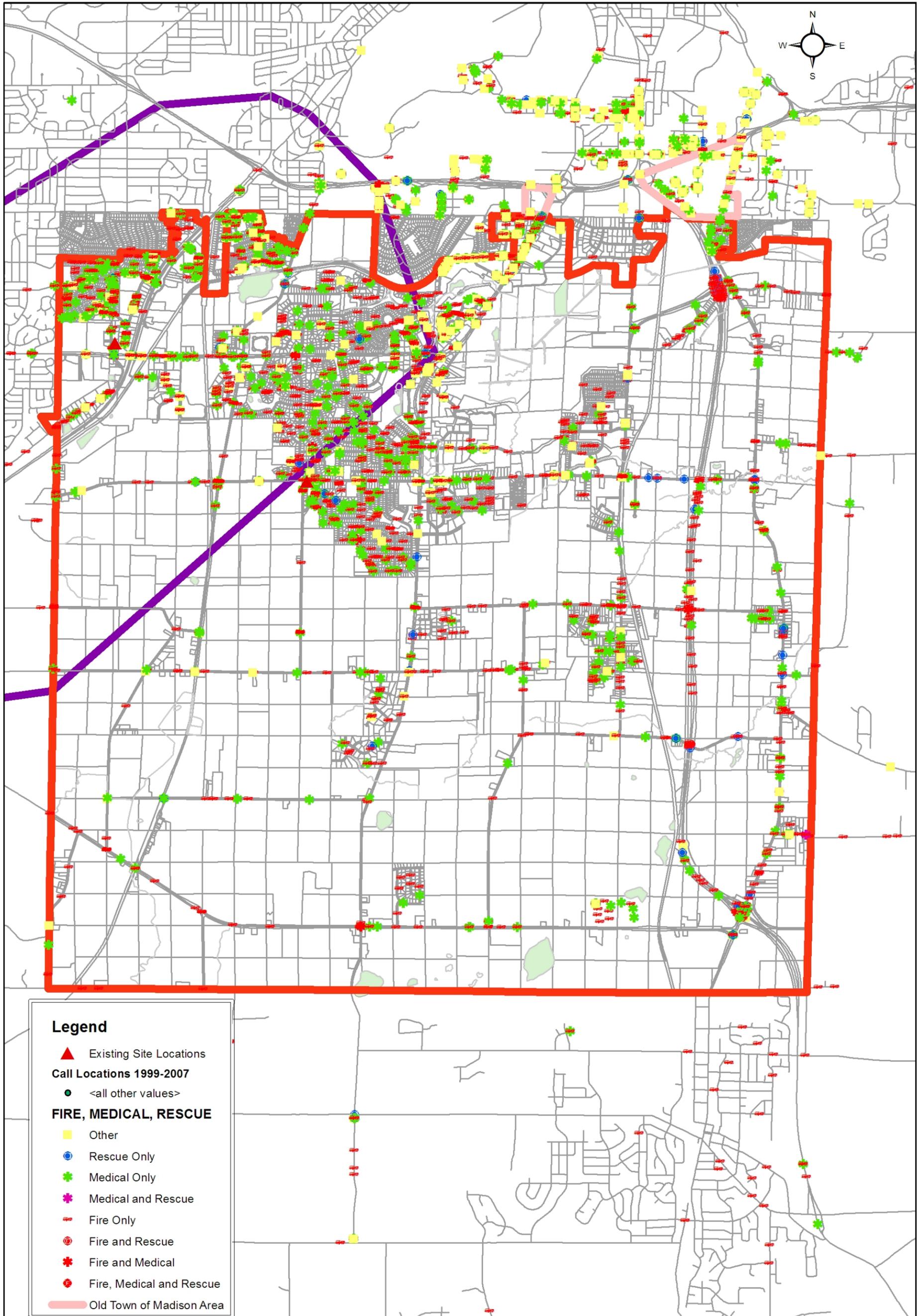
4 - Minute Response Time Boundary  
Existing Station Locations  
Fire Station Location Study  
City of Fitchburg, WI



Call Locations - 2004 through Present  
 FitchRona Call Locations  
 Fire Station Location Study  
 City of Fitchburg, WI

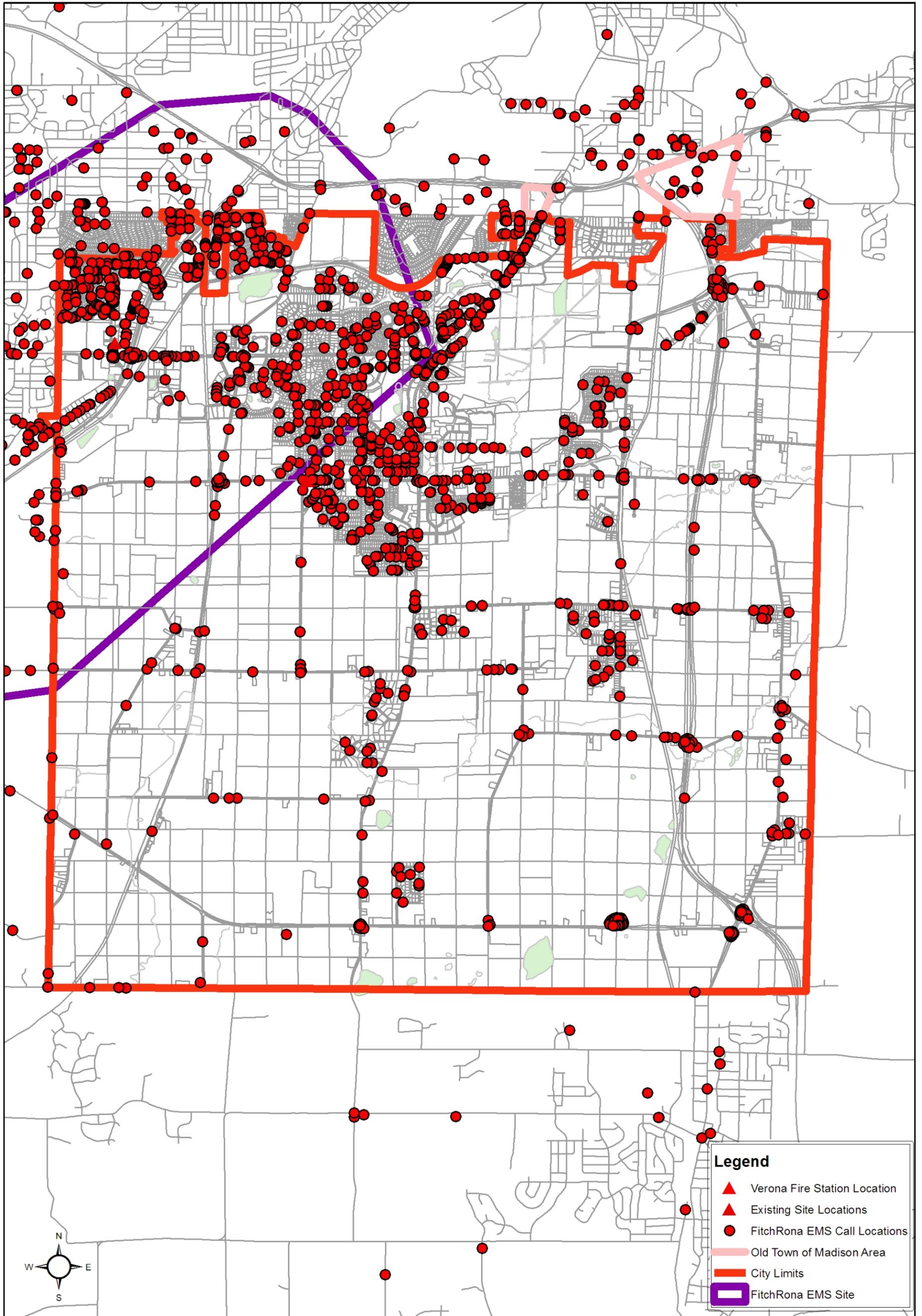
FIGURE 4





0 0.35 0.7 Miles

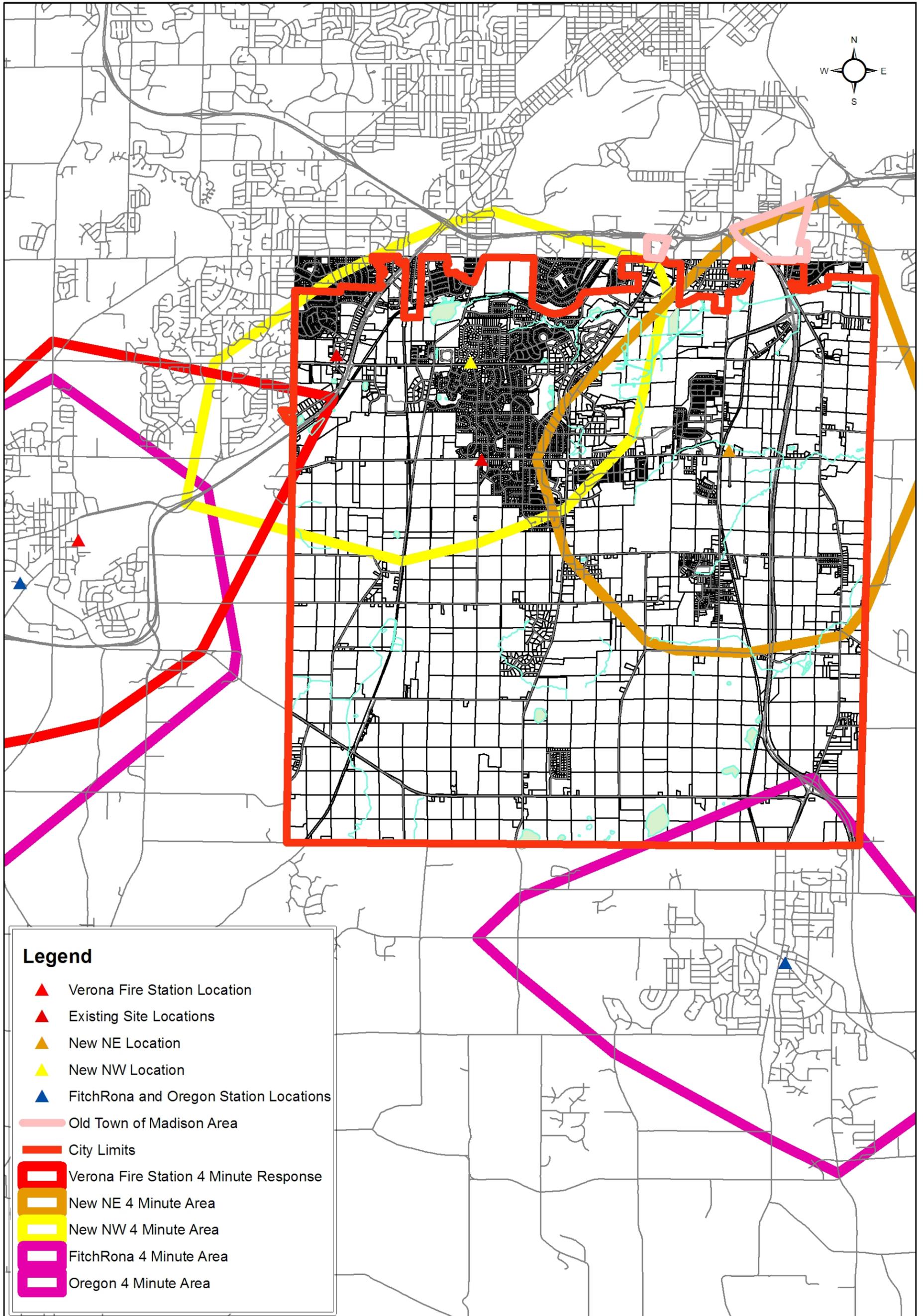
Call Locations - 1999 Through 2007  
 Existing Station Locations  
 Fire Station Location Study  
 City of Fitchburg, WI



FitchRona Call Locations - 2004 through Present  
 With 4 Minute Response Time Boundary  
 Fire Station Location Study  
 City of Fitchburg, WI

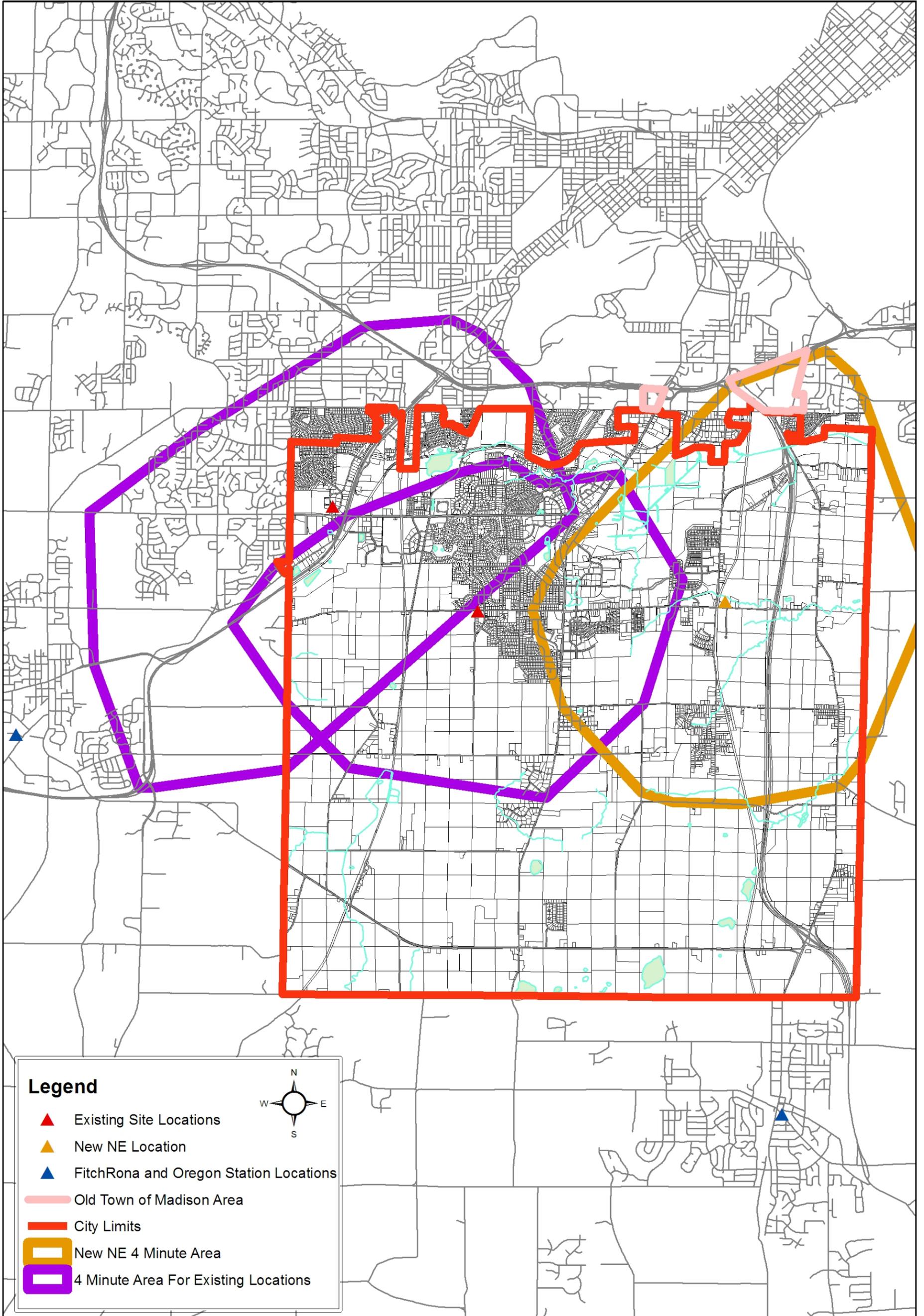
FIGURE 6





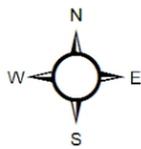
0 0.5 1 Miles

4 - Minute Response Time Boundary  
 Relocated Station Locations With Oregon/FitchRona  
 Fire Station Location Study  
 City of Fitchburg, WI



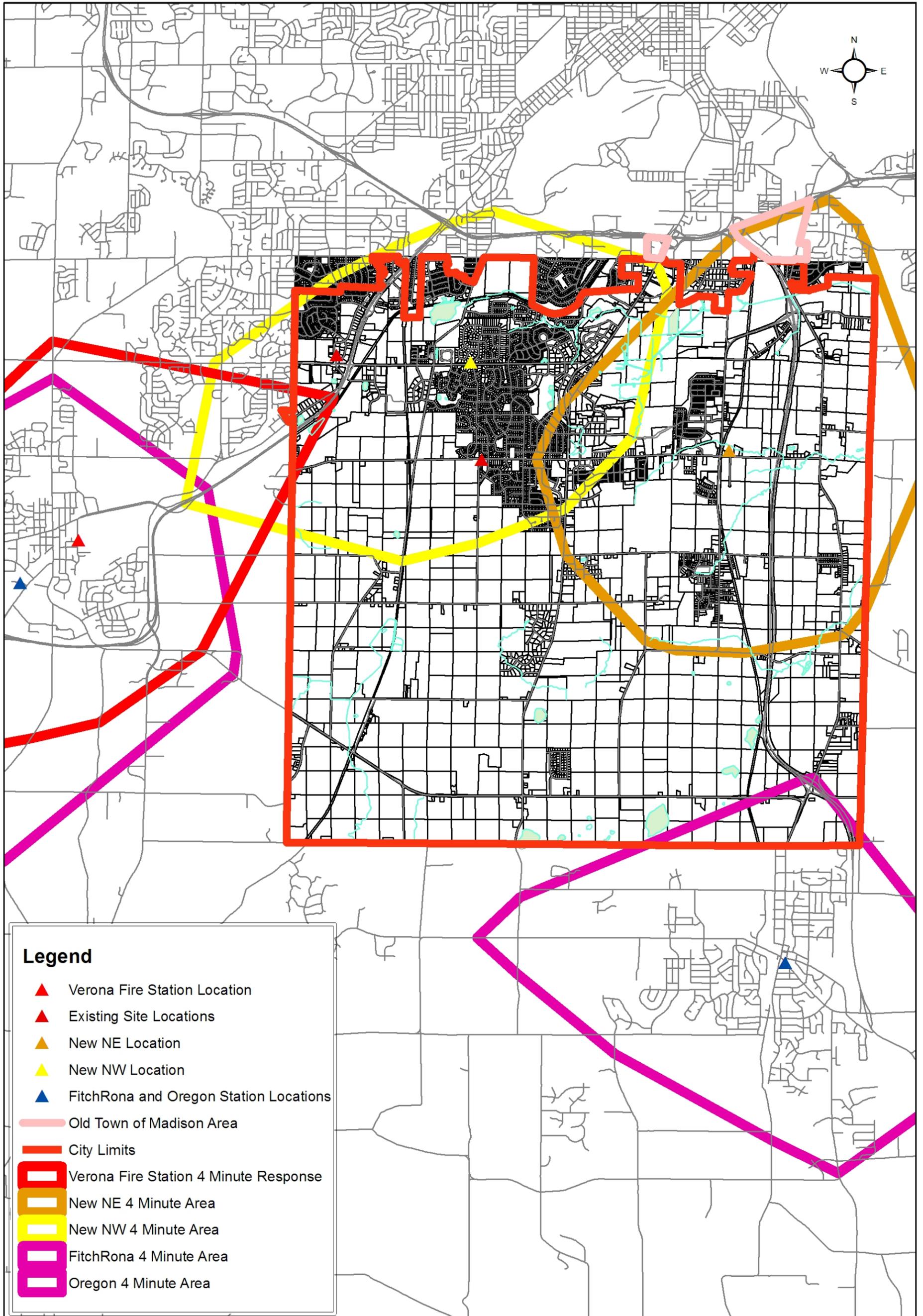
**Legend**

- ▲ Existing Site Locations
- ▲ New NE Location
- ▲ FitchRona and Oregon Station Locations
- Old Town of Madison Area
- City Limits
- New NE 4 Minute Area
- 4 Minute Area For Existing Locations



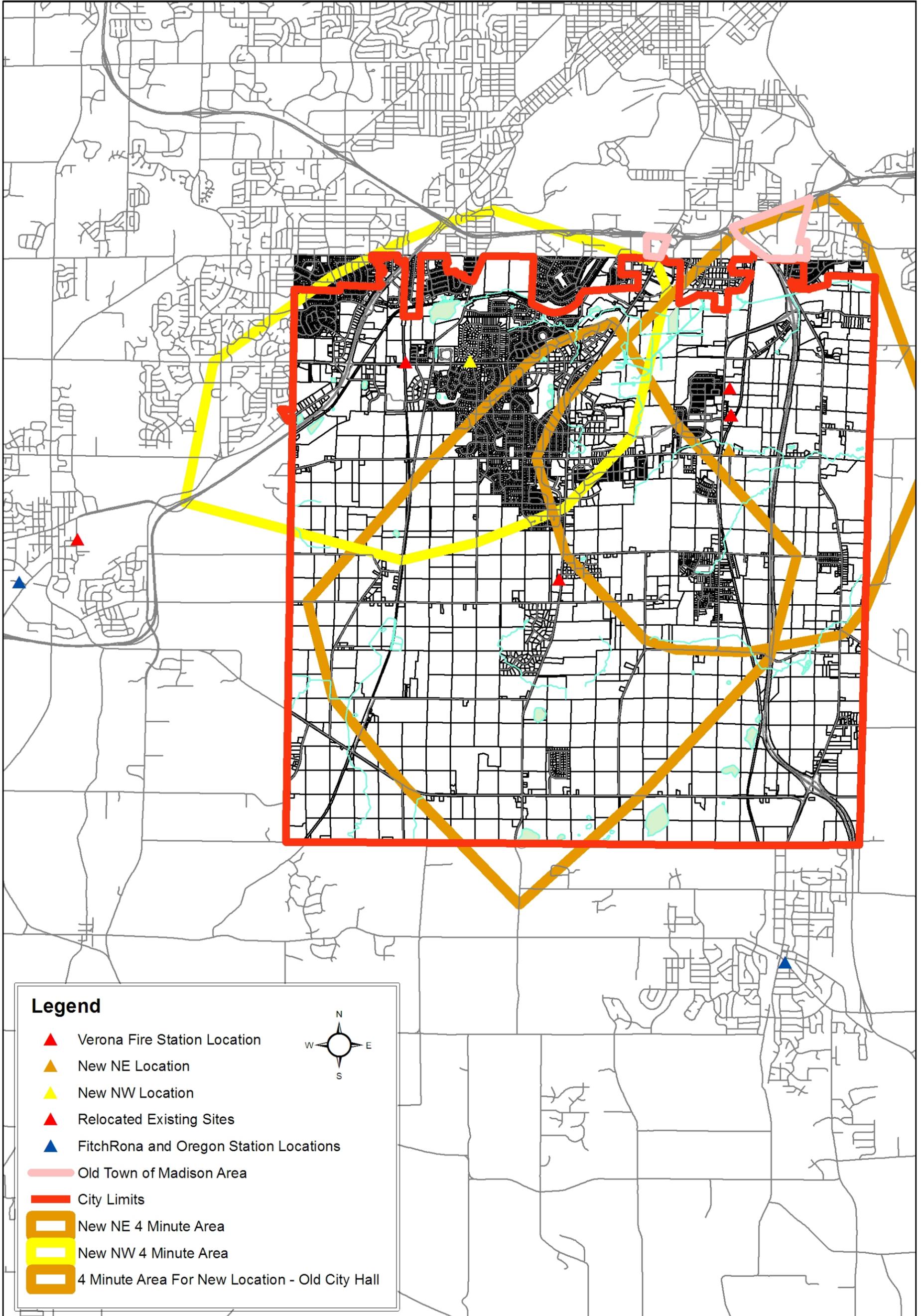
0 0.5 1 Miles

4 - Minute Response Time Boundary  
 Existing Station Locations  
 Fire Station Location Study  
 City of Fitchburg, WI



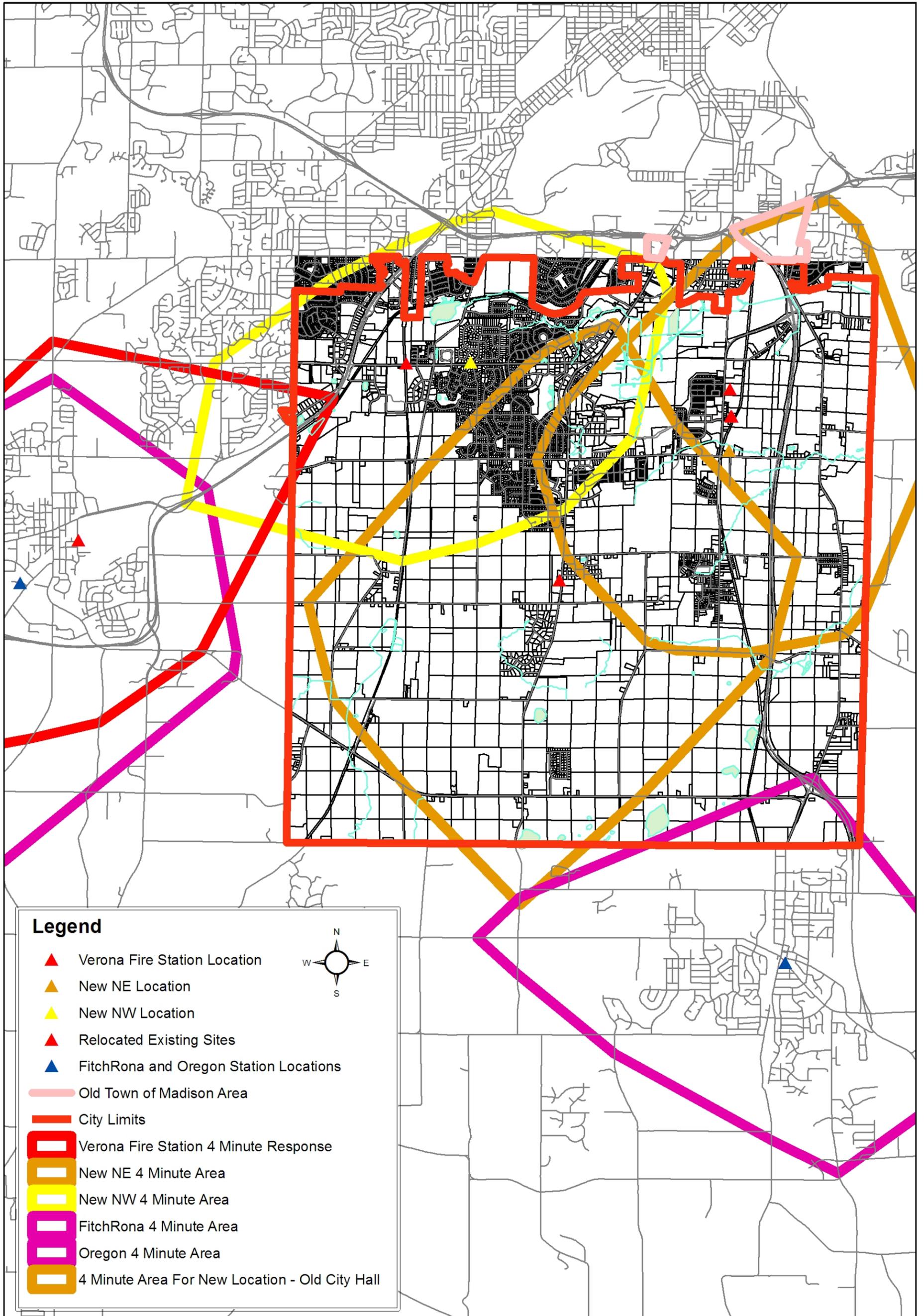
0 0.5 1 Miles

4 - Minute Response Time Boundary  
 Relocated Station Locations With Oregon/FitchRona  
 Fire Station Location Study  
 City of Fitchburg, WI



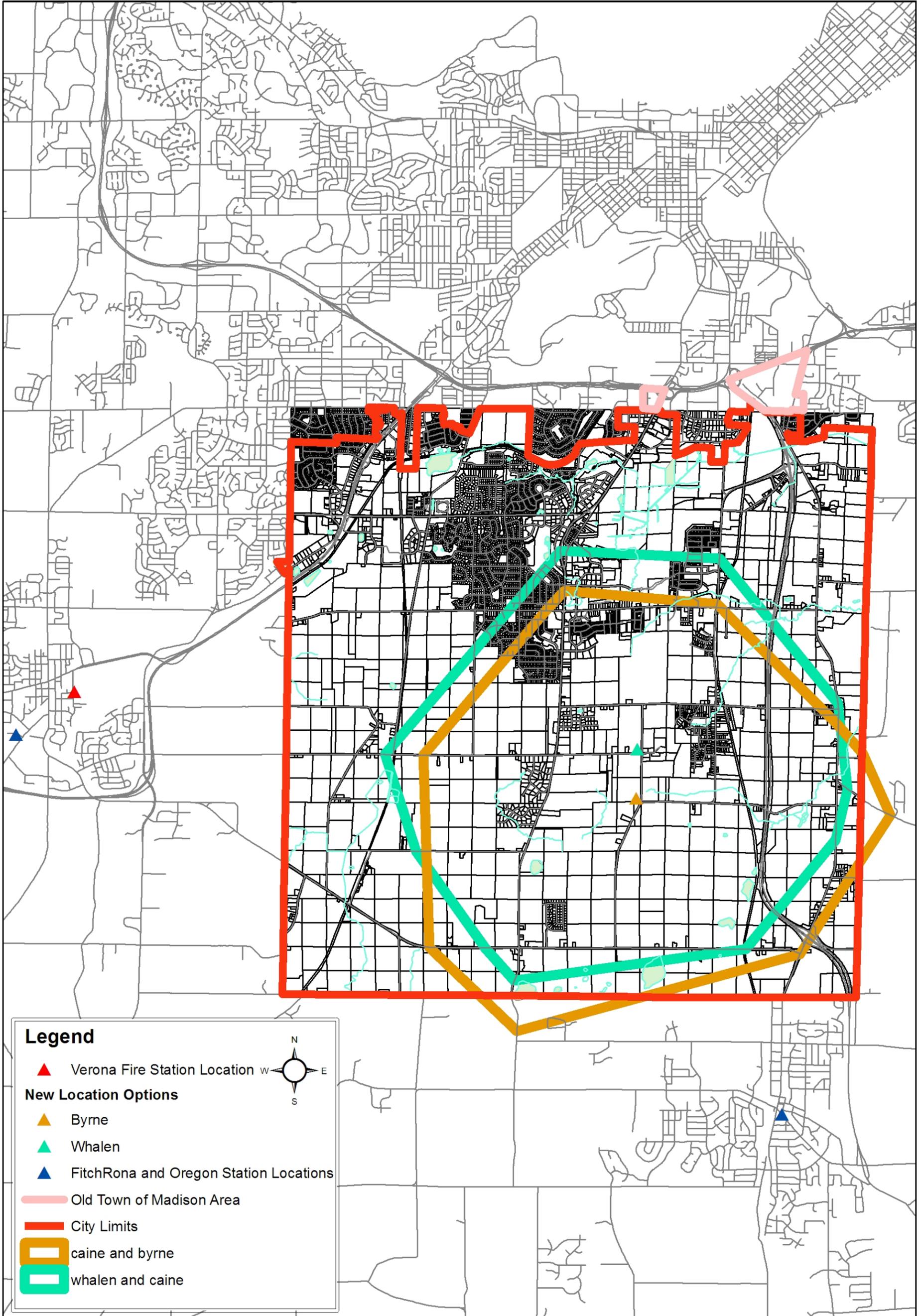
0 0.45 0.9 Miles

4 - Minute Response Time Boundary - 3 Sites  
 Relocated Station Locations  
 Fire Station Location Study  
 City of Fitchburg, WI



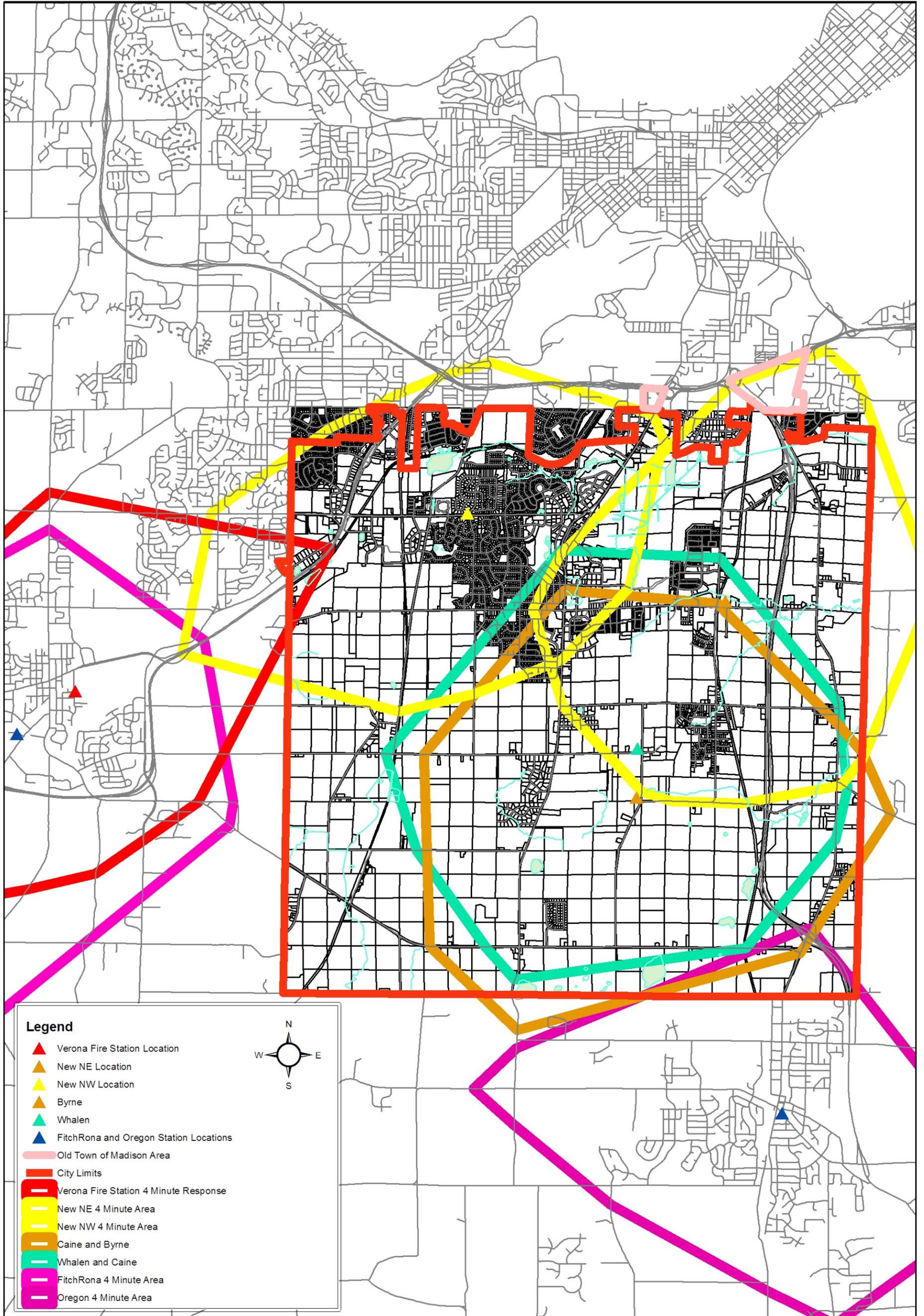
0 0.45 0.9 Miles

4 - Minute Response Time Boundary - 3 Sites  
 Relocated Station Locations With Oregon/FitchRona  
 Fire Station Location Study  
 City of Fitchburg, WI



0 0.5 1 Miles

4 - Minute Response Time Boundary  
 Other Station Locations  
 Fire Station Location Study  
 City of Fitchburg, WI

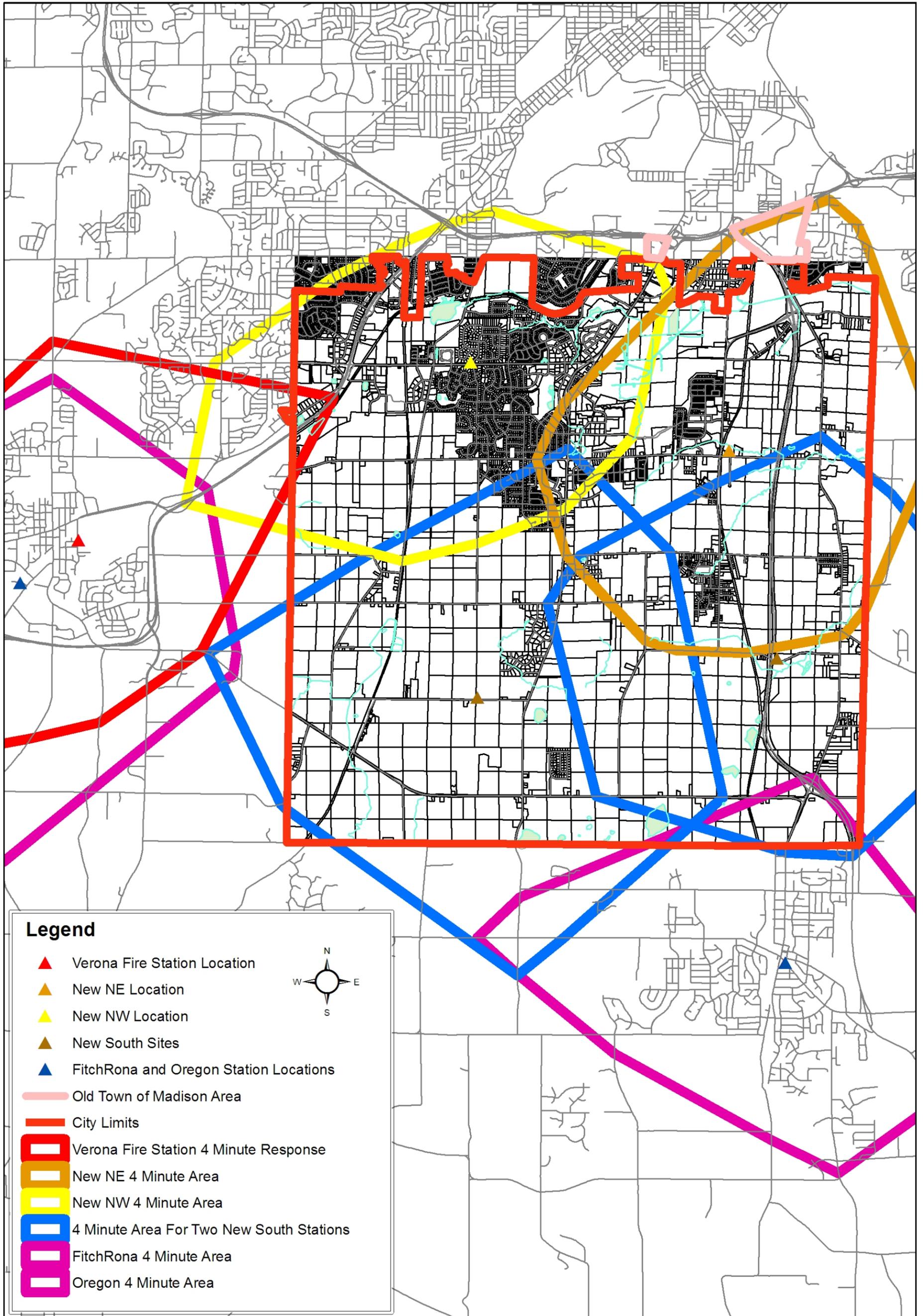


0 0.45 0.9 Miles

4 - Minute Response Time Boundary  
 Relocated Stations With Other Station Options  
 Fire Station Location Study  
 City of Fitchburg, WI

FIGURE 12

1 OF 1



0 0.45 0.9 Miles

4 - Minute Response Time Boundary  
 4 Optimal Station Locations with Oregon/FitchRona  
 Fire Station Location Study  
 City of Fitchburg, WI

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## **Appendix B**

### **Comprehensive Plan Maps**

Figure 14 - 2007 Existing Land Use Map

Figure 15 - Future Urban Growth Area Neighborhoods

Figure 16 - Future Land Use Plan Map

Figure 17 - Cooperative Agreement

Figure 14 - 2007 Existing Land Use Map

# 2007 EXISTING LAND USE MAP

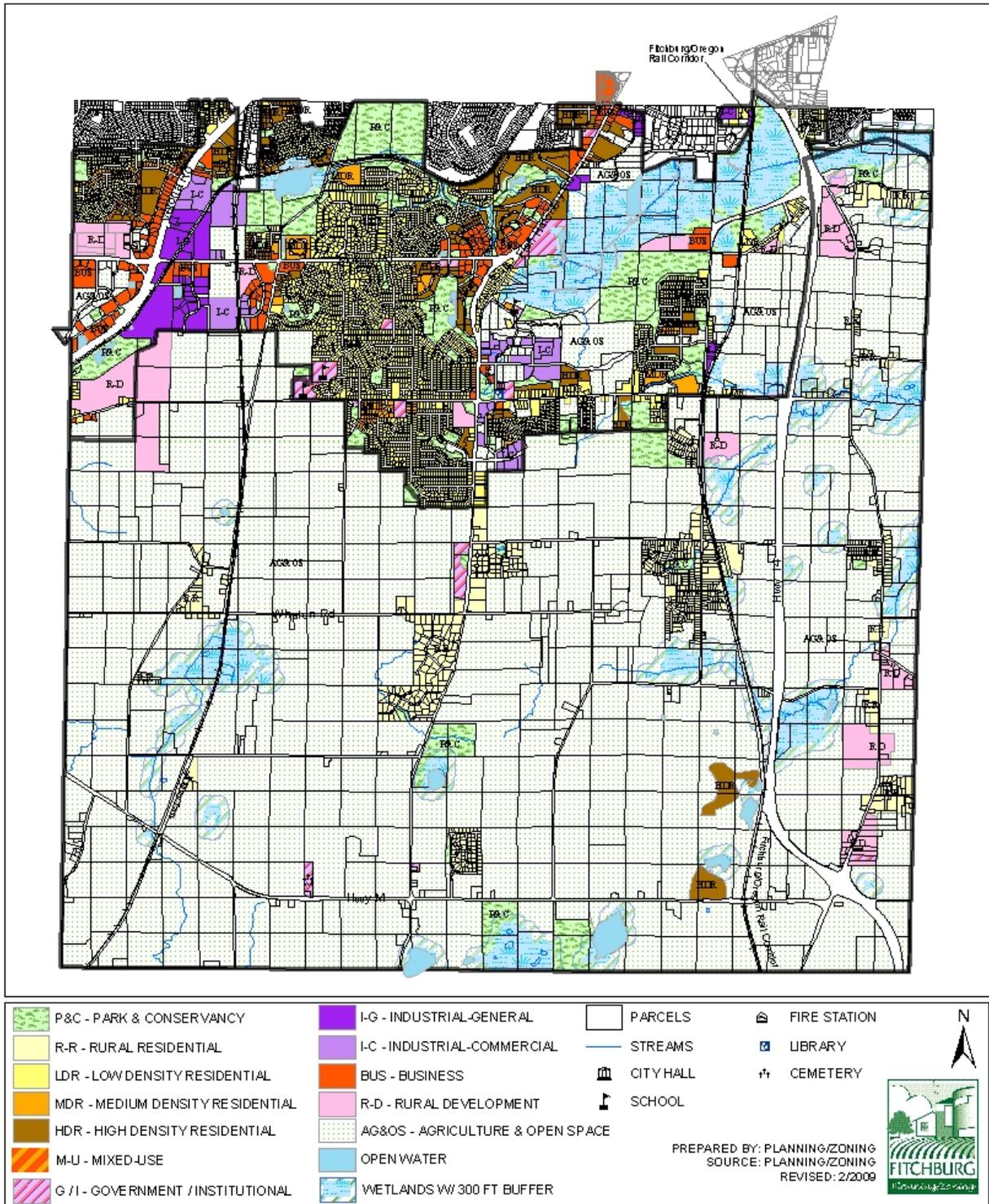


Figure 15 - Future Urban Growth Area Neighborhoods

# FUTURE URBAN GROWTH AREA NEIGHBORHOODS

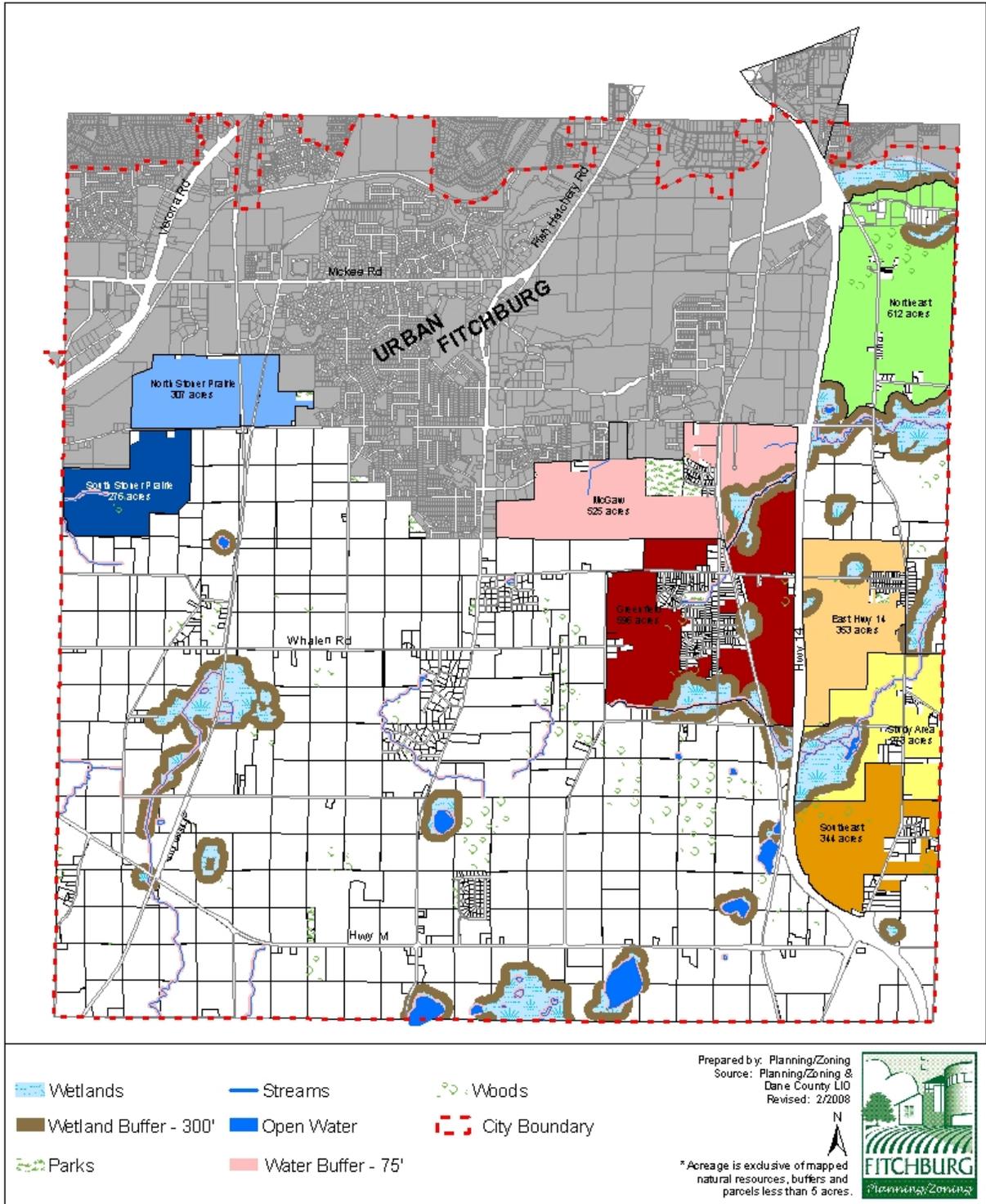


Figure 16 - Future Land Use Plan Map

# FUTURE LAND USE PLAN MAP

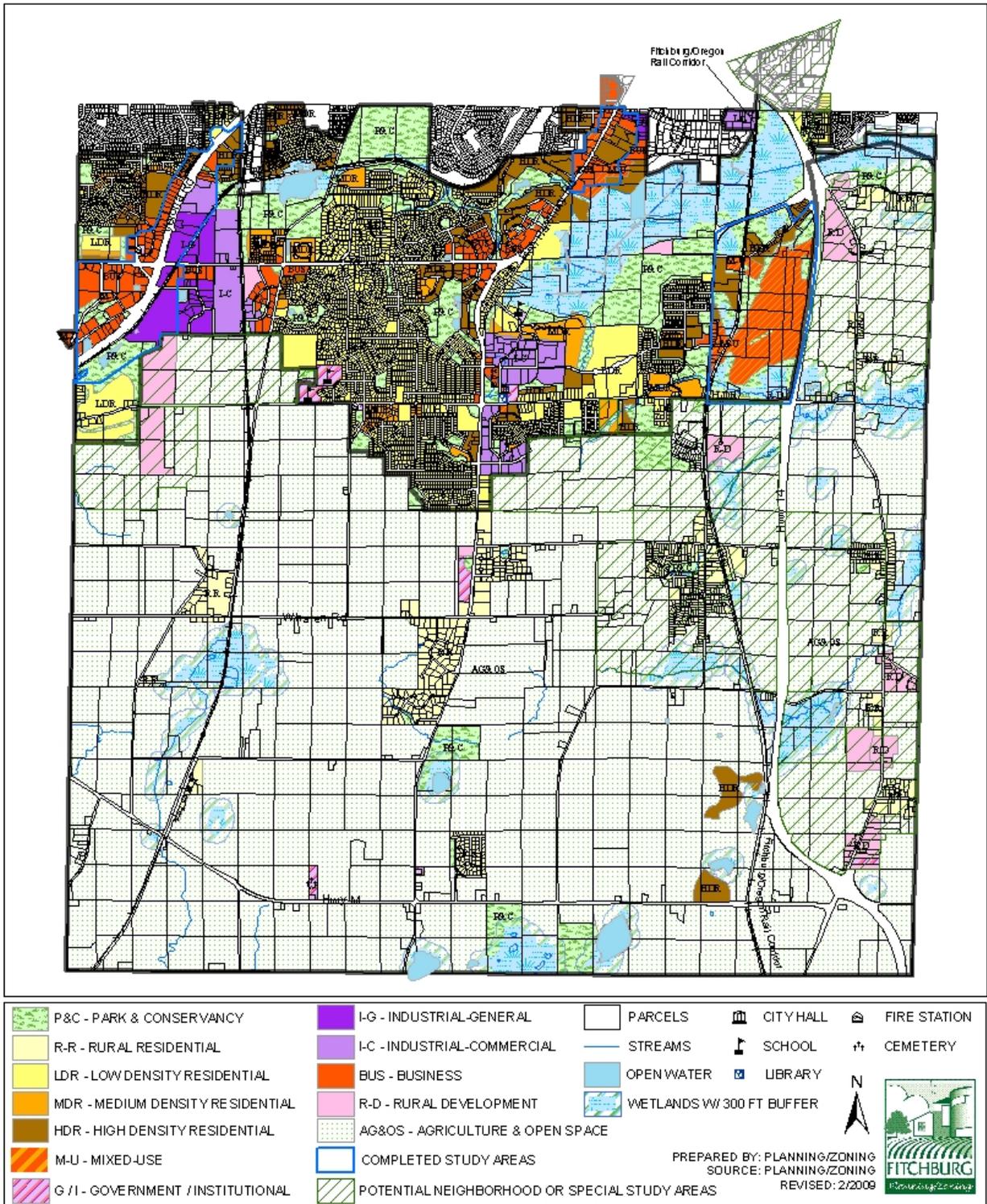


Figure 17 – Cooperative Boundary Agreement

