Response Time and
Station Location Study

Edina Fire Department

Edina, MN

Five Bugles Design
a division of Wendel

January 11, 2019

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Architecture Engineering Planning Energy Efficiency Construction Management

January 11, 2019

Tom Schmitz, Fire Chief
Edina Fire Department
6250 Tracy Ave,
Minneapolis, MN 55436

RE: Edina Fire Department Response Time and Station Location Study

Dear Tom,

Five Bugles Design would like to thank you for the opportunity to provide the attached Response Time and Station Location Study for the Edina Fire Department. It was a pleasure working with you and your team to explore the issues that your department is experiencing as you grapple with the recent growth trends in your community.

Five Bulges Design, a division of Wendel Companies, is a full service architectural and engineering company that specializes in the Public Safety Market Place. I would like to specifically thank you on behalf of the Five Bugles Design personnel directly responsible for the work on your project.

- Heather Lewis, GIS Analysist. Heather provided the team with public safety based GIS mapping, assisting the team in graphically visioning the response time, and risk and demand data provided by the City.

- Mark Windschitl, Retired Fire Chief. Mark retired in 2015 from the St. Louis Park, MN Fire Department where he finished a career with over 35 years of firefighting experience. At the close of his career Mark was responsible for the management and operation of a department required to meet the same exacting standards as Edina Fire Department. During his career Mark was fortunate to have constructed two fire stations and brings that experience, along with added experience of working with Five Bugles to plan fire stations for a number of other departments.

- Jim Schmidt, Retired Fire Chief. Jim retired from full time firefighting as Chief of the Marshfield Fire Department where he finished his career with over 30 years of firefighting experience. His department was a career department that provided Advanced Life Support services to his community where he was responsible for the staffing and deployment of both fire and EMS assets in his community.

- Michael Clark, AIA. Mike is a registered architect who has spent most of his 35-year career planning and designing fire stations and public safety buildings. Mike has developed an expertise in the development of feasibility studies of all sorts including station location studies, space needs analysis, and conceptual design studies.

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While our team completes many similar projects each year, they are each as unique as the communities in which we work. In that respect we cannot do our work without first gaining in-depth input into the current conditions and future outlook of the communities in which we work. Our team would not have been able to complete the attached study without the critical input of your team. The following are just some of the individuals that provided assistance, knowledge and advice throughout the course of our work.

- Scott Neal, City Manager
- Tom Schmitz, Fire Chief
- Ryan Quinn, Edina Fire Department
- Scott Vadnais, Edina Fire Department
- Shaun White, Edina Fire Department
- Cary Teague, Community Development Director
- Bill Nuerendorf, Economic Development Manager
- Tony Martin, PSAP Manager
- Tara Brown, Sustainability Coordinator
- Rebecca Foster, GIS Coordinator
- Mark Nolan, Transportation Planner
- Tim Barnes, City Facilities Manager

If we can provide any additional assistance to the City in this matter, please contact us.

Best Regards,
Five Bugles Design

Michael Clark, AIA

Table of Contents:

INTRODUCTION

The Edina Fire Department provides fire and advanced life support (ALS) ambulance service to the City of Edina with a staff of 31 full-time firefighters/paramedics and 11 paid-on-call volunteers. The department responds to calls from two locations within the City; Station No. 1 (Headquarters) located at 6250 Tracy Ave, Edina, MN 55436 and station No. 2 located at 7335 York Ave S, Edina, MN 55436.

The City of Edina is a first ring suburb of Minneapolis and has been experiencing significant population growth for the past decade (9%). This growth is expected to continue and will exert an increasing impact on the Fire Department's ability to provide their desired level of service to the residents they serve.

While the City is landlocked with little ability to grow in territory, it is anticipated that growth in population will continue in the form of increased density. The City Planning office reports over 1000 residential units either in the approval process or under construction. The majority of these will be in mid-rise or high-rise type structures.

The Community Development Department has identified areas of town with aging office and retail structures that are likely to be redeveloped in coming years. A number of these projects are in early phases of development. The majority of these developments will also be mid-rise or high-rise developments.

The Fire Department is seeking input on four critical questions they will face in addressing this issue into the future:

- An analysis and recommendations for determining performance standards based on current and future workloads that encompasses emergency response as well as community demands to include the recommendations of benchmarks to guide future adjustments in response to community need;
- An assessment of how traffic patterns affect fire/ALS response times and station locations and a review of current operational effectiveness as it relates to times/location and provide recommendations on current short comings and future solutions.
- An analysis of the impact that multi-level housing and growing retail and commercial redevelopment on our organizational capacity to provide fire/ALS resources to include our facility distribution throughout the city and our response procedures.
- A review of the effectiveness of our current facilities and emergency response deployment mode to meet the response needs of our community and benchmarks for the organization to respond to future demands.

These questions as well as others are answered within the body of the report.

Requirements, Standards and Data Sources

Response time requirements for fire departments are established by the National Fire Protection Association in NFPA Standards 1710 (career departments) and 1720 (volunteer departments). The Edina Fire Department's primary operational approach aligns with that of a career department (NPFA 1710). The small contingent of Paid on Call staff employed by the Edina Fire Department are not utilized in the traditional volunteer manner indicative of NFPA 1720. Therefore, the study assumes a requirement to meet NFPA 1710. These time limits will be discussed in depth in the Response Time Analysis section of the report.

The current City of Edina Comprehensive Plan (2008) indicates a preferred response time for the Fire Department of 8-minutes. While not yet published, the Fire Department has indicated a preferred response time of 6-minutes in the Comprehensive Plan (2018) that is in development.

As a provider of ambulance based life support services in Hennepin County, Edina Fire Department must also meet Hennepin County Ordinance 9, Emergency Medical Services. This ordinance requires among other things that the department achieve a travel time of 10 minutes to 80% of the community for a city like Edina. Edina Fire Department achieved this standard 94.33% of the time in 2017. However, while this goal is achieved in the community as a whole, one goal of the study is to explore whether it is achieved equally across the community.

Fire Department Response time data referenced within this documents was provided by Edina 911 Communications Center and the Edina Fire Department and includes call data for all calls directed to the Fire department for the years 2015-2018.

2015 Minnesota Building Codes as required by Minnesota Department of Labor and Industry.

Other data and codes as referenced in individual sections of the report.

RESPONSE TIME ANALYSIS:

The Edina Fire Department provides both Fire Protection and Emergency Medical Service on a 24/7 basis relying on full time staffing with a paid-on-call contingent for back-up during times of heavier need. As such, the Department's stated goal is to achieve the response characteristics of NFPA 1710 which governs career departments. NFPA 1710 provides guidance for both fire and Advanced Life Support (ALS) response regarding the fielding of equipment and personnel during fire and ALS events. The specified time for response as stated by NFPA 1710 can be summarized as follows:

- Travel time of four minutes (240 seconds) or less for arrival of first arriving company for fire calls.
- Travel time of eight minutes (480 seconds) or less for arrival of an ALS unit at an EMS incident.

An analysis of call data for the past three years shows the following:

Call Type	Total Calls	# of Calls Arrived at Scene within 240 seconds (4-min.).	# of Calls Arrived at Scene within 480 seconds or 8-minutes (including those calls that arrived at the scene within 240 seconds).
Fire	5,410	1,129 (21%)	3,770 (70%)
Medical	14,820	5,346 (36%)	12,772 (86%)

The following clarifications should be noted here:

1. The referenced standards have additional requirements for arrival of a full response to mid-rise and high rise fire calls. The data provided by the Department does not provide separate data points for first arriving engine company versus arrival of full alarm assignment. However, the department has a clear and well established dispatch system and mutual aid agreements that dispatches required units based on type of call received. Therefore, this report treats the first arriving engine (recorded data point by PSAP) as the approximate arrival time of the full alarm assignment.
2. There are additional standards that separate ALS First Responder travel time versus Advanced Life Support Arrival. The department provides Advanced Life Support for all 911 ALS calls and therefore the eight-minute response is used as the standard for the purpose of the study.
3. The Police Department provides some First Responder services. This data was not separable from the data and therefore not considered in the analysis.

The goal of the Edina Fire Department, as stated in the 2008 Comprehensive Plan is an eight-minute or less response to all calls with an intent to improve this to six minutes in the 2018 revision to the Comprehensive Plan in order to address the issue of time required to reach patient care locations in large buildings.

Current Average Response Times from the past 3 years are as follows:

Year	Average Response Time (Minutes)
2015	6.9
2016	7.2
2017	7.0
2018 (Partial)	6.9
Overall Average	7.0

One additional item of note considered in the Response Time Analysis involves responses to large buildings. The data provided by the 911 Communications center records only the arrival at scene of the first arriving company. In the case of large buildings (both vertically and horizontally challenging), there can be a significant impact to arrival at the incident as fire crews negotiate the built environment from closest point of arrival to the patient care location. A study was performed by the Department that timed response from point of arrival at representative large buildings to an imaginary incident. This data generated the following average additional time required to reach an incident:

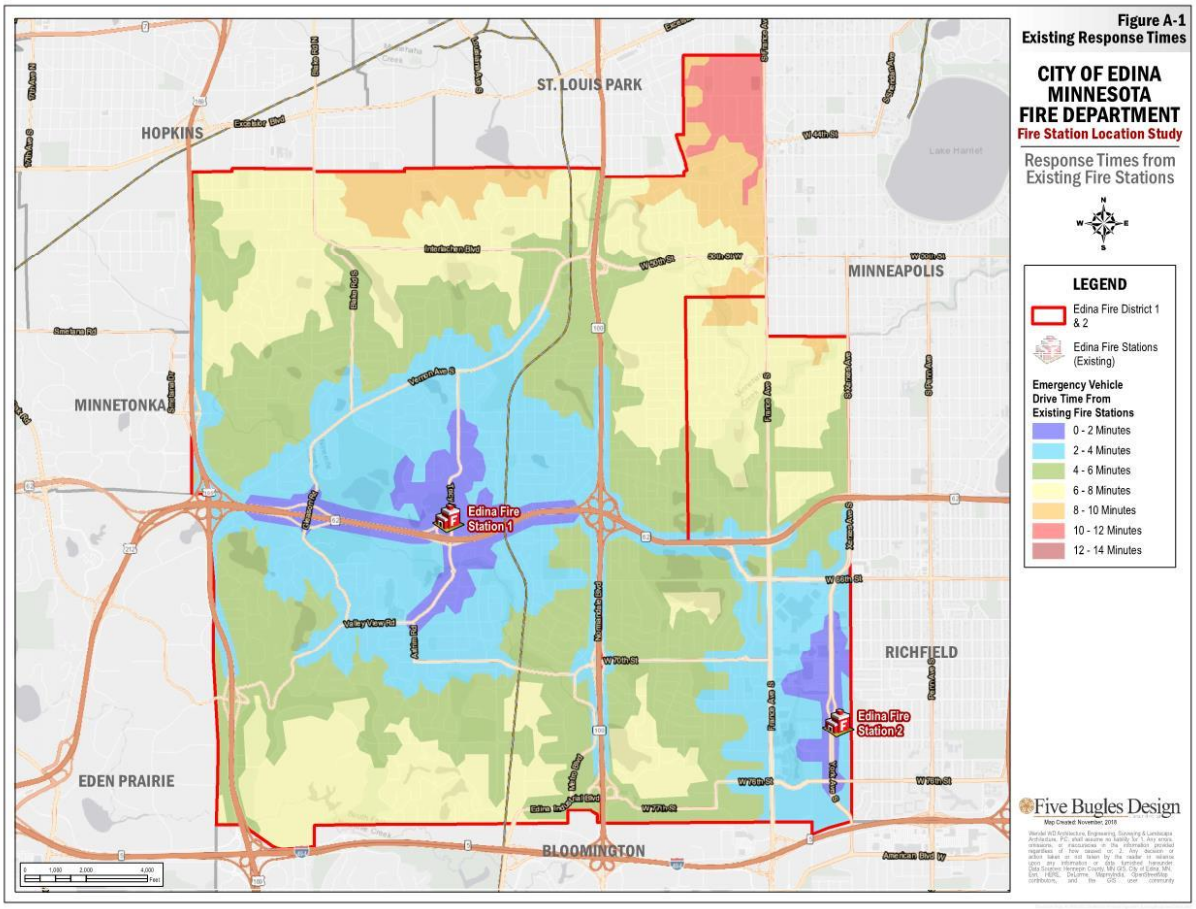
- Large Commercial Structures (malls, office and medical): 195 seconds (3:15 min.)
- Mid-rise (four story or less): 239 seconds (3:59 min.)
- High-rise (four stories or more) 196 seconds (3:16 min.)

Most urban departments have this issue in common. A study performed in New York (The "Vertical Response Time": Barriers to Ambulance Response in an Urban Area, Robert A. Silverman, MD, et.al., 2007) found similar results; an additional, 3.2 minutes response time for buildings of ten stories or higher, and 2.3 minutes added for buildings three to 10 stories in height. The information in the above table (and elsewhere in the study) does not reflect the added time (3-4 minutes) required to reach the location of patient care in large buildings.

This section of the report uses response time polygons showing anticipated response times for emergency services vehicles in the City of Edina and are calculated using Esri's ArcGIS Network Analyst. These times are calculated as what can be reasonably expected of a responding emergency vehicle running with lights and sirens; actual results may vary.

Analysis: Current Conditions

Map A-1 below shows anticipated department response times for arrival on scene from existing stations.



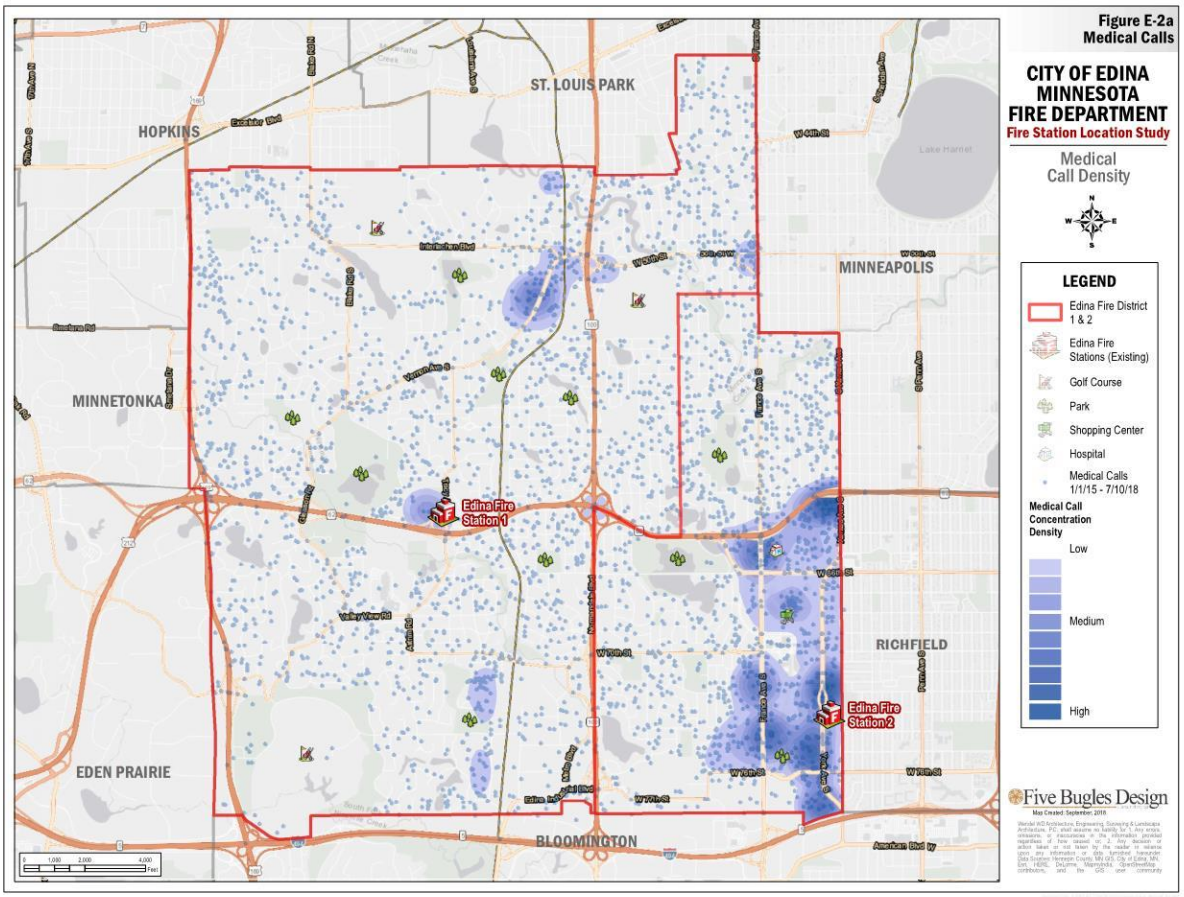
Several Conclusions can be reached from this map:

- Significant areas of the City are not meeting the NFPA 1710, 4-minute response requirement.
- Large areas are still challenged to meet the 6-minute response time desired by the department.
- Most of the City is being served under the current fire department policy of 8-minutes.
- A significant portion of Station No. 2 response zone is in the City of Richfield that is not typically served by Edina Fire Department.

Maps E2 and E2a (next page) show density of Fire calls and ALS calls for the past 3 years.

CITY OF EDINA FIRE CALLS

Map E-2a Medical Call Density (continued from previous page).



CITY OF EDINA MEDICAL CALLS

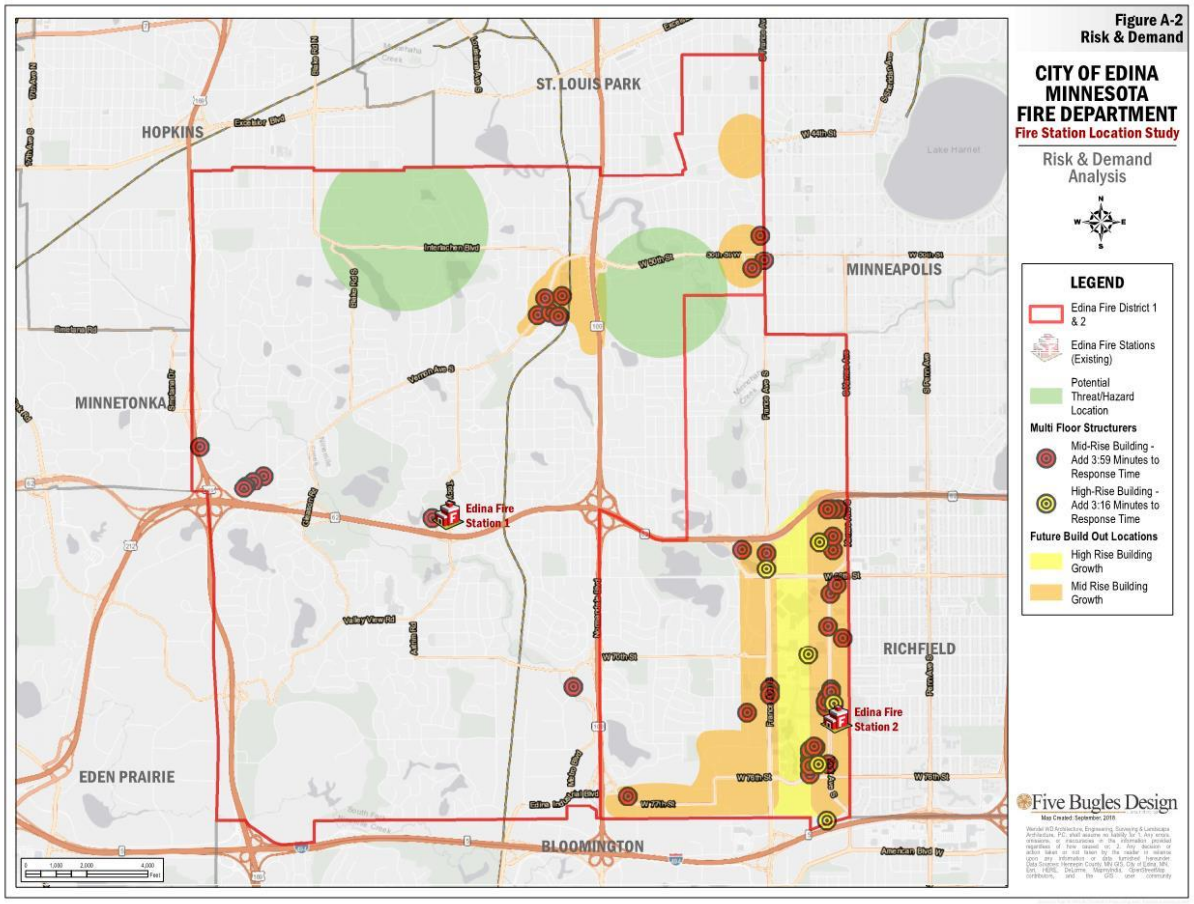
Several Conclusions can be reached when maps E-2 and E-2a are compared to Existing Response Time Map A1:

- Major call density is apparent in the southeast quadrant of the city that is being served by Station No. 2.
- There are pockets of call density in the northcentral and northeast parts of the City that are not receiving adequate response.
- Due to building, site and staffing constraints, Edina Fire Department only provides ALS from Station No. 2 and maintains only a single reserve fire engine at this location, leaving this section of the city underserved for fire protection.

Analysis: Risk and Demand – Increasing Density

A risk and demand analysis was performed to determine challenges that the department is currently experiencing or may anticipate in the future. This analysis seeks out barriers and challenges that may exist in the City, or can be reasonably predicted, that will affect fire and ALS services, now or in the future.

Map A-2 Risk and Demand, shows the impact that current and projected growth in population density is projected to have over the next 10 years. Icons indicate locations of existing large buildings with both mid-rise and high-rise buildings show.



Several Conclusions can be reached from this map:

- Call density in the southeast quadrant of the city is expected to continue to grow.
- Call density in the northeast quadrant of the city is expected to continue to grow.
- The western half of the city is anticipated to remain at serviceable density levels for the foreseeable future.
- When compared to the existing response time mapping, Map A-1 it can be seen that challenges in response time in the northeast corner will continue to grow in the future.

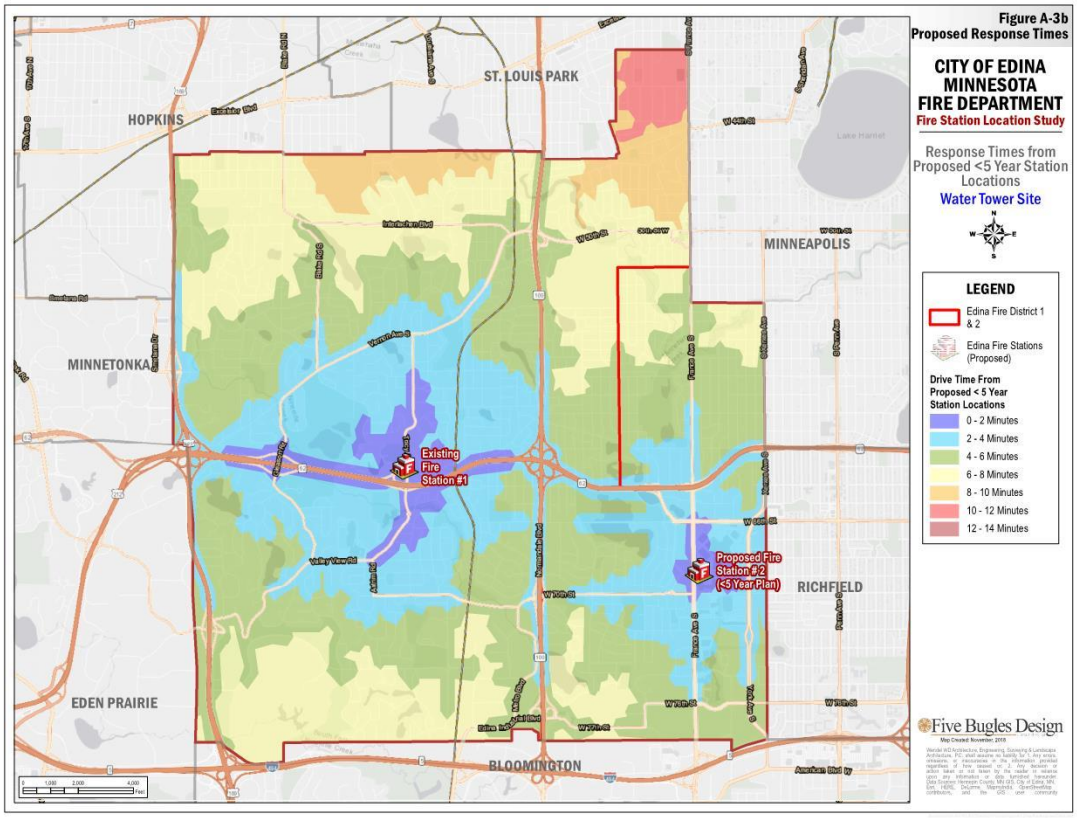
Response Time Analysis Conclusions

Portions of the city are not being served within the time frames required. There are several discussion points related to this challenge:

1. Meeting the 4-minute response time required by NFPA 1710 would require major changes to the districts service model; specifically, changing to a minimum of a four-station model with one located in each quadrant of the city. This option was not considered to be financially or politically feasible. Also, while meeting NFPA 1710 is a desired goal, it is not required. A four station model was not explored further.
2. Meeting the desired 6-minute response time as referenced in the City of Edina Comprehensive Plan 2018 Draft to all parts of the city would have a similar challenge as item no. 1 above, although more of the City would be covered than under the 4-minute scenario.
3. Meeting the 8-minute response time (not including the added time for travel to patient care locations in large buildings) as referenced in the City of Edina Comprehensive Plan 2008 is more obtainable within the current two station model, but will function better as a three station model.

Map A-3b shows a proposed Two-Station Model with the following characteristics:

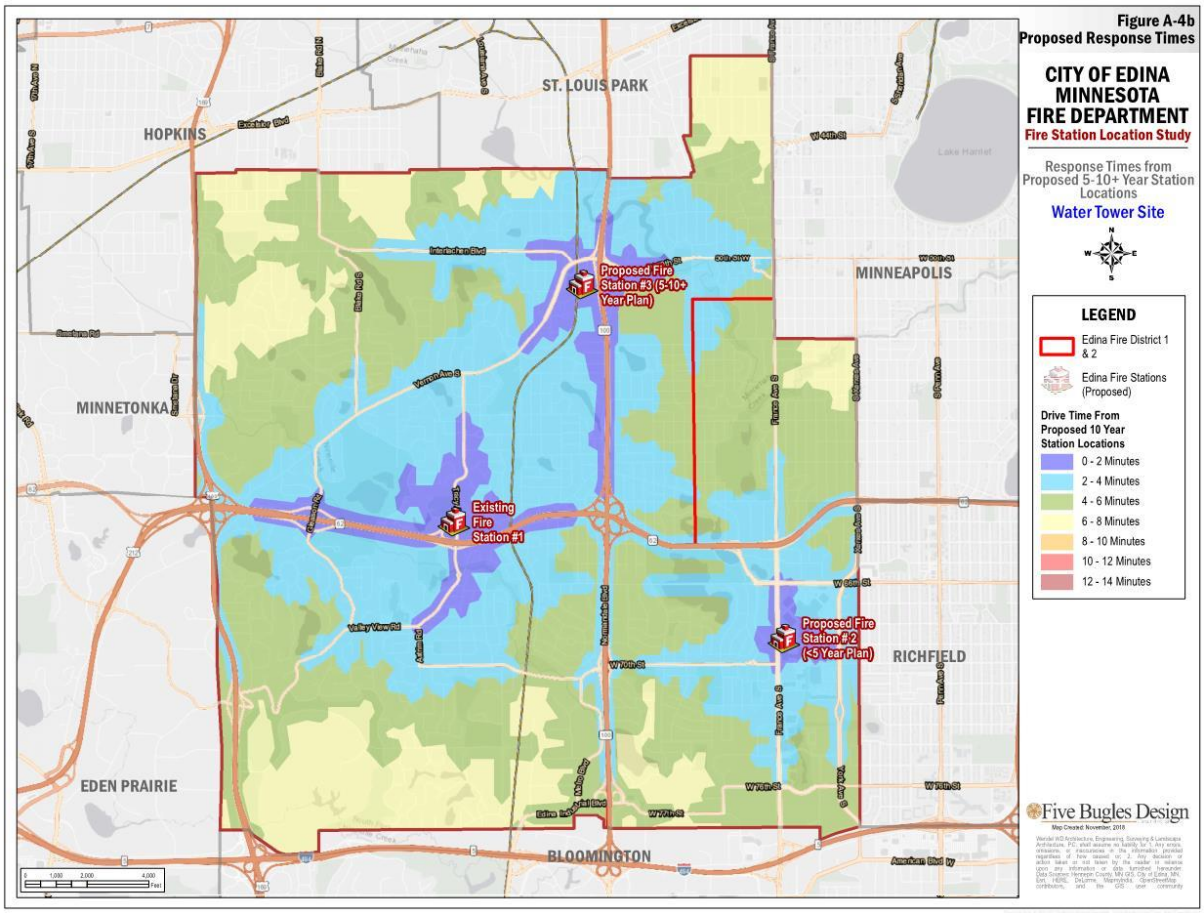
- Station No. 1 to remain as is.
- Station No. 2 is relocated. Location shown for purpose of this mapping exercise is assumed to be the southwest corner of Southdale Center at approximately the corner of France Avenue S. and W. 69th St.



(continued from previous page)
This solution provides a balanced response to the majority of the City with only the northeast and a small portion of the northcentral section failing to meet an 8-9 minute response time. It should be noted however that a comparison to prior mapping shows this same northeast corner to be an area of growing density.

Map A-4b shows a Three-Station Model with the following characteristics:

- Station No. 1 to remain as is.
- Station No. 2 relocated near or at the northeast corner of France Ave S. and W. 69th Street.
- Station No. 3 constructed in the vicinity of City Hall. The Old Public Works Building Site in the 5100 block of Eden Ave. S.



This solution creates the same balanced response as the Two-Station Model with the added benefit of improved response to the growing challenge in the northeast quadrant

FACILITY ASSESSMENT

This section of the report provides an overview of both the physical and operational conditions of the existing facilities.

The City of Edina responds to fires and ALS calls from two locations:
Station No. 1 (Headquarters): 6250 Tracy Ave, Edina, MN 55436
Station No. 1: 7335 York Ave S, Edina, MN 55436

Station No. 1: 6250 Tracy Ave.

Station No. 1 was constructed in 2008. It has six, double deep apparatus bays and is approximately 34,000 SF in size. It contains the department's offices, station offices, living quarters, training rooms, support spaces and the majority of the department's firefighting equipment. The facility also has a basement space that is designated as a storm shelter.

Physical Conditions

The building is constructed predominantly of load bearing masonry construction with precast plank floors and ceilings. Interior walls are predominantly burnished CMU with some metal studs and drywall. Finishes include epoxy paint and burnished CMU in the apparatus bays, stained

concrete and burnished block in the living quarters, and carpet and painted drywall and burnished block in the department offices. Most ceilings are exposed structure. All construction and finishes appear to be in good condition.

The City of Edina recently completed a facility assessment of all City owned structures. This assessment (VFA Facility Maintenance Tool) does not indicate any major deficiencies or system replacements. The City should fund and continue to update systems as required by that assessment.

Only one item of concern was noted in our evaluations; a lack of ventilation air provided to the basement storm shelter. This would appear to be a code violation that should be remedied as soon as possible.

Operational Conditions

The facility appears to have been well programmed and designed. All six apparatus bays are drive through, adequate support spaces are centrally located and well sized for their current and projected uses.

There are eight existing dorm rooms with adequate kitchen dayrooms, bathrooms, lockers and shower facilities. The number, location and use of offices is adequate for the department's current and foreseeable future need.

There is only one area of concern with the facility. A growing awareness of cancer within the fire service has led to recent changes in best practice design standards related to personnel decontamination processes following fire calls. Station No. 1 is lacking in shower and decontamination rooms located so as to prevent contamination of living spaces or personal clothing and equipment.

It should also be noted that if no changes are made relative to Station No. 2 (support for increased staffing and equipment or a new facility), then Station No. 1 will be challenged in supporting increased response, or overall response to the city will suffer.

Station No. 2: 7335 York Ave S

Station No. 2 was constructed in 1996. It has a single double deep bay with one additional single back-in bay. The station is approximately 5,000 SF in size. It primarily serves as an ALS station with a single reserve engine.

Physical Conditions

The facility is constructed primarily of load bearing masonry exterior walls with some metal stud and EIFS systems. Roofing appears to be fiberglass shingles. Interior construction consists of painted CMU with some studs and drywall. Finishes consist of epoxy floor coatings, and vinyl floor coverings. A second floor storage mezzanine was converted into two dorms in approximately 2001. All systems and finishes are showing their age.

One area of concern in this building is the conversion of the second floor storage area to dorms. This would appear to have some code issues with a lack of elevator accessibility to a second floor, a second floor with no bathrooms or drinking fountains and exits that appear to open to the apparatus bay.

Operational Conditions

The facility was designed for a single ambulance crew of two with no overnight quarters. Over time the department's call volume has grown to require overnight shifts and often a second ambulance with two additional crew members. This growth is overtaxing the station.

While a reserve engine is kept at this facility, current operations would not expect this apparatus to be needed unless a structure fire is reported. Fire response from this station is only provided by off-duty personnel in cases of emergency recall of staff.

The facility could support an additional ambulance within the current bays. However, an additional overnight shift would require two additional sleeping rooms as well as increased kitchen, dining and dayroom space.

Turn out gear is currently stored in the apparatus bay against current 'best practices', nor are there any gear cleaning or decontamination spaces, fitness, SCBA, or maintenance spaces available at this station. Increased usage of this station will need to correct this situation.

Facility Assessment Conclusions

Station No. 1 is in very good condition, both physically and operationally. It can remain in service with the following concerns addressed:

- Installation of a code complying HVAC system in the basement.
- Addition of personnel decontamination spaces.
- Establish an annual maintenance budget to reflect the City of Edina Facility Asset report.

Station No. 2 is in fair condition physically with several issues that will need to be remedied if the facility is to see a major renovation. Operationally it is challenged as a future asset to the Fire Department.

- Any future renovation project should address that second floor sleeping quarters, ideally by reconstructing them on the ground floor.
- Additional living quarters should be added to increase the capacity of the facility to include a minimum of two ambulance crews, and possibly an engine company for a total of eight staff.
- Establish an annual maintenance budget to reflect the City of Edina Facility Asset report.
- See also the Space Needs Assessment section of the report for projected need of a new replacement facility.

Note: The design of a new facility or additions is outside the scope of this project, but it is our professional opinion the current site at Station No. 2 lacks adequate room for an expansion project of the magnitude that would be required.

SPACE NEEDS ASSESSMENT

This section of the report discusses potential space needs for the department and is informed by the previous sections of the report. Specifically, it provides recommendation for the two new facilities that are discussed in the Response Time section of the report.

The following is a summary of space needs. A detailed listing of the space needs developed in the study are included in the appendix of the report

New (Replacement) Station No. 2

The new Station No. 2 should be constructed to house a minimum of two ambulance crews and one engine crew including required support and living spaces. A summary or proposed spaces includes:

Space	Proposed Size	Remarks
Apparatus Bay	5,313 SF	2 ambulance, 1 Engine, 1 Utility
Apparatus Support	4,670 SF	Gear storage, maintenance and decon
Training	1,325 SF	Fitness
Administration	3,403 SF	Station office, work and conference space
Staff Support	3,048 SF	Day Room and dorms
Mechanical	2, 664 SF	
Totals	**20,422 SF**	

Project Costs for a New Station No. 2:

Construction Costs	$7,000,000
Other Project Costs	$1,800,000
Total Project Cost	**$8,800,000**

Notes:

1. Does not include site acquisition costs.
2. Estimates of probable cost are based on a 2019 construction costs. Inflationary costs should be added for each year the project is delayed beyond that.

Proposed Station No. 3

The new Proposed Station No. 3 should be constructed to house a minimum of one ambulance crew and one engine crew including required support and living spaces. A summary or proposed spaces includes:

Space	Proposed Size	Remarks
Apparatus Bay	2,762 SF	2 ambulance, 1 Engine, 1 Utility
Apparatus Support	3,766 SF	Gear storage, maintenance and decon
Training	750 SF	Fitness
Administration	1,913 SF	Station office, work and conference space
Staff Support	2,473 SF	Day Room and dorms
Mechanical	1,749 SF	
Totals	**13,411 SF**	

Project Costs for a Proposed Station No. 3:

Construction Costs	$4,600,000
Other Project Costs	$1,200,000
Total Project Cost	**$5,800,000**

Notes:

1. Does not include site acquisition costs.
2. Estimates of probable cost are based on a 2019 construction costs. Inflationary costs should be added for each year the project is delayed beyond that.

ADDITIONAL INFORMATION

Impact of Responding to Large Buildings

The benchmark requirements from NFPA define travel time as the time from dispatch of units to arrival at the physical address of the scene, which can be different, sometimes significantly, from arrival at the incident. The difference being the time it takes to exit the vehicle after arrival at the nearest access point and travel to where the victim or fire is located. This issue is specifically associated with large buildings, both horizontally such as an enclosed shopping center, or vertically in high-rise buildings.

The Edina Fire Department does not currently record the incident related travel time, which is consistent with most PSAP policies. A study was conducted by the Edina Fire department to develop a basic level of understanding regarding the magnitude of this issue. This study consisted of simulating a response scenario at several large buildings in the City of Edina wherein an (off-duty) ambulance crew responded to representative locations on several occasions to generate an average time factor to be added to the existing response time data. A total of 36 runs were made in 12 structures that included high-rise, mid-rise and large commercial structures. Those results are depicted in the following tabulation.

Structure Type	Average Incident Response Time
Commercial Structures	Plus 3:15 (195 seconds)
Mid-rise Structures (<4 stories)	Plus 3:59 (239 seconds)
High-rise Structures (>4 stories)	Plus 3:16 (196 seconds)

The additional time reflected here is NOT added to any data in the response time analysis above.

Impact in Response Due to Rush Hour

Traffic patterns and density is a factor that affects response times in urban environments. In order to determine what effect this issue might have on the Edina Fire Department's response, our team filtered provided data by calls that occurred in rush hour (defined as 7am -9am and 4pm-6pm, Monday through Friday) and those calls that fell outside of those parameters. The results showed no statistically relevant difference that can be attributed to rush hour traffic.

CONCLUSIONS AND RECOMMENDATIONS

The Edina Fire Department is meeting their currently stated goal of responding to Fire and ALS calls in an average time of 8-minutes. Achieving a goal of responding in 4-minutes per NFPA 1710, or 6-minutes as indicated in the draft Comprehensive plan, would be difficult to achieve without the construction and staffing of four new stations; an unlikely proposition for the City. The ability of the department to achieve these goals within the urban core of the City is, however, an obtainable goal. This goal is reflected in the following recommendations:

1. **Recommendation No. 1:**
   Keeping existing Station No. 1 in its current location. While this will not fill the gaps in coverage at the northwest and southwest areas of the City, the number of calls falling outside of the desired response times are few and these areas of the city are not experiencing significant growth.
   a. Continue annual maintenance projects as identified in the City of Edina VFA Tool.
   b. Add the required ventilation system to the basement Emergency Shelter.

2. **Recommendation No. 2:**
   Construction a New Station No. 2 near the southwest corner of the Southdale Center. Station 2 is in serviceable condition, but the facility and site will not support the additional development necessary to add a second ALS crew and, eventually, an engine company that will be necessary in the coming years. It should also be noted that more than 1/3 of the response zone for this station is in Richfield; moving the station north and west of the current location will better center it and move it closer to growing areas of the community.
   a. Two crews should be scheduled on a regular basis from Station No. 2 as warranted by call volume. This should be expected to gradually increase to two full-time ALS crews. Monitor need for fire response from this location and add an engine company as needed.
   b. Construct New Station No. 2 (assumed to be required in next 3-5 years).

3. **Recommendation No. 3:**
   Plan for the continued growth in the northeast quadrant of the city. It is anticipated that in 5-10 years there will be a need for a station in the general location of City Hall to support the need for improved ALS response.
   a. Acquire 2-4 acres of land for Proposed Station No. 3 near City Hall.
   b. Construct proposed Station No. 3 as needed (assumed to be required in next 5-10 years).

**The response time goals stated here are based on the industry standard of measuring response time as arrival at scene. The construction trend of building large buildings in the City of Edina will continue to have an impact that is not reflected in the response times discussed in these recommendations. The Edina Fire Department has implemented procedures that will provide improved data for future discussions of this important issue, but the fact remains that 3-4 minutes of additional time must be added to the data it does have to adequately express the time it takes to provide the services the community expects.

APPENDIX

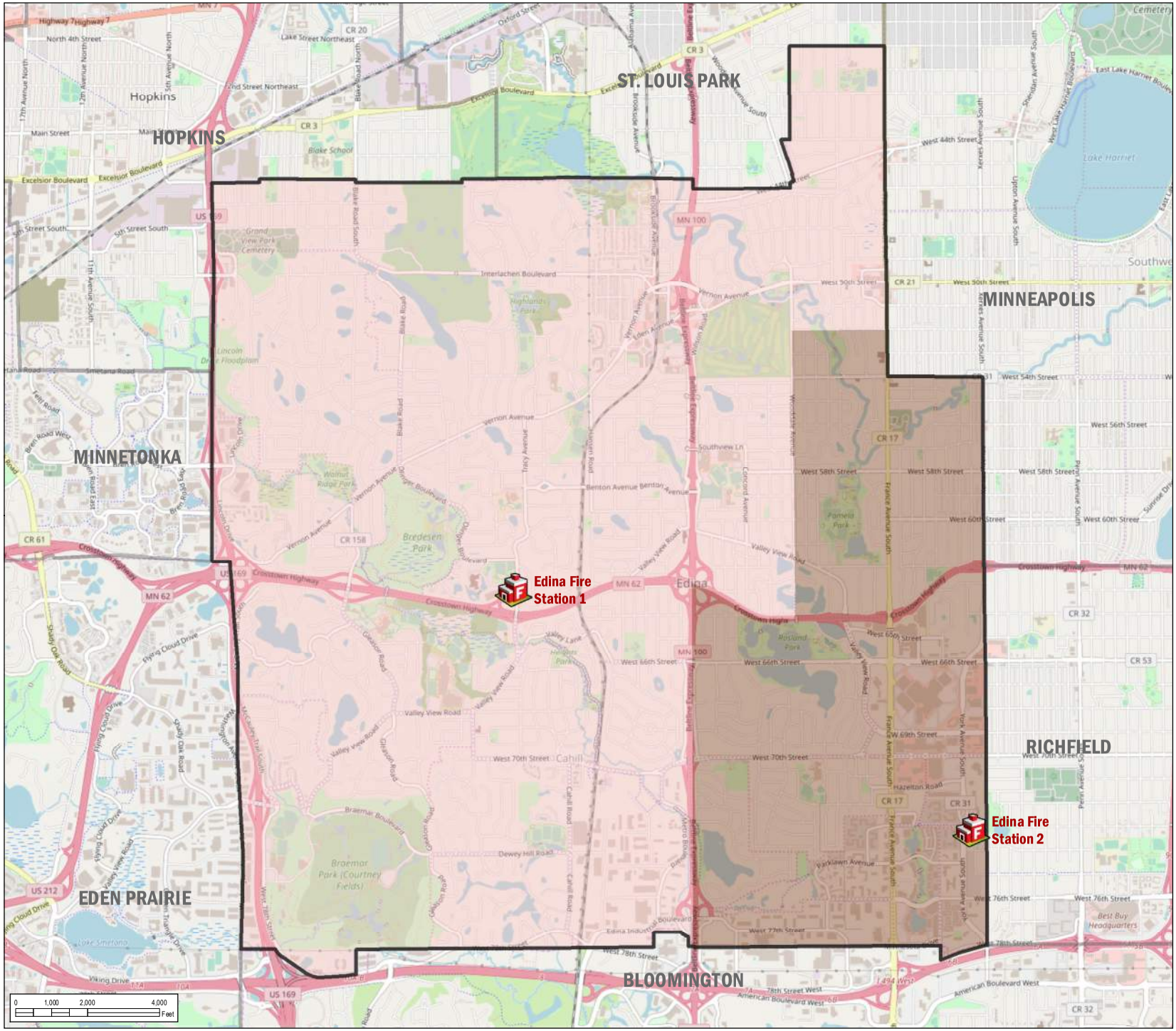


Figure E-1
Response Area

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Fire Station Response Area

N
W E
S

LEGEND

- City of Edina
- Edina Fire District 1
- Edina Fire District 2
- Edina Fire Stations (Existing)

Five Bugles Design

Map Created: August, 2018

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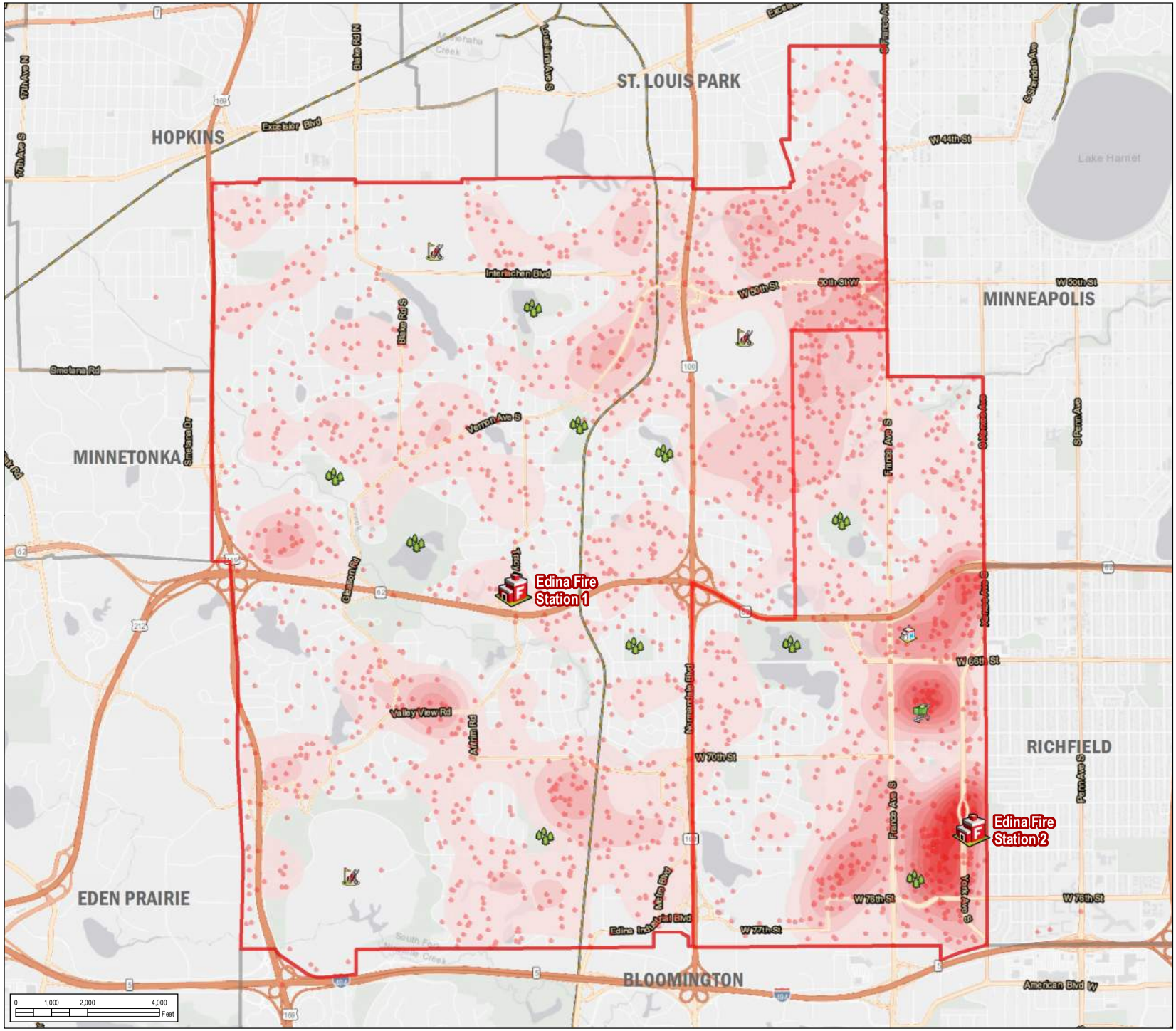

Figure E-2
Fire Calls

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Fire Call Density

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)
- Golf Course
- Park
- Shopping Center
- Hospital
- Fire Calls 1/1/15 - 7/10/18

Fire Call Concentration Density

Low
Medium
High

Five Bugles Design

Map Created: September, 2018

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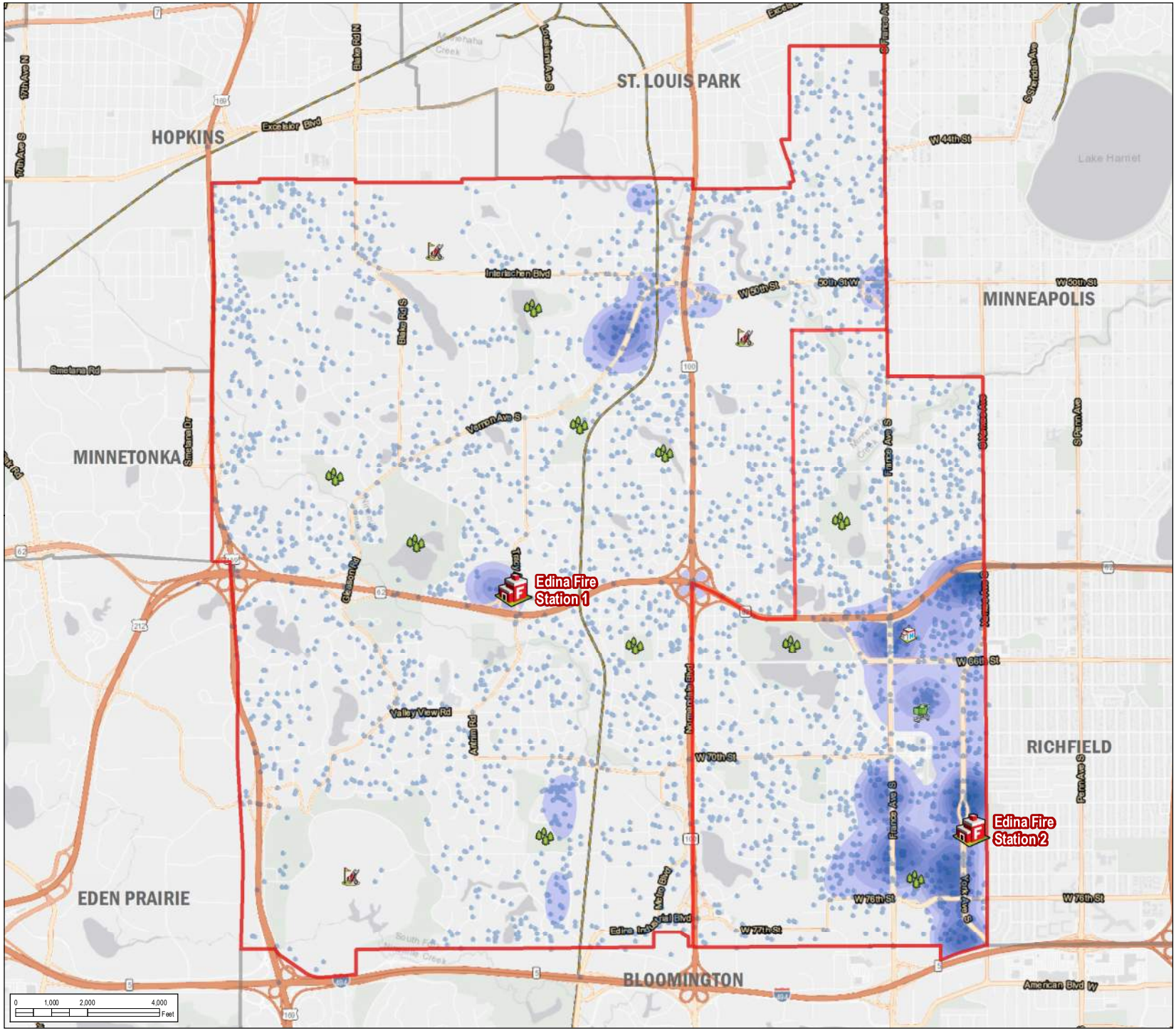

Figure E-2a
Medical Calls

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Medical Call Density

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)
- Golf Course
- Park
- Shopping Center
- Hospital
- Medical Calls 1/1/15 - 7/10/18

Medical Call Concentration Density

- Low
- Medium
- High

Five Bugles Design

Map Created: September, 2018

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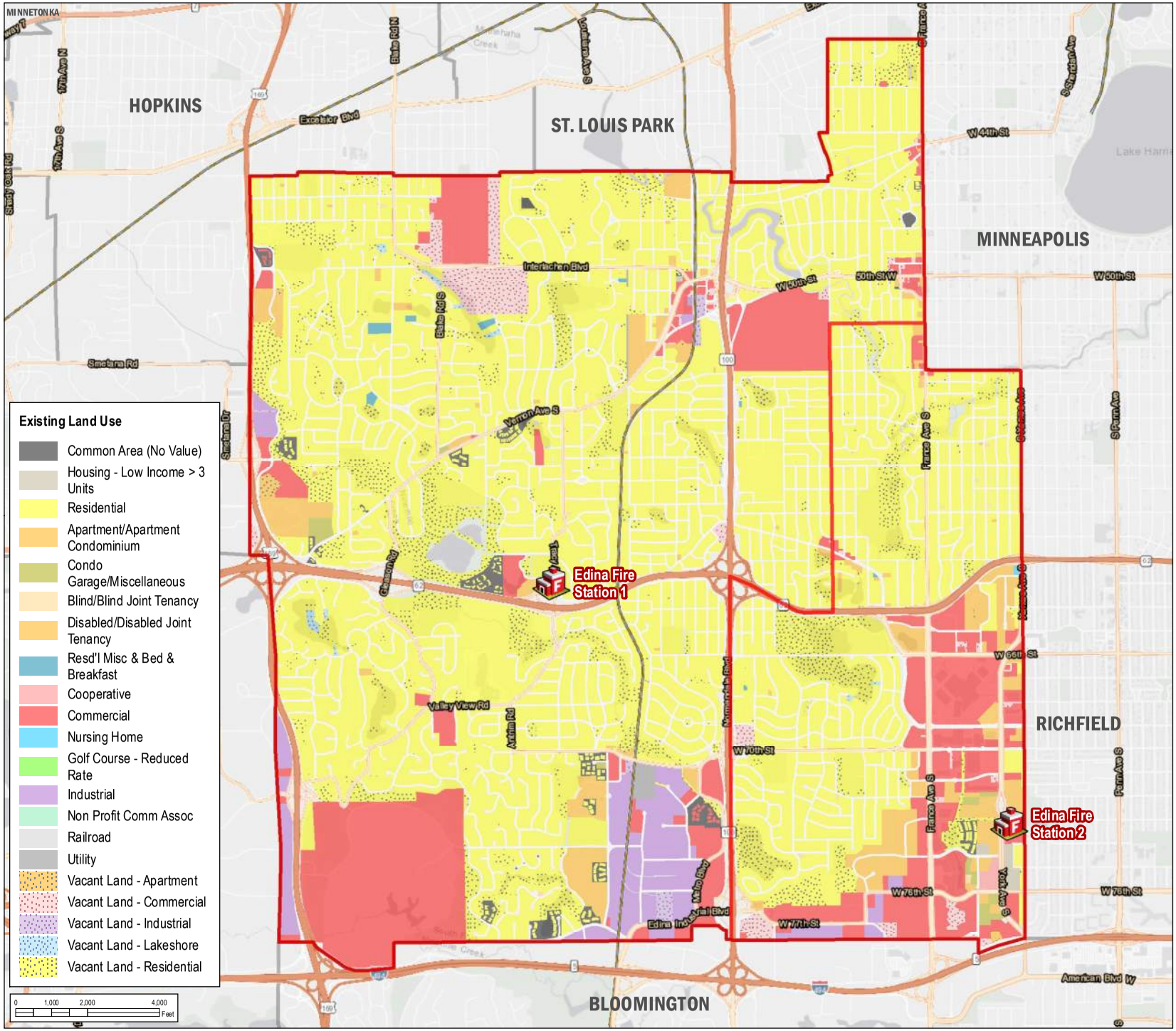

Figure E-4
Existing Land Use

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Existing Land Use

N
W E
S

LEGEND

- City of Edina
- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)

Five Bugles Design

Map Created: August, 2018

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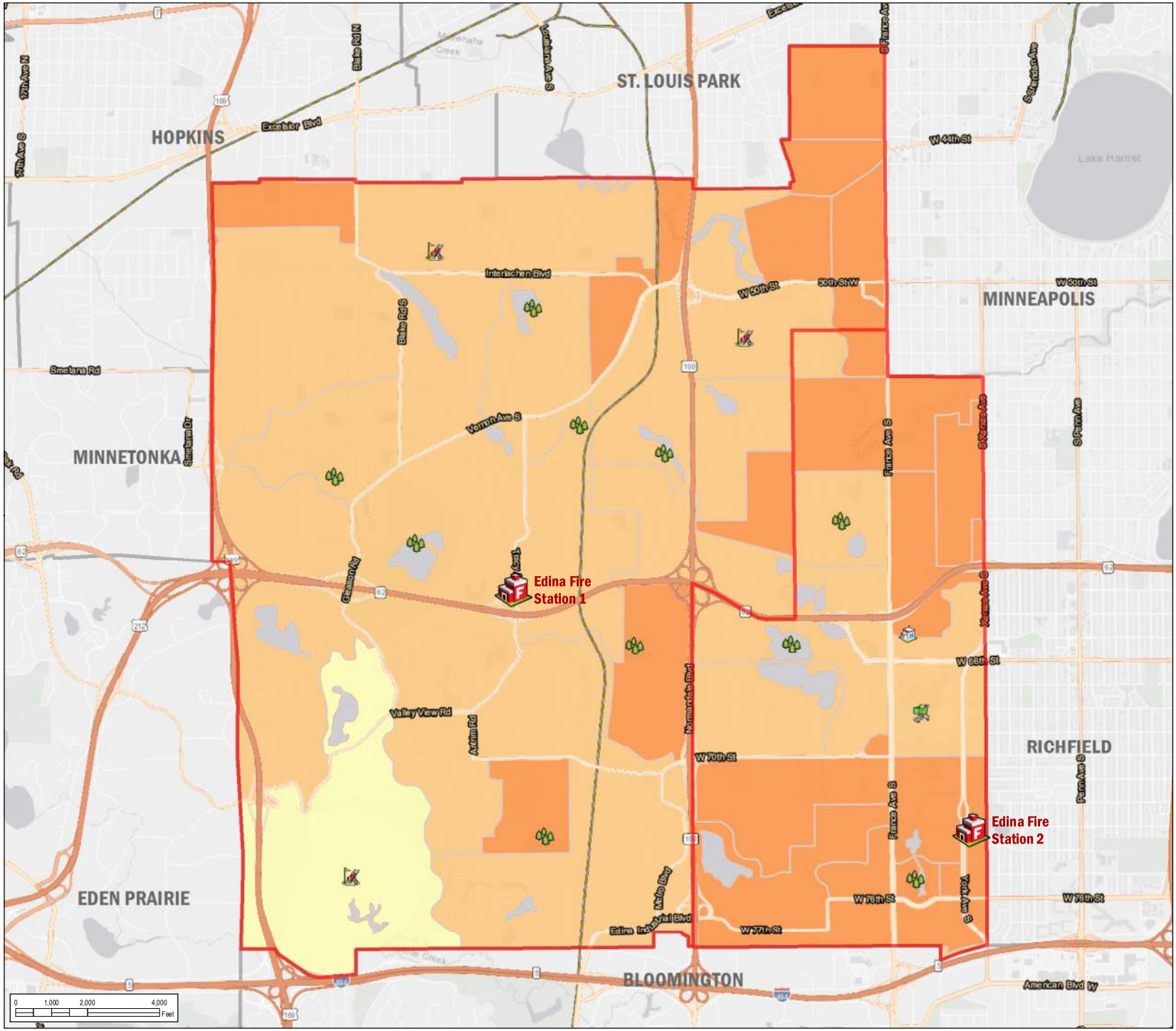

Figure E-5
Population Density

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Population Density

N W E S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)
- Golf Course
- Park
- Shopping Center
- Hospital
- 0 - 1,000 people per sq mi
- 1,000 - 4,000 people per sq mi
- 4,000 - 22,000 people per sq mi
- 22,000 - 116,000 people per sq mi
- 116,000 - 618,125 people per sq mi

Five Bugles Design

Map Created: August, 2018

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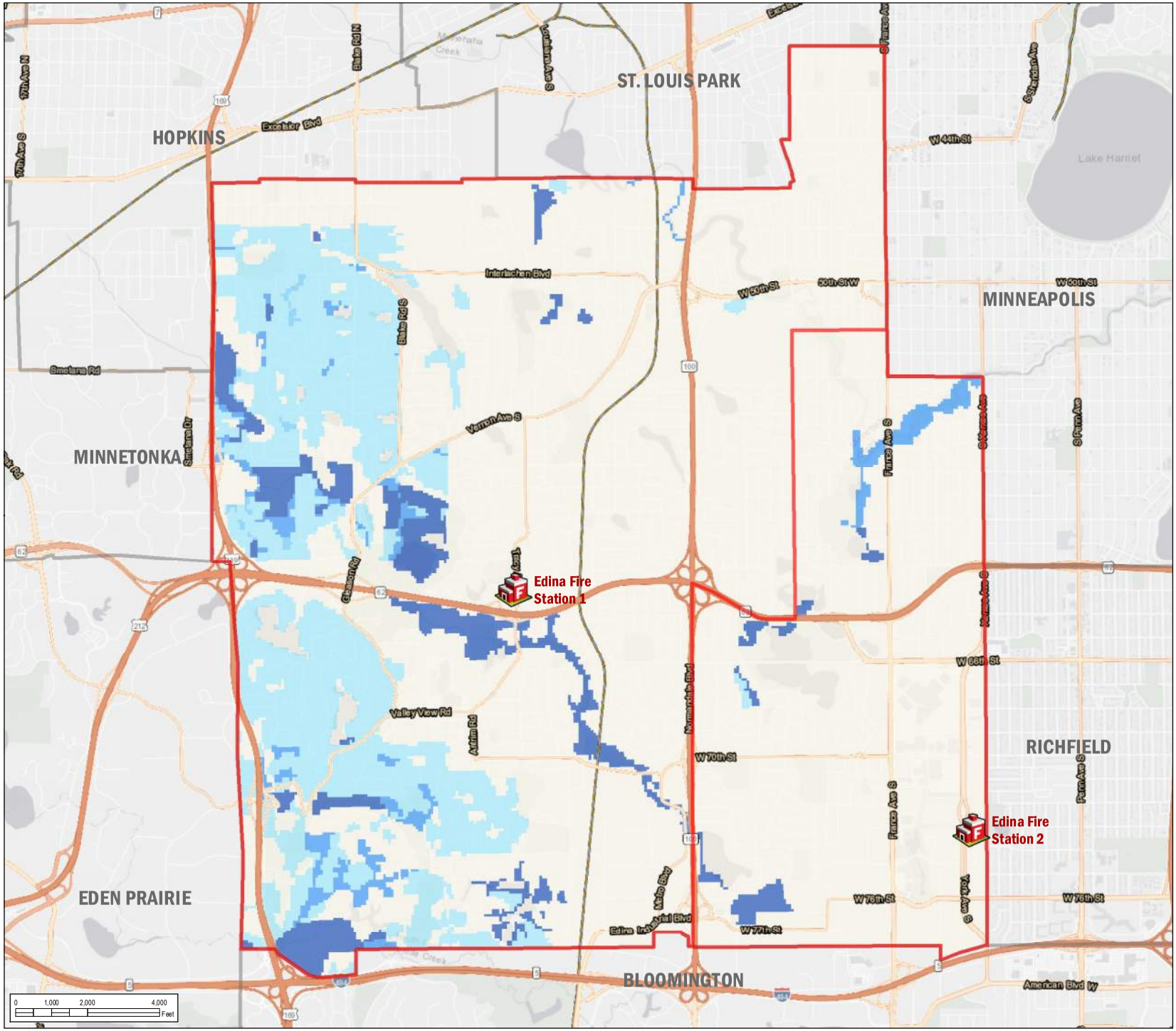

Figure E-6
Soil Conditions

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Soil Conditions

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)

Hydric Soils Class

- Not Hydric
- Partially Hydric (1 - 25%)
- Partially Hydric (26 - 50%)
- Partially Hydric (51 - 75%)
- Partially Hydric (76 - 95%)
- All Hydric

Five Bugles Design

Map Created: August, 2018

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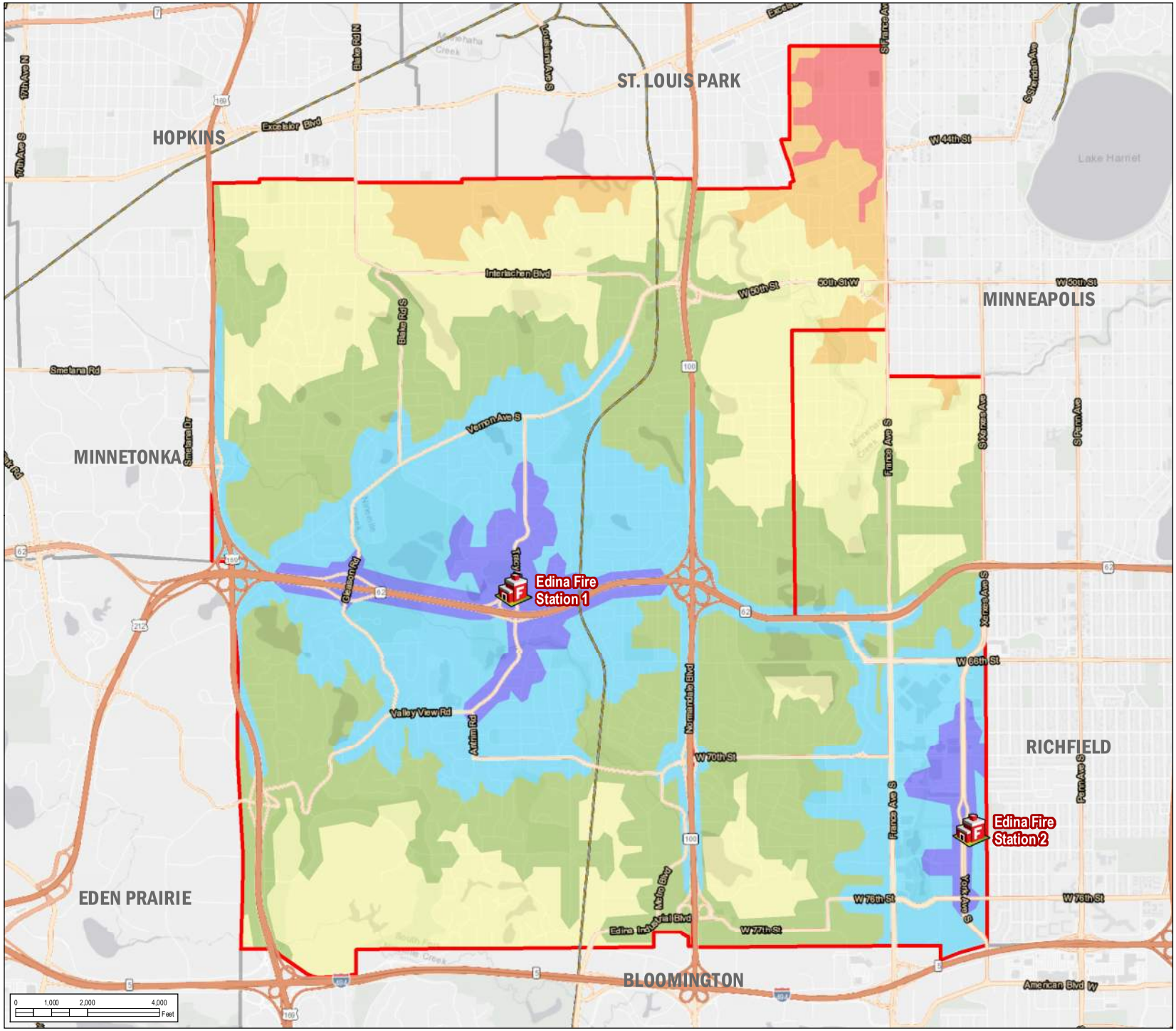

Figure A-1
Existing Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times from Existing Fire Stations

N W E S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)

Emergency Vehicle Drive Time From Existing Fire Stations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Five Bugles Design

Map Created: November, 2018

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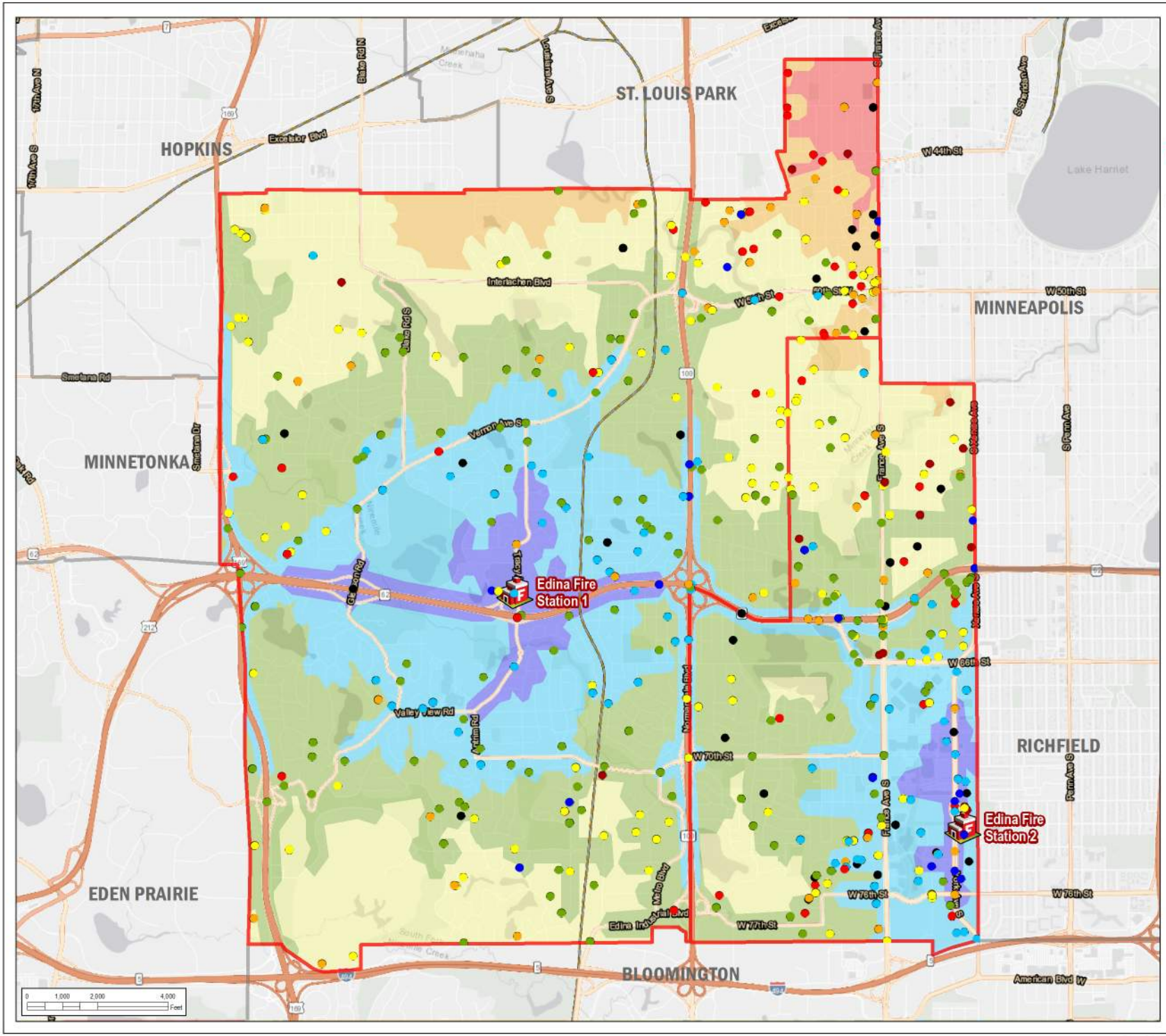

Figure A-1a
Existing Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times vs. Rush Hour Call Response

N W E S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)

Emergency Vehicle Drive Time From Existing Fire Stations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Edina Fire Calls During Rush Hour Traffic with Response Time

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes
- >14 Minutes

Five Bugles Design

Map Created: September, 2018

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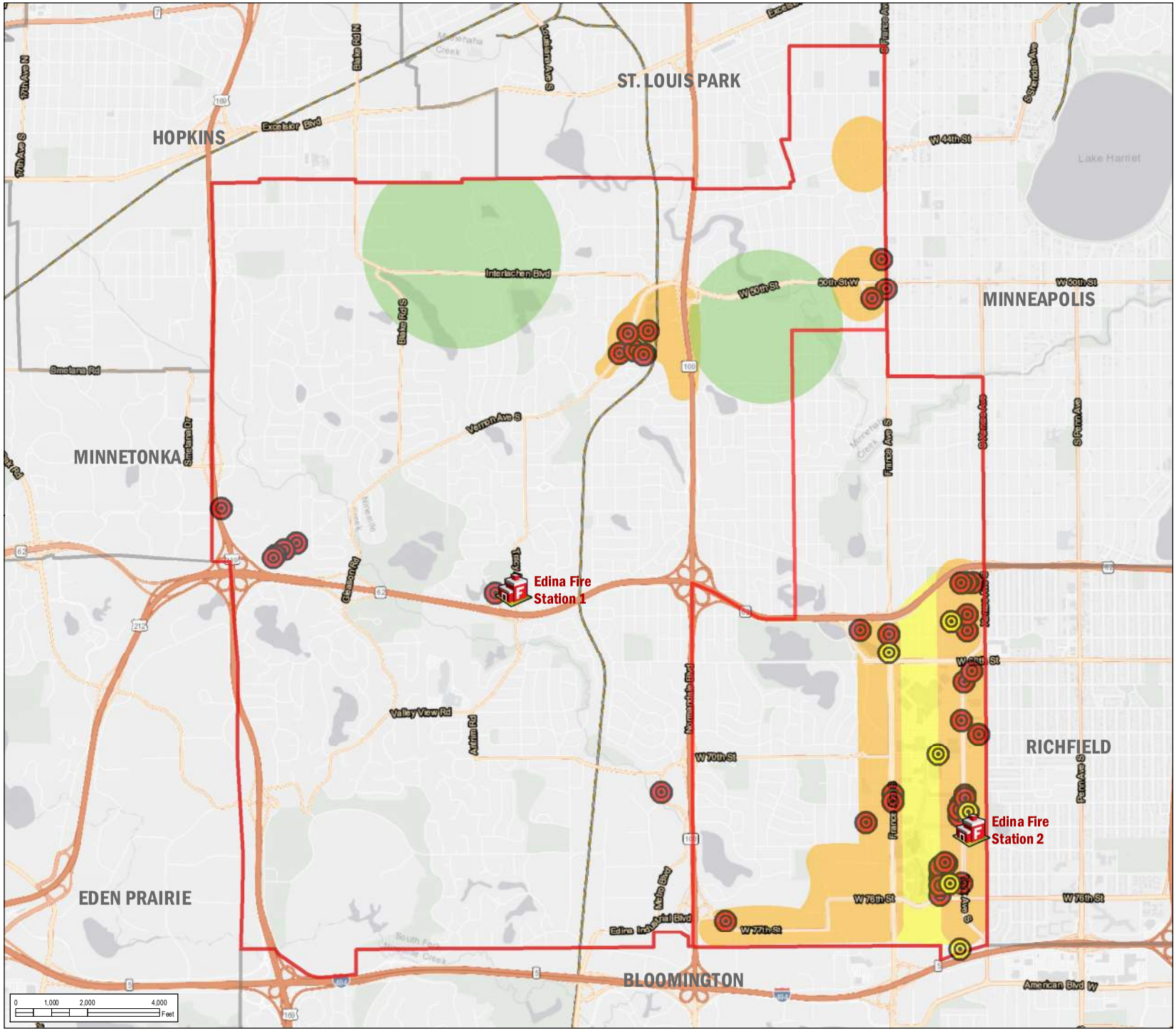

Figure A-2
Risk & Demand

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Risk & Demand Analysis

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Existing)
- Potential Threat/Hazard Location

Multi Floor Structurers

- Mid-Rise Building - Add 3:59 Minutes to Response Time
- High-Rise Building - Add 3:16 Minutes to Response Time

Future Build Out Locations

- High Rise Building Growth
- Mid Rise Building Growth

Five Bugles Design

Map Created: September, 2018

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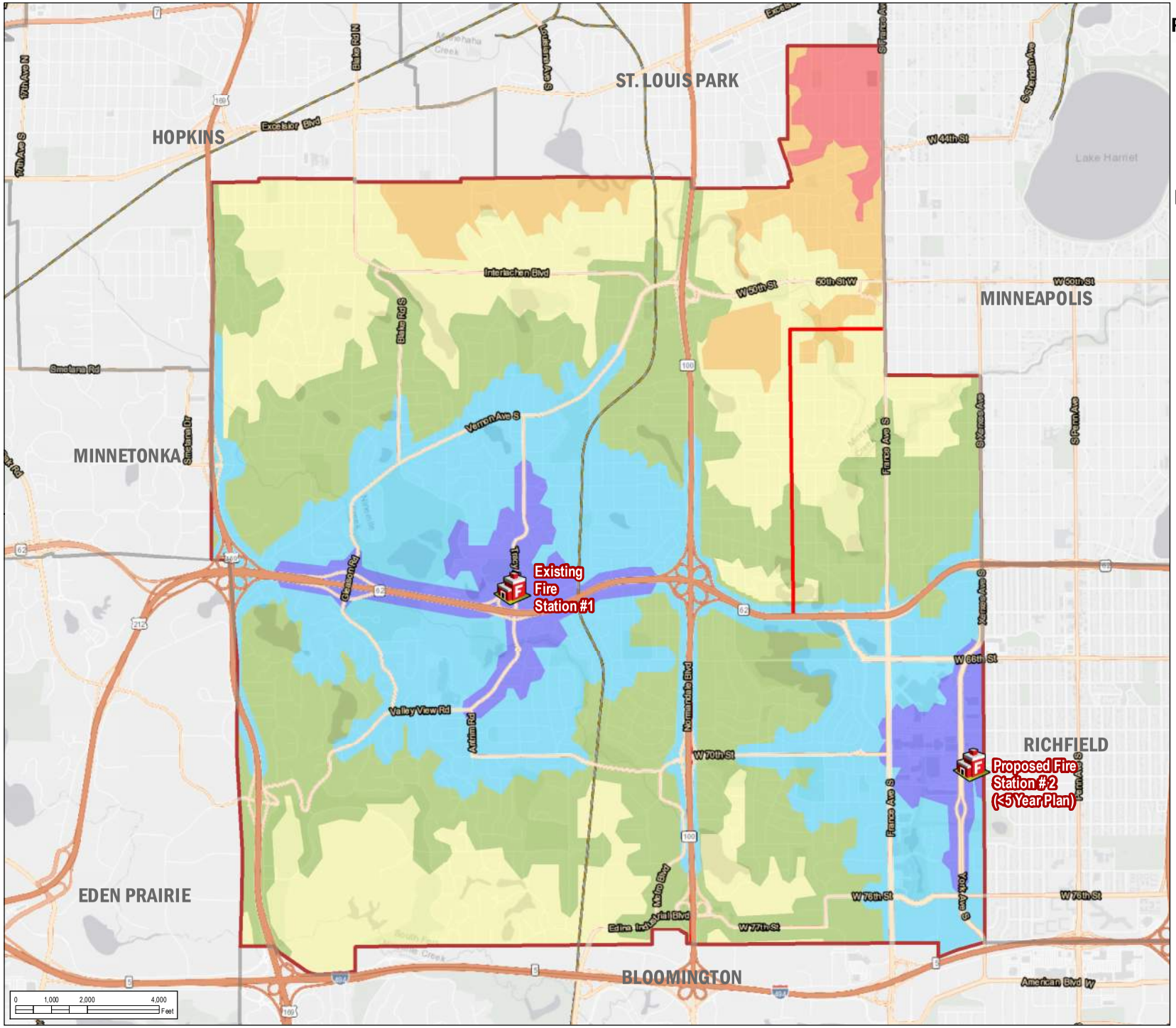

Figure A-3a
Proposed Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times from Proposed <5 Year Station Locations

Library Site

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Proposed)

Drive Time From Proposed < 5 Year Station Locations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Five Bugles Design

Map Created: November, 2018

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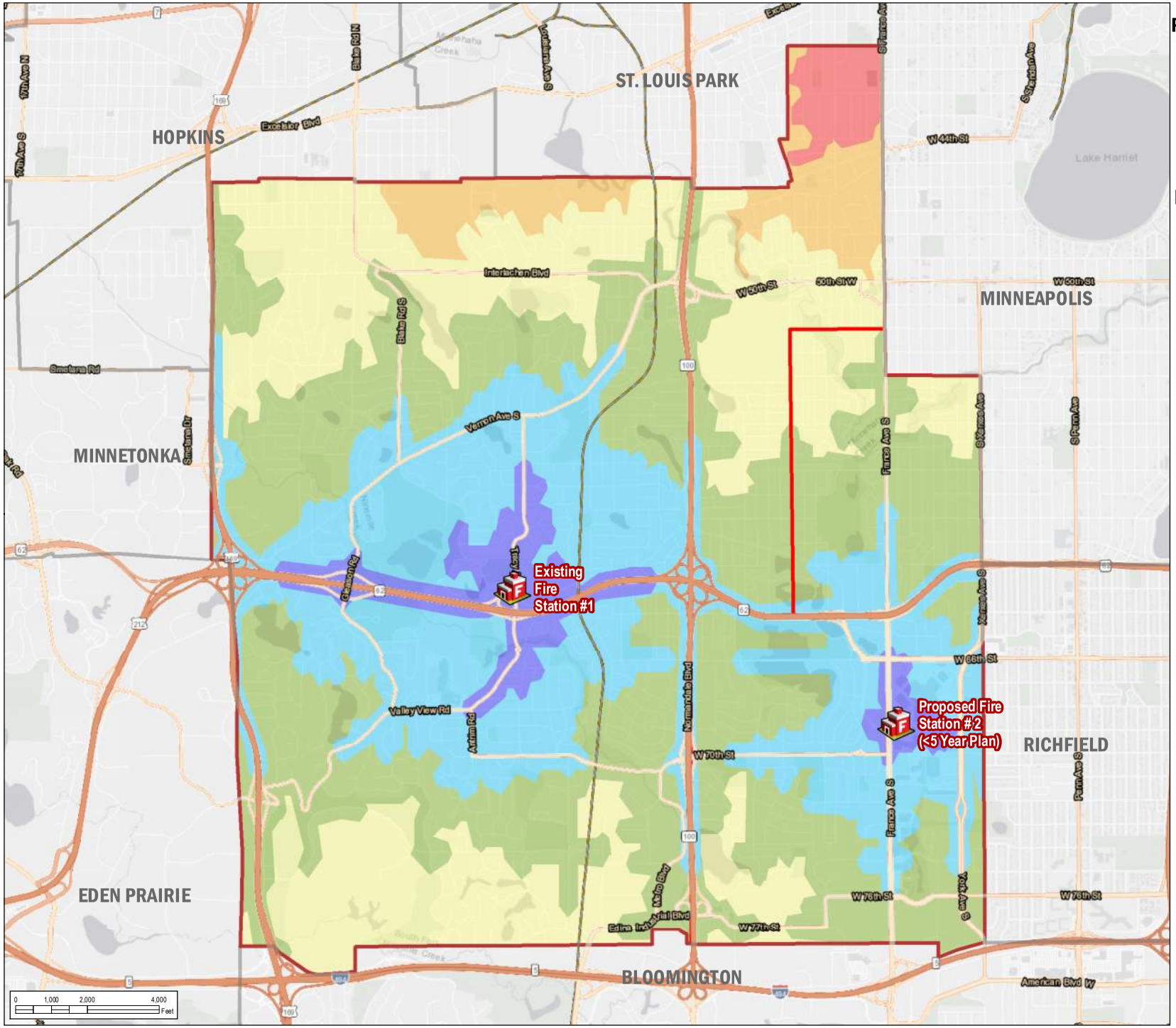

Figure A-3b
Proposed Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times from Proposed <5 Year Station Locations

Water Tower Site

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Proposed)

Drive Time From Proposed < 5 Year Station Locations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Five Bugles Design

Map Created: November, 2018

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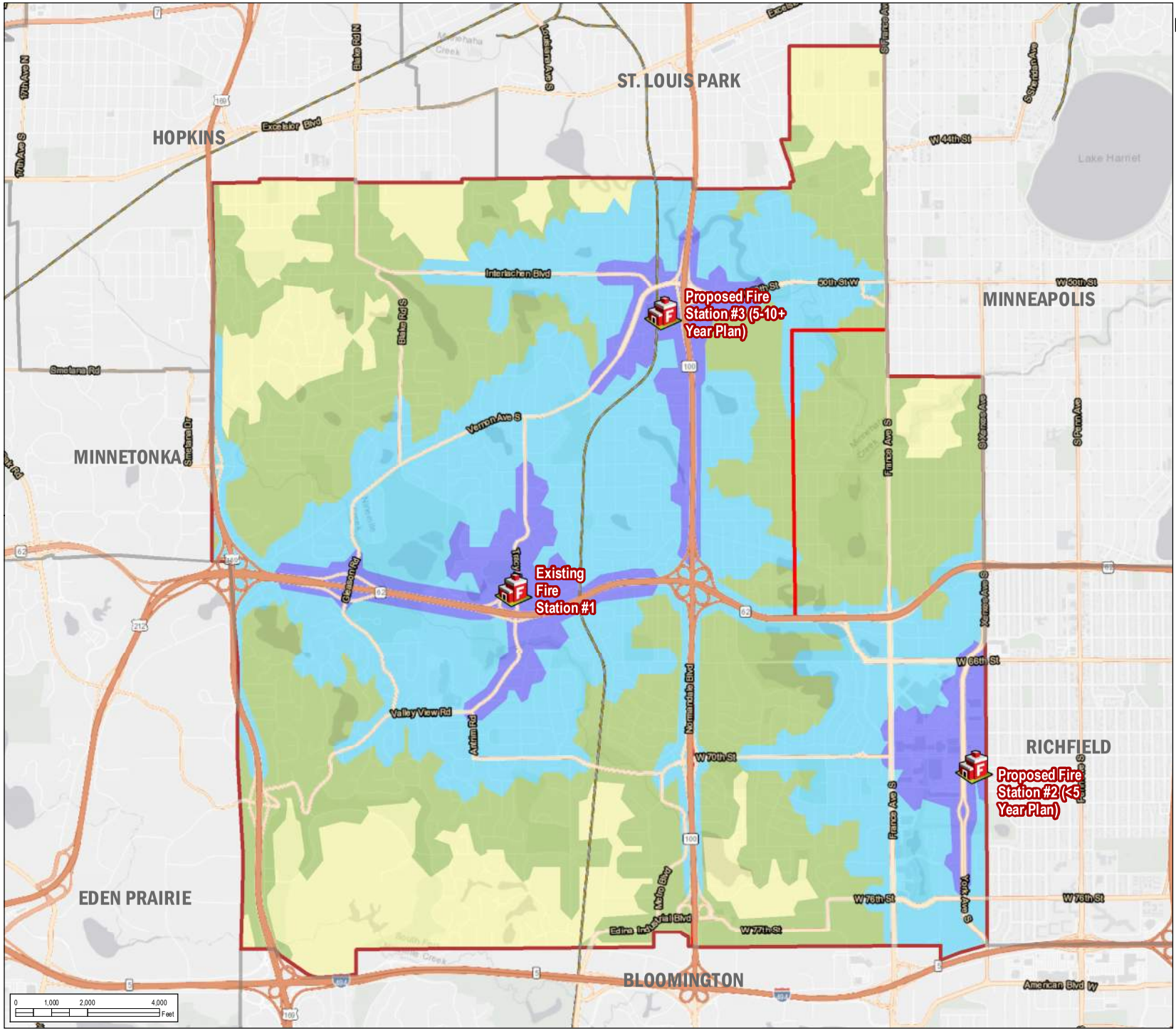

Figure A-4a
Proposed Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times from Proposed 5-10+ Year Station Locations

Library Site

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Proposed)

Drive Time From Proposed 10 Year Station Locations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Five Bugles Design

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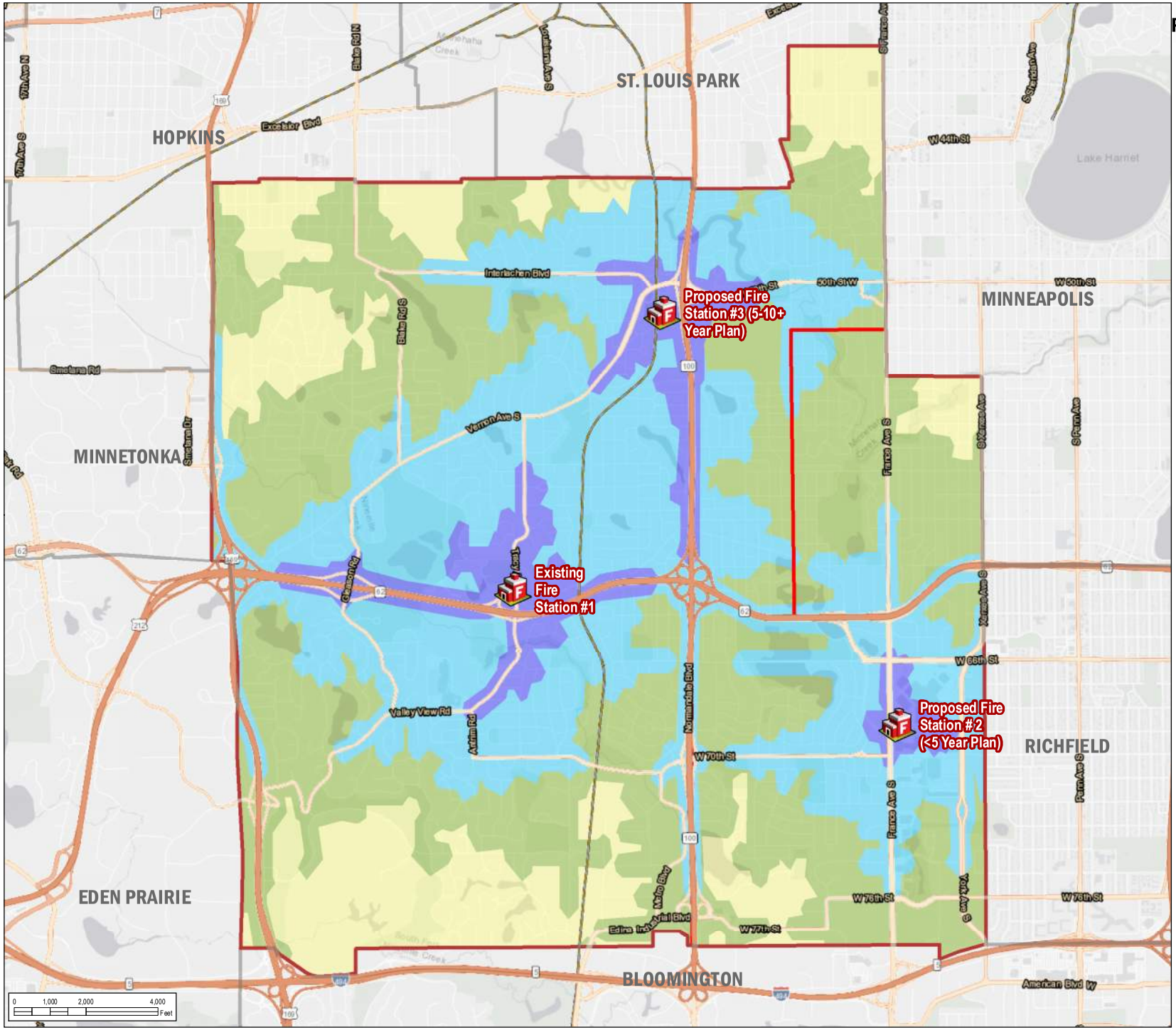

Figure A-4b
Proposed Response Times

CITY OF EDINA MINNESOTA FIRE DEPARTMENT

Fire Station Location Study

Response Times from Proposed 5-10+ Year Station Locations

Water Tower Site

N
W E
S

LEGEND

- Edina Fire District 1 & 2
- Edina Fire Stations (Proposed)

Drive Time From Proposed 10 Year Station Locations

- 0 - 2 Minutes
- 2 - 4 Minutes
- 4 - 6 Minutes
- 6 - 8 Minutes
- 8 - 10 Minutes
- 10 - 12 Minutes
- 12 - 14 Minutes

Five Bugles Design

Map Created: November, 2018

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