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Dayton Fire Department Study

Dayton, Minnesota

September 30, 2019



Table of Contents

Executive Summary	3
Introduction and Process	7
Demographic Analysis	11
Calls for Service Analysis	13
Apparatus Assessment	17
Staffing Assessment	25
Facility Condition Assessment	33
Station Location Assessment	37
Space Needs Assessment	47
Facility Master Planning Concepts	51
Recommendations	61

Appendix A: Fire Station #1 Assessment and Captial Plan

Appendix B: Fire Station #2 Assessment and Captial Plan

Appendix C: NFIRS Call Data

Appendix D: Firefighter Survey Results

Appendix E: City Council Survey Results

Acknowledgements

BKV Group would like to thank the Dayton Fire Department project team and the City of Dayton leadership for their time during the preparation of this study.

Fire Chief Jason Mickelson
Deputy Chief Jeremy Schmitz
Deputy Chief Gary Dotseth
Captain Jesse Sillman (Training Officer)
Captain Greg Kruse (Fire Marshall)
Lieutenant Al Blair
Lieutenant Tim Lulloff

City Administrator Tina Hollingshead
Mayor Tim McNeil
Councilmember Jon Mellberg
Councilmember Bob O'Brien
Councilmember Dennis Fisher
Councilmember Julie Gustafson
City Clerk Amy Benting

Executive Summary

BKV Group was retained in early 2019 to review the conditions of the Dayton Fire Department facilities and apparatus, assess the future needs of the Department, and provide recommendations about how to move forward.

The intent of this study is to provide tools enabling City and Department leadership to make informed decisions. This report will assist the Department in identifying solutions to current facility issues and support the Department in providing services that are responsive, efficient, safe, and provided in an economically responsible manner.

Discovery

The study started with a discovery process where BKV Group obtained basic information about the existing facilities, demographics, and the history of emergency responses. The next step in the study was an on-site assessment of the building by BKV Group, which occurred on March 15, 2018.

Apparatus Assessment

In general, the apparatus are in good to excellent shape for the current and expected future mission of the department. A few key recommendations that will assist operational readiness are as follows:

- Replace Utility 21 with an additional engine that is consistent with the current Engine 11 and Engine 21. Ensure that all future purchases pay particular attention to firefighter health and safety considerations.
- Replace the tank on Tanker 11. The chassis is in good condition with low miles and reusing the chassis will be cost effective
- Ensure that both rescues are consistent is layout. All future vehicles of this type

should have four doors. It may also be possible to reuse the “box” on these vehicles with new chassis.

- Develop a replacement schedule for all vehicles in the fire department fleet.
- Consider leasing or bonding for large expenditures if cash flow concerns are important.

Staffing Assessment

Dayton, although having a relatively low call volume is experiencing an increase in call volume that is anticipated to grow as the community population increases, especially with the forthcoming Dayton Parkway interchange off Interstate 94. Concurrently, recruiting and retaining volunteer firefighters has become increasingly difficult for Dayton Fire. This mirrors state, regional and national trends where the recruitment and retention of firefighters and in particular volunteer firefighters is becoming increasingly difficult. Most fire service analysts agree that the reason for this difficulty is due to demographics (applicant pool is smaller) culture (people are increasingly disinclined to volunteer) as well as the increased training and response demands of a firefighter. It is evident that a change to Dayton Fire Department's concept of operations will be required.

There are several ways to staff a fire department that range from Dayton's current paid-on-call (volunteer) model to a fully staffed 24/7/365 operation. Deciding on which model to employ is dependent on cost, community expectations, call volume, coverage, and available personnel to respond.

After examining a multitude of options, it is recommended that the City of Dayton position the Fire Department to incrementally grow as the city grows in population and the associated emergency response call

volume. It is recommended that the city hire a full-time Fire Chief and subsequently implement a “duty crew” concept to respond to daytime calls when availability of the current staff is very limited. Full-time Fire Chief positions have been initiated in several comparable communities in Minnesota, including Albertville, Zimmerman, and Farmington.

Facility Condition Assessment

The building was reviewed for physical and functional issues. Any issues discovered were documented with text and photographs. Many issues are simple to correct – some of the more complicated issues are listed below.

- The exterior walls of the buildings are clad in fluted concrete block and insulation occurs inside this combination structural/cladding system. Concrete block is porous and cannot block the passage of water, so the exterior paint serves as the main weather barrier. The buildings should be painted regularly to prevent water intrusion.
- The parking lots and response aprons at both stations are in need of replacement.
- There is very limited electrical service to Station #2, complicating any remodel or addition projects.
- There are many accessibility concerns at each station.
- The stations lack appropriate space for the decontamination of equipment and personnel.
- The stations lack sufficient apparatus bay space to accommodate the recommended fleet vehicles.
- The stations do not have the code-required exhaust system to remove contaminants from the apparatus bays.
- The stations do not have appropriate separations between clean and dirty spaces.

Based upon findings during the facility assessment, BKV Group estimated the costs to rectify the maintenance, repair, and safety issues. Each issue was categorized as urgent, short-term (1 to 5 years), medium-term (5 to 10 years), or long-term (10+ years). These estimates do not include major building additions or renovations that might be necessary to address functional concerns.

Combined, the fire stations require approximately \$1.64 million of repairs and upgrades over the next 10 years. This number is estimated as if all work will be done in 2019, although some of the work is not expected to be necessary until 2028. Cost escalation for each required repair out to the recommended date of the work is detailed in the CIP tool. The city should consider carefully these expenditures particularly in light of the fact that the existing stations are not optimally located. In addition, this expenditure would not resolve the myriad functional issues of the stations on a long-term basis.

Station Location Assessment

BKV Group utilized GIS mapping technology as well as historical call data to examine response times, call volume and coverage for the community. Currently, areas of town requiring frequent response occur at the northwest and northeast corners and at the mobile home park.

The current stations are not optimally located to provide service to the city. A good portion of their response profile is outside the city limits and the southern portion of the community is difficult to reach in a timely manner. BKV Group looked at ways to distribute two or three fire stations across the City to provide optimal coverage and resources. The maps are provided as references for further analysis in the Master Plan

It is recommended that the best long-term solution is a two new station scenario. In order to achieve phased improved coverage, it is recommended that a new south station be built and operated while using the two existing stations. By incorporating the recommended staffing plan, the majority of daytime responses would be from the new south station. A future new north central station would then allow the city to convert the current stations to new city uses or sell the facilities.

Space Needs Assessment

BKV Group assessed the Fire Department's space requirements based on national standards, interviews with Department leadership, and demographic trends. To operate in full compliance with national standards and best practices for the next 20 years, we recommend a headquarters station of ~18,600 square feet and satellite station(s) of ~11,500 square feet. These sizes are similar to the size of headquarters and satellite stations in surrounding communities.

Facility Master Planning Concepts

BKV Group explored, at a high level, the potential for four different facility and staffing alternatives, in addition to a "status quo" option.

Option Zero, the "status quo" option, still recommends \$3.7 million of investment in the existing facilities to provide minimum cancer-prevention equipment and workflows and to make the critical repairs necessary to keep the buildings operational for the long term. This option does not provide for timely response to the south portion of the City.

Option One recommends the construction of a South Station of 18,600 square feet and keeping the two existing stations in service as "response garages." All decontamination and department meetings would occur at the South Station. Critical repairs necessary to keep the buildings operational for the long

term will still be required. With an estimated cost of \$8.36 million, this is not a long-term solution by itself, but can serve as a stop along the way to Option 3 or 4.

Option Two explores the idea of keeping the two existing stations operation in the long-term by doing major addition/renovation work on both. An eventual south station would be required to serve that portion of the City but it could be delayed if the two existing stations were fully functional. The two existing stations are not ideally located, but they are close to current population centers. This option has an estimated cost of \$21.6 million.

Option Three explores the idea of building three new stations at optimal locations. This would be necessary if City leadership adopts a goal of drive-times to an incident within 4 minutes, 90% of the time, which is the goal stated in NFPA 1510 for Career Fire Departments. Due to assumptions about bonding capacity for the City, the option shows completing a station every five years and is estimated at a total cost of \$22.9 million.

Option Four explores the idea of building two new stations at optimal locations. This would be the preferred option if the City adopts a goal of drive-times to an incident within 6 minutes, 90% of the time. The estimated cost for this ranges between \$13.4 million and \$17.7 million depending on how much time delay occurs between the projects.

We recommend pursuing Option One because it results in clear progress toward operational needs while the City decides how dense it will ultimately become and what level of service the citizens will want from the Fire Department for the long term. In addition, it makes use of current facilities at least for the short-term.

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Introduction and Process

Study Scope

In March 2019, BKV Group was selected by the Dayton Fire Department via a Request for Proposal process to conduct a facility, equipment, and apparatus study; a brief analysis of their organizational structure and management/ staffing alternatives; and an analysis of the existing fire station locations in the context of national response time standards and best practices. Specifically, RFP requested the following study components:

1. Apparatus and equipment needs for the future including a capital plan and an evaluation of the appropriate capabilities for the Department
2. Staffing and organizational structure evaluation, with alternatives and pros/cons
3. Existing facility conditions and facility needs for the future
4. Engagement of City staff, firefighters, and elected officials
5. Written to be accessible to non-firefighters

City of Dayton Background

The City of Dayton encompasses approximately 32 square miles in Hennepin and Wright Counties along the shores of the Crow and the Mississippi Rivers. The estimated population as of 2017 is 5,791 but the City is experiencing rapid growth as evidenced by several new housing developments under construction as well as a new Interstate 94 interchange being developed. It is anticipated that the interchange will further increase residential and economic growth. Dayton's location along the I-94 corridor and its proximity to the metro Twin Cities area makes it a desirable commuter community. It is 30 minutes from downtown St. Paul and approximately 20 minutes from downtown Minneapolis.

The Dayton Fire Department (DFD) is organized as a department of the City of Dayton, a city established and organized under Minnesota law. It provides fire protection, emergency medical response, and rescue services to the City of Dayton. It has automatic aid agreements with Rogers, Maple Grove, Elk River, Osseo and Anoka-Champlin.

The mission statement of the Dayton Fire Department is:

The Dayton Fire Department strives for excellence in the performance of duty during the service they provide to all citizens. Its core values statement is: DFD strives for excellence and we hold to our core values of Trust, Integrity, and Professionalism.

Services are currently provided from two fire stations. Station 1 is located at 18461 Dayton Street and Station 2 is located at 12260 S. Diamond Lake Rd. The fleet currently consist of three engines, two rescue trucks, two rescue boats, a utility truck, two staff vehicles, and a tanker.

When fully staffed, there are 36 members who continuously train in order to become more effective and efficient at protecting lives, homes, and other property from fire and other disasters. Currently, there are 25 paid-on-call firefighters in the Department including the Fire Chief and six additional officers. In addition to fighting fires, our members are trained as First Responders and are first on-scene for all of Dayton's medical emergencies. The Dayton Fire Department responds to nearly 300 calls of various types each year.

Study Goals

BKV Group worked with the Department leadership to identify their goals for the study, which were documented as follows:

- Understand what space constraints the current stations create and what the space needs of the department will be over time.
- Understand how new facilities may improve ability to train.
- Understand the impact of population growth on call volumes.
- Understand what capital investments will need to be made in equipment and facilities.
- Outline how the department can grow in parallel to the community.

Methodology

1. Survey of the fire department
2. Survey of the city council
3. GIS review and response time analysis of current station locations
4. GIS review and response time analysis of potential new locations
5. Analysis of call volume, dispersion and time of day against available staff and applicable standards.
6. Comprehensive analysis of existing facilities and proposed repair and/or modification costs.
7. Cost estimates for a new headquarters and satellite facilities.

Any review of a department cannot be conducted without an underlying framework of assumptions and an acknowledgement of current trends in the fire service. This project is no exception. Given that, the conceptual framework for this study including the following assumptions:

1. The assessment of various operational aspects that may be impacted by the Department's facilities and staff and will require related considerations.
2. Nationally recognized standards are used as the baselines for recommended changes in operations.
3. Programs, benchmark policies, guidelines, etc. recommended for use should be recognized as successful programs, policies, guidelines, etc. in other fire and rescue service agencies.
4. It is projected that the population of Dayton will double by 2040
5. The new I-94 interchange will have a positive impact on economic and population growth
6. Given regional and national demographic trends, difficulty in recruiting paid-on-call firefighters will continue to be a challenge

Department Description

Department Name	Dayton Fire Department
Agency type	Municipality – City of Dayton
Headquarters location	12260 S. Diamond Lake Road Dayton, MN 56131
Station locations	Dayton Fire Station 2 – 12260 S. Diamond Lake Road Dayton Fire Station 1 – 18461 Dayton Street
Other facilities (please list by name)	None
ISO rating, date	ISO-7
Area in square miles	23.25 sq. mi. (5.0 sq. mi. are Elm Creek Reserve)
% Urban (>1,000 pop/sq. mi.)	0 sq. mi.
% Suburban (500-1,000 pop/sq. mi.)	~2.0 sq. mi.
% Rural (<500 pop/sq. mi.)	~21.25 sq. mi.

Staffing

Department Leadership	Fire Chief Jason Mickelson Deputy Chief Jeremy Schmitz Deputy Chief Gary Dotseth Captain Jesse Sillman (Training Officer) Captain Greg Kruse (Fire Marshall) Lieutenant Al Blair Lieutenant Tim Lulloff
Total Members (actual and allowed)	24 members, 36 authorized
Career Staff	0
Paid-on-Call Staff	24

Demographics

Population	5,791 (estimated 2017)
Number of residential structures	2,043* (26 occur in Wright County)
Number of business structures	77* (includes multifamily)

Numbers of Alarms

Data from 2014-2018	
Fires	53
Property value exposed to fire	Data not available
Property value lost to fire	\$329,850
Rupture or explosion	1
Medical	526
Rescues	52
Hazardous condition	72
Service call	43

* Data extracted from Hennepin County Assessment Report 2019 (<https://bit.ly/2XGn9xw>)

Good intent call	222
False call	36
Severe weather	2
Other	7
Total	1014

Automatic Aid

Agreements with	Rogers, Maple Grove, Elk River, Osseo and Anoka-Champlin
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A Note on ISO Ratings:

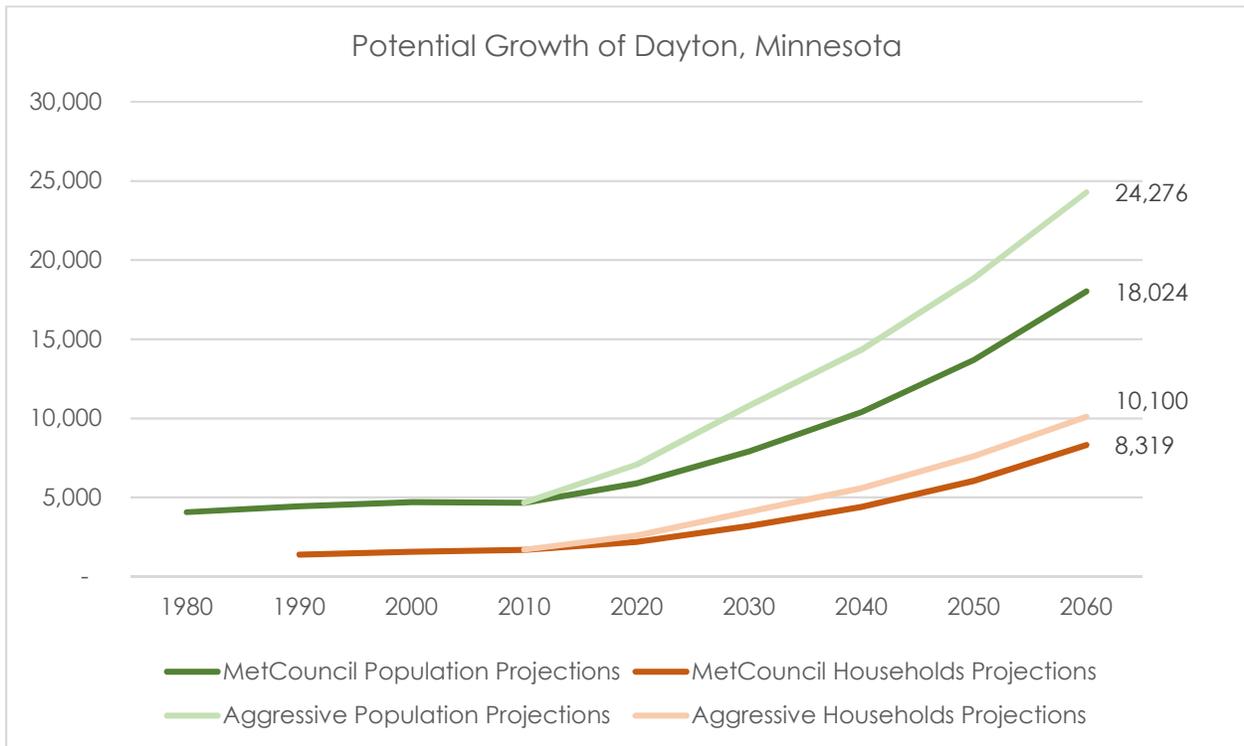
The Insurance Service Office (ISO) is an independent company that grades fire departments in Public Protection Classes (PPC) and sells the information to insurance providers, some of whom use the data to adjust insurance premiums. A PPC of 1 is the highest rank and is difficult to achieve – less than 1% of Fire Departments nationwide can boast an ISO-1. A score of 10 is lowest rank and usually denotes minimal to no fire protection. Any area that is more than 5 driving miles from the nearest fire station is automatically rated a 10. Many departments have multiple rankings, especially if they protect

According to the ISO's Fire Suppression Rating Schedule (FSRS), there are four main criteria to a fire rating score:

- up to 50 points are awarded based on the quality of your local fire department including staffing levels, training, apparatus, and proximity of the fire stations.*
- up to 40 points are awarded based on the availability of a reliable water supply, including the prevalence of fire hydrants, the water pressure at those hydrants, and how much water is available for putting out fires.*
- up to 10 points are awarded based the quality of the area's emergency communications systems (9-1-1 dispatching).*
- up to 5.5 points are awarded based on the Department's community outreach efforts, including fire prevention activities, fire cause investigations, and fire safety courses.*

In general, urban areas tend to have better PPC scores than rural areas, as urban fire stations are closer together and often receive better funding. To score an ISO-1, a department must earn at least 90 points. An ISO-5 is the most common rating.

Demographic Analysis



Dayton, Minnesota is a growing community in a desirable area. Extending data from the Metropolitan Council, the regional planning agency that serves the Twin Cities metropolitan area, we can anticipate that by the year 2060 Dayton will have a population of approximately 18,000 people. If such growth were to occur, the demand for housing would be 3 times what it is currently.

Number of Housing Starts in Dayton, MN by year	
2018	152 starts
2017	189 starts
2016	122 starts
2015	39 starts
2014	43 starts
2013	40 starts
2012	16 starts
2011	7 starts
2010	17 starts
2009	10 starts

The rate of population growth is difficult to predict because it is based on a complicated array of variables. If only the last three years of housing starts are considered, Dayton may be growing at a more aggressive pace than predicted by Met Council. However, rapid growth in Dayton was expected in the early 2010's and didn't occur due to a bad economy. While the rate is difficult to predict, it is evident that growth will occur and will place additional demands on Dayton's Fire Department.

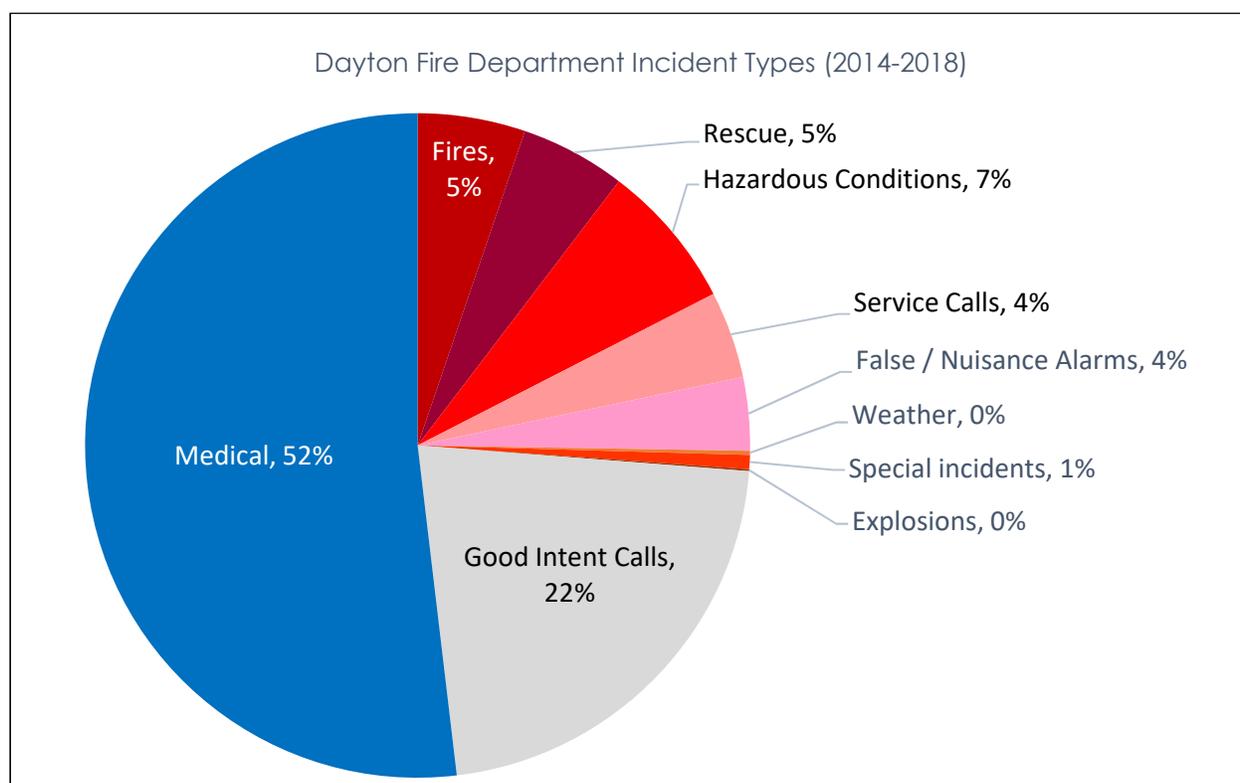
Long-term (50+ years) needs for the Fire Department will be affected by the long-term maximum population, which cannot be predicted with any precision at this time. As a point of reference, the mature communities of Apple Valley and Coon Rapids have similar geographical areas to Dayton and both have a population of well over 50,000. Depending on the density of residential areas built in Dayton, the city may end up with a lower population than these communities.

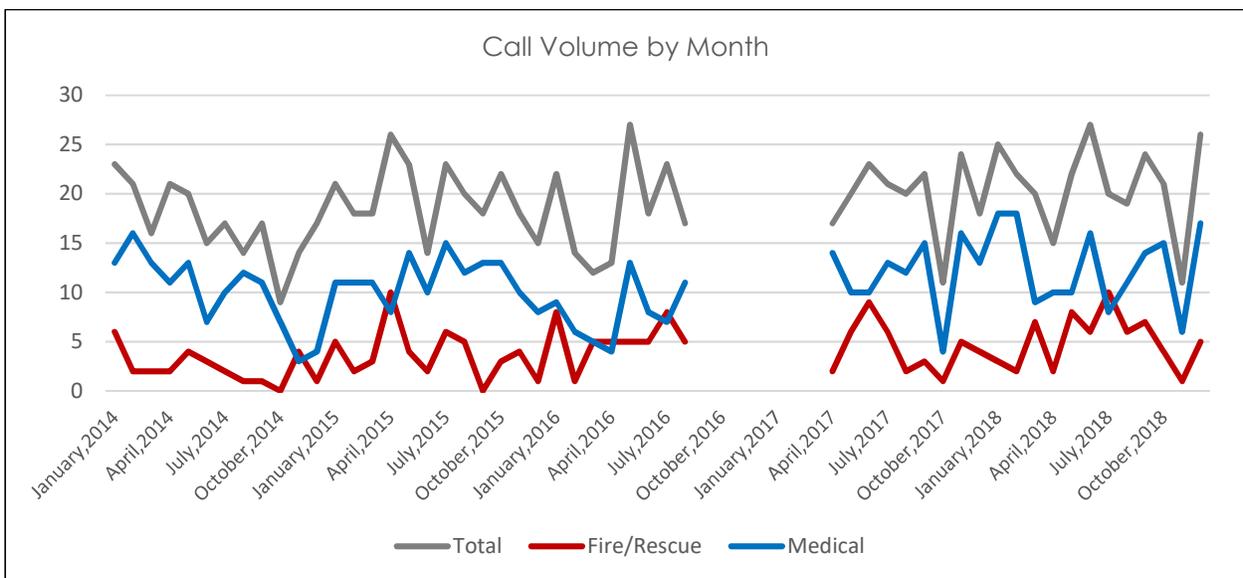
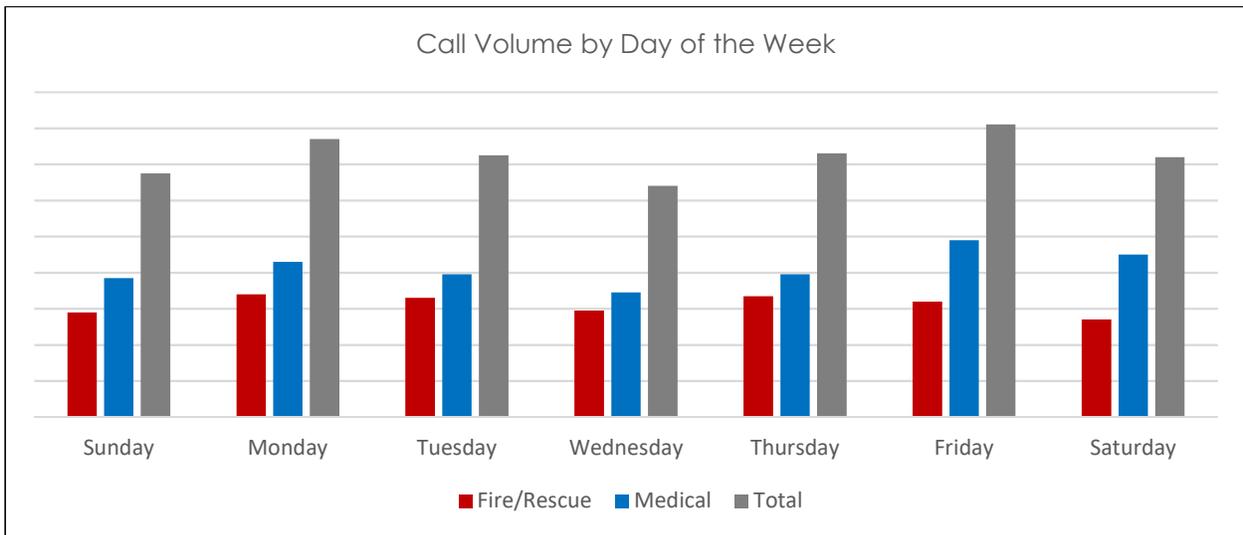
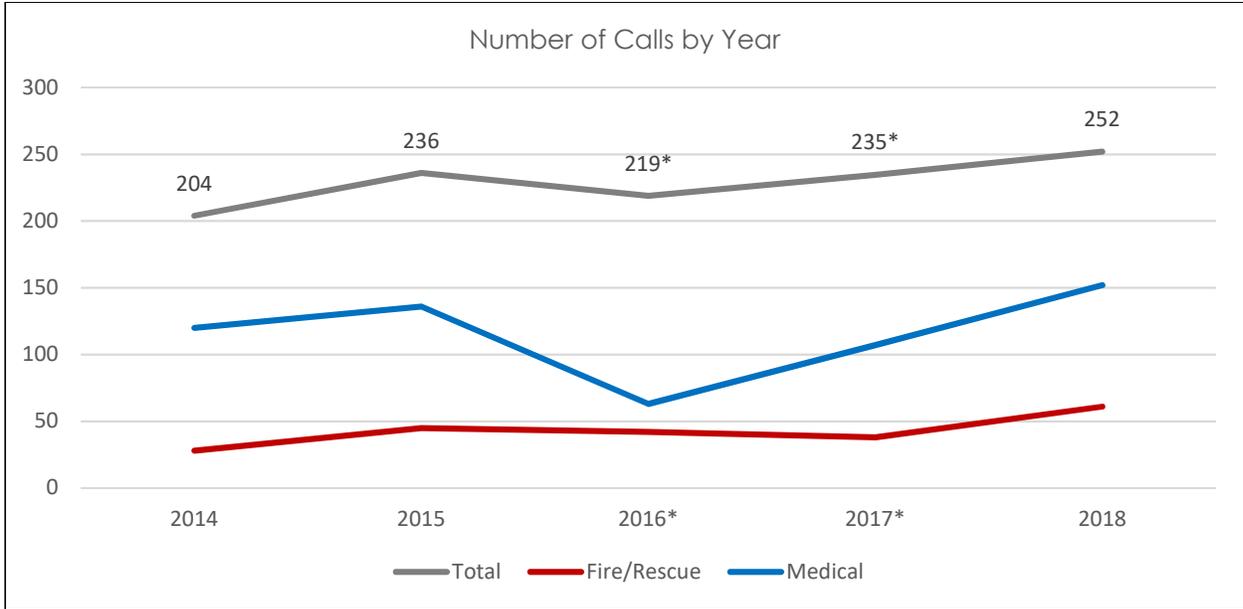
Recommendations in this report are, for the most part, based on planning for a 20-year projected need. It is not financially feasible, nor reliable, to spend money to accommodate all contingencies that may occur within the next 75 to 100 years. A community's population might vary 10% from projections within 20 years but could vary 50% from projections after 50 years. A forecast of 20 years is the practical limit of reasonably accurate demographic projections. Because of these uncertainties, this study will set forth recommendations that can be phased over time and can be adapted to serve a range of populations.

Calls for Service Analysis

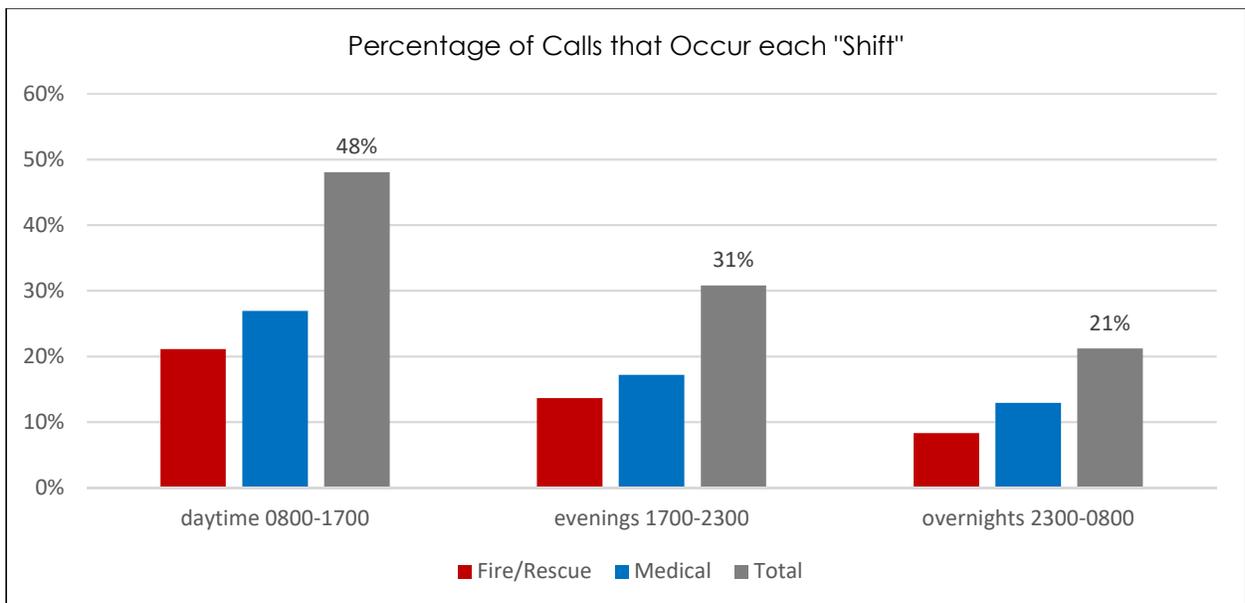
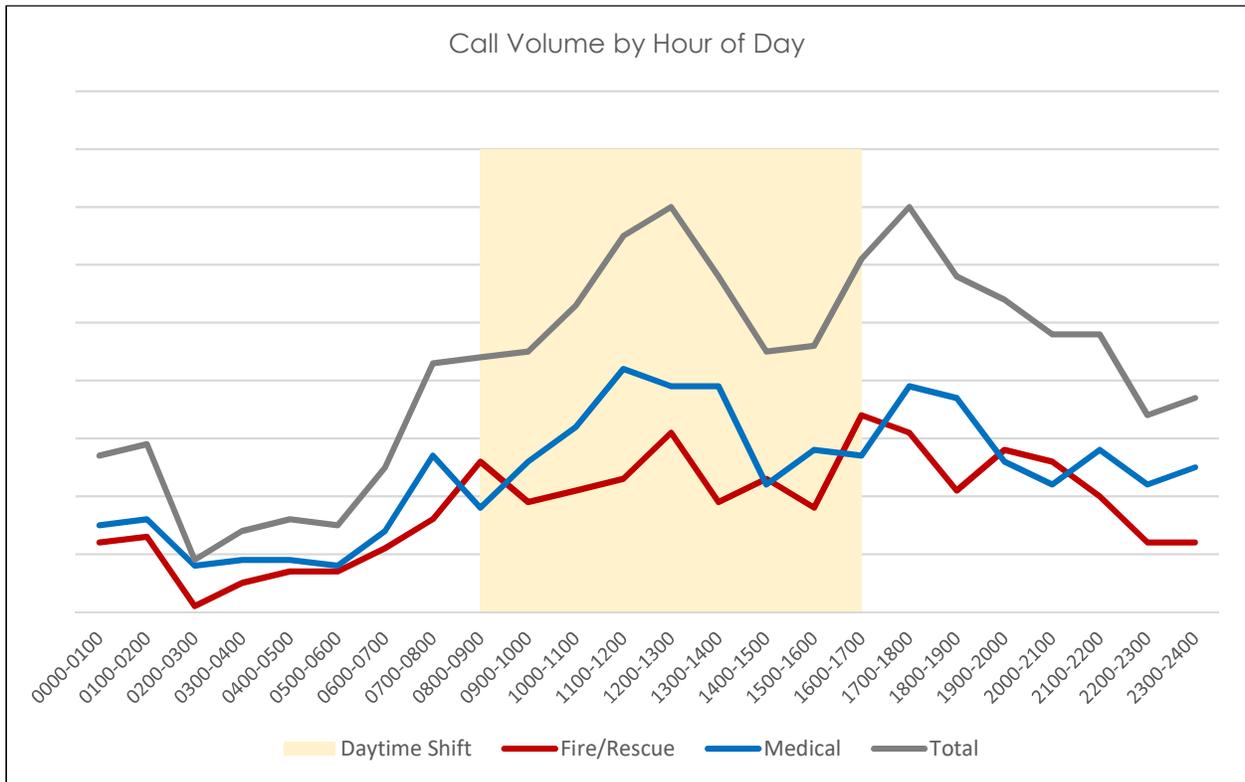
BKV Group obtained a five-year history of Dayton Fire Department responses from the Minnesota State Fire Marshall. The full record of this data can be found in the appendix. The Fire Department does more than simply extinguish fires. They also respond to medical calls because an ambulance may be 20 minutes away. They respond to vehicle accidents and people trapped and needing rescue. They respond to reports of hazardous conditions like gas leaks and downed power lines. When bad weather threatens and it is likely that emergency response will be necessary (e.g. icy roads) the firefighters pre-assemble at the station to reduce response times and ensure they are available to respond. Even for calls that are false alarms, the firefighters respond in a professional and diligent manner.

The data contains a seven-month gap between September 2016 and March 2017. Numbers for these months have been excluded where possible and interpolated where necessary – such interpolated numbers are marked with an asterisk. This data was analyzed for any patterns in the calls for service. Approximately 50% of calls to the Dayton Fire Department are to provide emergency medical care.





There are no discernable patterns of call prevalence by day of the week or by month of the year. The data shows that more calls occur during typical waking hours than during typical sleeping hours. Approximately half of all calls occur between 8 and 5, when it is difficult for firefighters to respond because their jobs are not close enough to the Stations or because their jobs do not allow them to leave. Currently, Dayton Police Officers respond to medical emergencies, but recent history in other communities indicates that as population increases and calls for service to the police department increase, they will respond to fewer and fewer medical calls. Unless there is a change in the operational strategy of the Fire Department, the citizens of Dayton will be under-protected during business hours.



Based upon data from 2017, Dayton responded to ~43.3 calls per 1,000 population. The averages for several counties around the metro area indicate that Dayton's response profile is similar to more rural counties. As the population of Dayton begins to increase, we anticipate the calls per 1,000 population will also increase to the levels found in the more developed counties. This phenomenon is partly due to the fact that residents of more rural areas tend to be more self-reliant and partly due to people driving themselves to help because it would take too long for help to arrive. As emergency services become easier and faster to access, they get accessed more frequently.

County	Population	Annual Call Volume	Runs/ 1,000 population
Hennepin	1,252,024	94,981	75.9
Ramsey	547,974	37,717	68.8
Dakota	421,751	22,015	52.2
Anoka	351,373	19,228	54.7
Washington	256,348	17,009	66.4
Scott	145,827	4,295	29.5
Wright	134,286	3,579	26.7
Carver	102,119	3,223	31.6
Sherburne	94,570	1,720	18.2
Isanti	39,582	1,342	33.9
Chisago	55,308	1,174	21.2
Dayton 2017	5,427	* 235	43.3
Dayton 2020 (projected)	5,900	266	45.0
Dayton 2030 (projected)	7,900	379	48.0
Dayton 2040 (projected)	10,400	530	51.0
Dayton 2050 (projected)	13,691	739	54.0
Dayton 2060 (projected)	18,024	1,027	57.0

Currently, due to uncertainty about who is available to respond, each firefighter is dispatched to each call, and spends an average of an hour each time they respond. Within the next 20 years, the Dayton Fire Department is expected to respond to ten calls per week. Ten hours of emergency response, added to the meeting and training requirements of being a volunteer firefighter, exceeds the time that most volunteers are able to commit. As the City grows, the Fire Department will need to adjust its operating model to make volunteering feasible. Sections later in this report will explore the implications of different operating models, including dispatching only the closest station, having on-duty staff during business hours, having some career staff on the Fire Department, and other options.

Apparatus Assessment

The purpose of this section of the Study is to document the condition of the existing Fire Department fleet and make recommendations for the future. The apparatus assessments were conducted on April 3, 2019 by the following individual:

- Greg Martin
Public Safety Specialist, BKV Group

Current Dayton Fire Department Apparatus

Designation	Make and Model	Model year	Water (gallons)	Pump (gpm)	Class A / Class B Foam (gpm)	Responds From
Engine 11	Rosenbauer custom pumper	2017	1,000	1,500	30 / -	Station 1
Engine 21	Rosenbauer custom pumper	2010	1,000	1,250	20 / 20	Station 2
Engine 12 (reserve)	Ford L8000 commercial chassis	1990	1,000	1,000	20 / -	Station 1
Tanker 11	Freightliner FL80 commercial chassis	2000	3,500	250	n/a	Station 1
Rescue 11	Ford F350 Two door	2006	250	150	8 / -	Station 1
Rescue 21	Ford F550 Four door	2016	300	150	10 / -	Station 2
Utility 21	Sterling Acterra commercial chassis	2006	SCBA/ heavy rescue			Station 1
Utility 22	Ford F350 extended cab	2008				Station 2
Boat 11	River Pro Jet Boat (owned by DNR)	2001				Station 1
Boat 21	Zodiac 30hp outboard	2018				Station 2
Chief 1	Ford F150 crew cab	2017				Take home

Comparison to National Averages (5,000 to 9,999 population)

	National Average	Dayton Fire Department
Stations per 1,000 population	0.19	0.34
Engines per 1,000 population	0.31	0.34
Ladder Trucks per 1,000 population	0.04	0.00
Other vehicles per 1,000 population	0.29	0.51

Apparatus Physical and Functional Findings

The Dayton Fire Department utilizes a standard fire service array of fire apparatus and utility vehicles to provide service to the community.



Engine 12



Tanker 11



Engine 11



Rescue 11

A Note about the "Clean Cab" Concept:

NFPA 1901 governs the design of fire apparatus while NFPA 1500 addresses firefighter health safety. Together these two standards have assisted in developing this concept. In the typical fire apparatus design, contaminated firefighter protective gear and equipment are loaded or bracketed into the apparatus cab as firefighters leave a fire incident and return to the fire station. The smell of a "fire" and associated carcinogen particles lingers in the cab and is noticeable even days later. The science has proven that carcinogens attach to the PPE and equipment and continue to off-gas while firefighters are in the apparatus. This concept focuses on specifically designing the cab of new apparatus to be free from firefighting equipment that can be easily contaminated on the fireground. This includes equipment such as self-contained breathing apparatus (SCBA), tools, hand lights, and other small equipment. The design provides a nonporous interior so that the cab can be easily cleaned after a fire to reduce any secondary cross-contamination. The goal is to reduce firefighter exposure to contaminated gear and off-gassing equipment and to address numerous other safety concerns.

Engines – Dayton Fire is adequately equipped with structural fire engines. Engine 12 will be replaced with a new engine and one of the current engines will go into reserve status. The working assumption is that Engine 21 would go to reserve status. (Note that the current Engine 12 was not reviewed for this study since it is due for replacement.) Both current front-line engines are Rosenbauer brand - a well-known and respected apparatus brand - and this approach provides consistency for maintenance and training. Both apparatus also have 1,000-gallon water tanks which is an operational advantage in both hydranted and non-hydranted areas. We recommend that future engines are similar in terms of capacities and layout to reduce error and confusion as volunteer staff aren't always on the same piece of apparatus.

Water Tenders* – Tanker 11 is generally adequate. The chassis is in good shape with low miles. However, the water tank has had repairs and will need to be replaced soon. It would be cost effective to replace the water tank on the existing chassis. Typically, a tanker does not experience as much wear and tear as a front-line engine, so they tend to have a longer service life. Nonetheless, a long-term plan to replace it should be developed. As hydranted areas grow and the standard for engines is to have larger tanks, the demand for a tanker will be diminished but will never fully go away. As neighboring communities rely more and more upon hydrants, the operational benefits of the tanker and its usefulness for mutual aid events will remain high.

* The term water tender and tanker tend to be used interchangeably in the Midwest and refers to an apparatus that hauls water. However, in standard National Incident Management System (NIMS) command terminology, these are referred to as tenders while tankers are aircraft that carry water or flame retardant

Rescues – DFD utilizes rescues to respond to auto accidents where extrication might be required. They are also used to respond to brush fires within the jurisdiction. Future rescues should be standardized on a four (4) door four-wheel drive (FWD) chassis. It may be possible to extend the service life of the rescue by replacing the chassis if the box is in good condition.

Utility Vehicles - Utility 21 has multiple roles – it has mobile command capabilities, carries a cascade system (an on-scene air compressor that allows the refilling of high-psi self-contained

breathing apparatus bottles), and carries some “heavy rescue” equipment like heaving lifting bags and additional extrication equipment. By trying to cover so many roles the apparatus is unwieldy and not well-suited to any type of event. Each of its functions can be addressed in other ways. The frequency of a long-running incident requiring mobile command (like a major hazmat event) is low and a command unit can be borrowed from a large department like Minneapolis Fire. In the case of the cascade system, the issue of needing additional air on-scene can be addressed less expensively ways by simply carrying more SCBA bottles and using mutual aid to shuttle bottles back to the stations for refill on a large incident. The heavy rescue equipment can be carried on another apparatus. Over the long run, the Department's operational capabilities would be better served by selling this vehicle and replacing it with another front-line engine.

Utility 22 is a pickup truck used for shuttling staff and equipment around town or towing a trailer. These vehicles are relatively inexpensive but vital to smooth operations and don't necessarily need to be stored indoors. We recommend replacing this vehicle once the maintenance exceeds its usefulness.

Fleet Deficiencies

The Dayton Fire Department fleet generally meets the requirements created by the community's size and risk profile. However, there are two additional capabilities that should be discussed.

Ladder Truck - The Dayton Fire Department does not currently operate a ladder truck but has been considering the need. The decision to add ladder capability should be evaluated carefully in a risk vs benefit context. There are three major areas to consider: cost, potential Insurance Services Office (ISO) rating improvement, and operational risk and exposure.

1. Cost - The startup cost of ladder trucks is high. A typically equipped new ladder truck will be in the \$900,000 to \$1.5 million range. In addition, because they are complex pieces of equipment, maintenance and testing costs are high and the certification and training to operate are considerable.
2. ISO ranking – The Dayton Fire Department has a current ISO rating of 7. The addition of a ladder truck to the fleet MAY improve Dayton Fire's ISO rating, but reduced response times and more areas with fire hydrants would likely have a much greater impact. A ranking improvement does not automatically result in lower insurance premiums for a homeowner since the typical improvement is more typical for a commercial property. It would also be advisable to contact a few local insurance providers to specify what savings might apply for different types of properties.
3. Operational Risk and Exposure – While the Dayton Fire Department service area does not have high-rise buildings, there are large churches, apartment buildings and commercial areas where a ladder truck would be a huge operational asset to rescue people and provide a large volume aerial water stream which can be critical in containing a large fire and preventing it from spreading. In addition, Dayton is a suburban community to the metro twin cities area with increasing numbers of very large homes where a ladder truck would be a significant operational benefit. However, the types of events where a ladder truck would be useful will get automatic aid from surrounding departments, some of which do operate a ladder truck.

Adding a ladder truck to the Dayton Fire Department would enhance the Department's capabilities. However, the number of buildings in the area that require a ladder truck is currently small. In addition, the availability of automatic aid ladder trucks further mitigates the need. Therefore, it is the opinion of BKV Group that when objectively reviewing the benefits relative to the risk the addition of a ladder truck is not justified at this time. This recommendation should be reevaluated at intervals as development continues.

A Note on Ladder Trucks:

There are different types, lengths and ladder carrying weight capacities of aerial ladder trucks. They range from a basic ladder mounted on an apparatus (straight stick), to a heavier duty ladder with a platform on the end (tower). Both have the capacity to discharge large volumes of water - typically 1,000 to 2,000 gallons per minute (gpm). Ladder trucks are valuable for rescue purposes at a multi-story building. However, their most commonly used function is to provide a high-volume elevated water stream at larger fires. Ladder trucks can be constructed with or without pumps. Traditionally, ladder trucks without pumps are operated by larger departments who have adequate numbers of engines to supply a ladder truck with water when needed. A ladder truck with a pump, commonly referred to as a "quint" is more common with smaller to medium departments where a ladder may need to operate independently of an engine.

All-Terrain Vehicle/ Utility Task Vehicle – Dayton Fire Department protects a large section of Elm Creek Preserve, most of which does not have trails that can accommodate traditional fire apparatus. We recommend procuring an ATV that can seat four and can tow or carry injured people out of the reserve and that can carry four personnel to an incident.

Heavy Rescue - Dayton will soon have a freeway interchange, and some of the Interstate 94 runs through the southwest corner of the City. Rogers has expressed that they are happy to keep protecting that small section of interstate since they already protect a major section. If Rogers decides against this in the future OR if the new major roadways being considered create a large number of multi-vehicle accidents each year, Dayton should consider purchasing and training on an apparatus dedicated to heavy rescue and carrying the cribbing, blocking, bracing, air bags, and cutting tools necessary for such operations.

Future Fleet Makeup

Type	Number if Two Stations	Number if Three Stations
Engines	4	4
Mini Pumper/ Brush Ladder Truck		
Water Tender	1	1
Heavy Rescue		
Light Rescue	2	3
Utility/ Squad	2	3
Hazmat Response		
Boat and Trailer	2	2
ATV and Trailer	1	1
Command Vehicle	2	2
TOTAL	14	16

A size and makeup of a Department's fleet reflects the size of a community, the risks in that community, the number of stations, and the staffing model. For the purposes of this report, we are assuming that, for the near future, Dayton Fire Department will remain a fully or partly volunteer department, that there will be two or three stations, and that there will not be a significant increase in risk profile (no unsprinkled warehouses, no large developments of mid-rise housing, etc.)

Apparatus Procurement Schedule

Common Life Expectancy for Types of Apparatus

Engine	20 years
Ladder	25 years
Tanker	25 years
Rescue	10 years
Utility	10 years
Staff	7 years
Vehicle	100,000 miles

There is no national standard for when apparatus need to be replaced. Many factors play a role, including mileage on the engine, hours on the pump, continued compliance with NFPA 1901 standards (which are updated every five years), availability of parts, ease of maintenance, and reliability to name a few. Rural departments with limited resources may use engines that are 50 years old while some large departments sell any engine more than 15 years old. The most commonly cited acceptable ages for apparatus are shown in the chart below and take into consideration which vehicles are used the most, which are most

expensive, which are engineered to a higher or lower standard, and which tend to have more significant changes in the NFPA requirements.

A replacement schedule is for guidance only. Depending upon all the factors mentioned above, any apparatus may need to be replaced a couple years earlier than expected or be able to operate for a couple years longer than expected. This also allows some freedom to adjust capital expenditures around other needs of the municipality. Manufacturers indicate that costs of apparatus are increasing at approximately 5% per year as electronics get more complicated and fuel efficiency standards become more stringent.

Proposed Apparatus Purchase Schedule – 20 years

DESIGNATION	REPLACES	APPROX. REPLACEMENT YEAR	BALLPARK COST
ENGINE 12	1990 Engine	2019	\$ 600,000
RESCUE 11	2006 Ford	2020 (chassis only)	\$ 40,000
RESCUE 21	2016 Ford	2023 (chassis only)	\$ 40,000
ATV AND TRAILER	n/a	2024	
TANKER 11	2000 Tanker	2025 (tank only)	
ENGINE 22	2006 Utility 21	2025	\$ 600,000
CHIEF 1	2017 Ford	2027	\$ 40,000
RESCUE 11	2020 Rescue	2027	\$ 200,000
UTILITY 22	2008 Ford	2028	(purchase used)
RESCUE 21	2023 Rescue	2030	\$ 200,000
ENGINE 21	2010 Engine	2030	\$ 600,000
ENGINE 11	2017 Engine	2035	\$ 600,000

Ahead of each replacement, the Department should convene a committee to specify what capabilities the apparatus should have. Before selecting a vehicle option, answer these nine questions:

1. What tactical functions will the vehicle be expected to support?
2. Will there be medications and other EMS supplies that require climate-controlled storage?
3. How many people will typically require a riding position where they can be properly seated and belted?

4. Will the vehicle be carrying equipment that must be properly secured?
5. How will personnel gain access to secured equipment?
6. Will the vehicle be transporting personal protective equipment and clothing?
7. What will be the vehicle's typical response area — urban, suburban or rural?
8. What's the area's topography? Will the vehicle require four-wheel drive capability?
9. Will the vehicle be used to tow trailers for hazmat, technical rescue or mass casualty equipment?

Recommendations

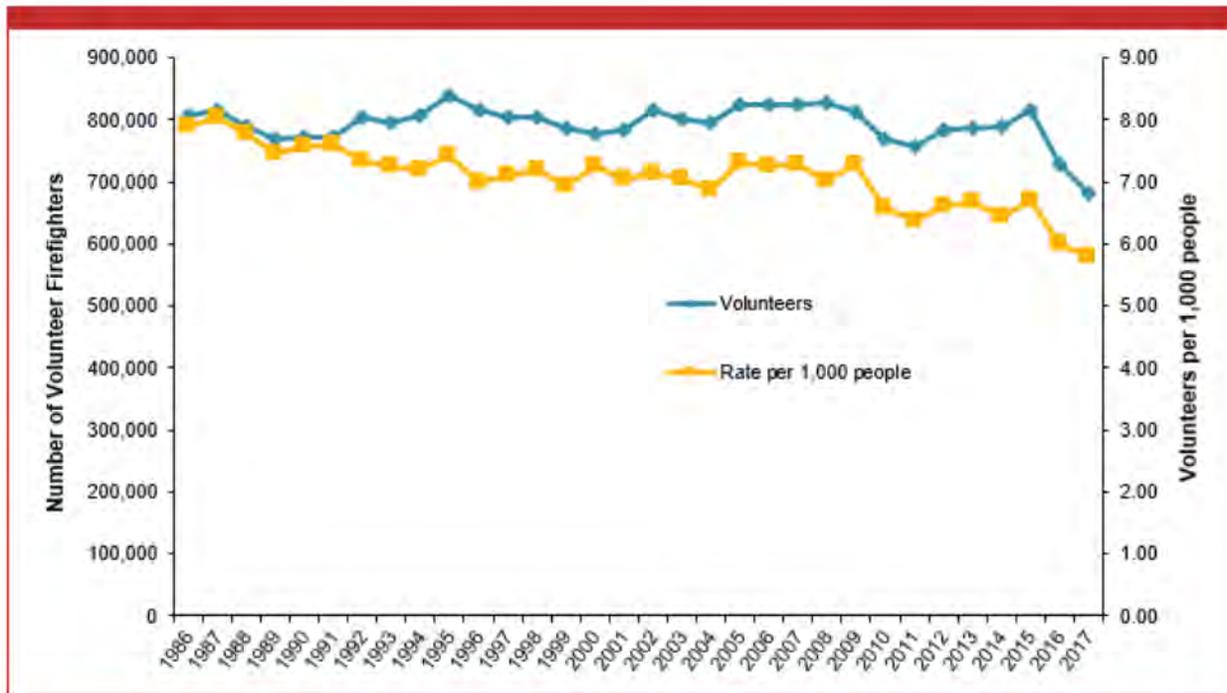
1. A life expectancy sample and replacement schedule has been included with this report. Generally, the schedule recommends a twenty (20) year life for an engine, twenty-five (25) year life for a tanker, ten (10) year life for a rescue and 1 seven (7) year life for a staff vehicle. However, these recommendations are based on the current and expected operating practices and mission of the department. Consider either bonding or leasing future equipment if cash flow is required for other departmental obligations or initiatives.
2. Engines 11 and 21 reflect the latest NFPA 1901 standards as of the date of their manufacture. This means that neither Engine 11 or Engine 21 completely reflect the clean cab concept. We recommend that the replacement for Engine 12 complies fully with the current version of NFPA 1901 and take into account the health and safety considerations noted in NFPA 1500. We recommend that the replacement for Engine 12 incorporate the state-of-the-art clean cab concept. It is already slated to be replaced and funds have been set aside.
3. Consider acquiring the replacement with a lease to purchase arrangement or bonding. This would allow additional funding in the budget for other department personnel, as noted earlier in this document, and equipment priorities.
4. Replace Utility 21 with an engine consistent with the new Engine 12 replacement.
5. Purchase additional SCBA air bottles to replace the existing cascade system on Utility 21. Use mutual aid air on scene for extended incidents.
6. Replace Rescue 11 with a similar configuration as currently exists with Rescue 21. In addition, given the call volume, the current Rescue 11 box and a future Rescue 21 box should be capable of having the chassis replaced in ten years while retaining the box.
7. All future utility and rescue vehicles should have four doors to maximize flexibility.
8. Replace water tank on Tanker 11 utilizing the same chassis. The chassis has low miles and is in good condition. Given the relatively low use, it would be more economically viable to utilize this chassis with a new tank.
9. Miscellaneous Equipment
 - a. 1.75 inch hose instead of 1.5 inch hose.
 - b. Supply all vehicles with Automated External Defibrillators (AED).
 - c. Consider lease/maintenance agreements for AED, Rescue tools, Thermal Imaging Cameras (TIC), etc. to levelize budget impacts when these expensive items need to be replaced. This will also control maintenance costs.

Staffing Assessment

The people who make up the Department are the most critical piece of any emergency service provider. Regardless of the apparatus available or the condition of the stations, the people are the resource that put these other items to good use. As such, it is essential to the long-term health of the Dayton Fire Department that an effective firefighting force be maintained. Across the country, fire departments are staffed through some combination of true volunteers, paid-on-call personnel, and full-time (career) personnel. The appropriate types of staff are depended upon call volumes, population density, demographics, administrative needs, and perhaps most critically, the availability of the population to enter into the fire service.

BKV Group assessed the Fire Department's operational model, which is currently a paid-on-call ("volunteer") fire department authorized for 36 members operating out of two stations. All active members of the department are alerted by pager and smartphone app for every call that comes in, and any available members respond to the station to which they are assigned, wait for other firefighters to arrive, and when a full crew is available take the appropriate vehicle to the location of the call. Any firefighter who responds to a call is paid for their time, at a rate of \$11/hour or portion of an hour. Firefighters who arrive after the apparatus has left the station continue to monitor the radio to determine if more assistance is needed on scene and in the meantime do chores around the station. There is a Fire Chief, elected by the members and approved by Dayton City Council, who receives a stipend, a District Chief for each station, and one Captain and one Lieutenant per station. One of the officers serves as the Training Officer and another as the Fire Marshall.

National and State Trends in Fire Department Staffing



The 2017 U.S. Fire Department Profile study[†] published by the National Fire Protection Association (NFPA) in March of 2019 details some of the issues facing fire departments across the country. One of the areas of largest concern is a decline in the number of volunteer firefighters. In addition, the percentage of volunteer firefighters over the age of 50 is increasing rapidly, demonstrating the fact that recruitment and retention of volunteer firefighters is becoming increasingly difficult as society places different demands on young members than it did a generation ago. Indeed, the rate of volunteers per 1000 population has dropped to 5.8, the lowest number since records have been kept. The number of applicants for career firefighter positions is also decreasing. Dayton Fire Department is no exception – they are currently short one-third of their authorized maximum. Staff reports that recruitment and retention is always difficult due to the demographics of the community and the increased training and certification requirements of a firefighter, which takes significant time and resources to accomplish.

According to the U.S. Fire Administration's Fire Department Registry[‡], Minnesota has the second lowest percentage of career fire departments in the U.S. (behind only Delaware) with only 2.6% of its 726 departments classified as career or mostly-career. According to recent research by the St. Paul Pioneer Press (May 9, 2019) Minnesota is uniquely dependent on volunteers. The state has the fewest number of full-time firefighters on a per capita basis. According to data collected by the MNFire Initiative, Minnesota is 22nd in population but 45th in spending on the fire service.

One of the primary responsibilities of a Fire Department's administration and the City leadership is to ensure that the Department has the means and ability to respond to emergencies in a timely, safe, and efficient manner. It takes an adequate number of trained firefighters available at any given time to accomplish this. Insufficient staffing, whether at a working fire, a medical emergency, or a rescue incident, increases the risk of injury to all involved. For certain types of calls, insufficient staff may **prevent the Department from intervening at all**. For instance, safety guidelines require a minimum of two firefighters to enter a working fire to search for people in need of rescue while two firefighters remain outside to act as a rapid intervention team if conditions worsen and the crew inside needs help. Without four properly trained and equipped firefighters on scene, no interior attack can be made.

The results of the Firefighter Survey, which can be viewed in full in the Appendix, indicate that there is a lack of personnel available to respond to non-fire incidents during traditional business hours. This poses a risk to the daytime population of the City and should be an area of focus for City leadership. The Department should take steps to improve recruitment/retention. However, due to demographic forces adding more firefighters from the community is unlikely to resolve the issue on its own.

Volunteer Recruitment and Retention

Responding to the challenges in recruiting and retaining volunteers, BKV Group has evaluated several initiatives that might improve recruitment and retention.

[†] <https://www.nfpa.org/News-and-Research/Data-research-and-tools/Emergency-Responders/US-fire-department-profile>

[‡] <https://apps.usfa.fema.gov/registry/>

1. Vesting Requirements: Currently the Dayton Fire Relief Association has a five-year vesting requirement. By contrast, the State of Minnesota Police and Fire Pension system has changed to a 20-year vesting requirement. Minnesota municipality examples indicate that Owatonna MN has a 10-year vesting requirement. Another example, Stewartville, MN has a 20-year vesting requirement. A longer vesting period provides a strong incentive for firefighters to serve until they are fully vested. **Recommendation:** Change the vesting requirement to ten (10) years for new volunteer firefighters.
2. Compensation: Paid on Call (POC) firefighters in Minnesota are generally compensated based on a point system or on an hourly basis with minimums of between one and three hours. The Dayton Fire Department currently compensates their members at \$11/ hour with a one hour minimum. A 2015 study conducted by Owatonna Fire Department indicates that the typical pay for a POC firefighter ranged from \$12-\$18/hour.
Recommendation: Retain the \$11/hour pay rate for POC firefighters but institute a system where the pay would increase in steps up to a maximum of \$14/hour. Firefighters would move up the steps after an acceptable performance evaluation and a specified tenure as a firefighter. In order to minimize budget impact, the recommendation is to initiate with a single-step program and phase into a two- or three-step program over subsequent budget years. The specifics of the program would need to be developed under the direction of the Fire Chief with input from the command staff and City leadership.
3. Incentives: Currently, there are no systematized incentives to become a Dayton firefighter other than a personal incentive to serve the community. **Recommendation:** Under the direction of the Fire Chief and City leadership, consider incentives such as a small property tax credit for individuals to serve as a volunteer. In addition, a small property tax incentive or some other benefit could be extended to businesses who employ firefighters.
4. Raising Interest: The firefighter survey indicated that most members joined because friends or family members were already a firefighter. A common way to build awareness of the fire department in people outside the firefighter network is through cadet or explorer programs for teenagers. **Recommendation:** Under the direction of the Fire Chief, research the feasibility of a firefighter cadet program among area high schools. This may develop a future recruiting pool. The outcomes on such a program would have to be carefully evaluated to ensure that sufficient recruits are being developed.

Options for Future Staffing Model

Because the recruitment and retention of volunteers is expected to get more and more difficult, and because call volumes are projected to increase as demonstrated in the Calls For Service Analysis above, and because approximately 50% of calls occur during business hours, and because the Staff Survey demonstrates that very few volunteers are able to respond to calls during business hours due to the constraints of their employment, it is evident that the current staffing model of the Dayton Fire Department will need to change if they are to continue to provide excellent service to the citizens into the future.

Several options for an operational model were examined and all were evaluated based on the following assumptions. In addition, each option has an associated general cost estimate

1. The largest unfilled demand for personnel availability is during traditional business hours of 0800 – 1700.
2. Approximately 50% of calls for service occur during traditional business hours of 0800 – 1700.

3. Minnesota has a strong tradition of volunteer firefighting.
4. Dayton Fire Department struggles to reach full staffing due to recruitment and retention difficulties outside of their control.
5. The future staffing model will be a major determinant in the location and numbers of fire stations. The converse is also true that the location of number of fire stations will drive a staffing model.
6. Investments into the fire stations will be a factor, but due to the current condition of the existing stations, any of the options selected would require some combination of significant station remodel/addition and /or construction of a new station(s).
7. Call volume is anticipated to grow at approximately 3% a year if the type of responses remains consistent and growth follows the Met Council projections.
8. Any crews staffed preemptively at the station would have ancillary fire inspections duties, public education responsibilities, fire station and apparatus maintenance, and training assignments during their assigned shifts. They would not be "sitting in the station waiting for calls."

Career Department

A fully staffed model would require a minimum of 6 on duty personnel (two companies) 24 hours a day. This would require approximately 24 full-time personnel to cover a 24/7 operation with an average annual workweek of 56 hours. This is a traditional firefighter work schedule and under Fair Labor Standards Act (FLSA) a firefighter can work 53 hours per week without overtime. This model would also likely require at a minimum a full-time fire chief and fire marshal. A very rough estimate of the annual personnel cost for this model would be in the \$2.0 to \$2.5 million range, around 10x the current Fire Department budget.

Alternatively, the City could start with a single crew available 24/7, which would require 12 full-time personnel and approximately \$1.2 million on an annual basis. This would offer a financial advantage since most of the calls in the fire service are handled by a single crew. However, it would not be effective for simultaneous incidents and may not be enough for a complicated auto extrication or other calls that require more personnel to safely conduct operations, requiring mutual aid.

Since 6 personnel would still not provide the minimum number to safely fight a structure fire, a career department would still rely on mutual aid and would likely significantly increase the incidences of mutual aid provided (under the current agreements) since this would be one of the few departments in the region with a minimum career response. It may open the possibility of a contract with Otsego for fire protection.

With a single centrally located station staffed 24/7, the fire department could provide better response times to most of the community than it currently does, simply because firefighters wouldn't have to drive to the station first. However, that single station would not be able to provide the response times outlined in NFPA 1510 as discussed in the Station Location Analysis section below, so two or three stations are likely. This model would require new or significant remodels or expansions of existing facilities, including sleeping quarters for the crews, but a large training room for the volunteers would not be necessary.

Personnel Cost: \$900,000 - \$1,200,000 for twelve full-time personnel plus full-time chief at \$130,000

Combination Department

This model provides a single-company career response (12 full-time personnel) and utilizes the volunteer/paid on call members of the department to supplement the career response for simultaneous incidents and to provide safe numbers of personnel at structure fires and other incidents requiring more personnel. This may be an attractive model as Dayton grows because it reduces personnel costs compared to career departments but allows a larger effective response. There can be complications managing a Combination Department because career and volunteer staff have differing priorities. Some volunteers might feel like they don't get enough calls to make the time they spend training worthwhile. This model is frequently used during a transition between volunteer and career operational models. It is likely that one station would house both career and volunteer staff and another one or two stations would house only volunteer staff. This model would require new or significant remodels or expansions of existing facilities, including sleeping quarters for the crews.

Personnel Cost - \$1,200,000 for twelve full-time personnel plus full-time chief at \$130,000 plus current paid-on-call budget

Duty Crew

This model assigns paid-on-call personnel to take shifts during the day/week so that at least three people are at the station or stations during peak call times or during times when few personnel are available to respond from their workplace (traditional business hours). Personnel would sign up to cover the shifts they wanted and unclaimed shifts might be covered by firefighters from mutual aid partners. The personnel on duty would be paid the standard hourly rate. The challenge with this approach is finding availability from current personnel because they might need to take time off from their day jobs. This model is most successful where there is many volunteers that can spread the shifts among them. There is typically a minimum number of hours of on-duty time per month. This model would require new or significant remodels or expansions of existing facilities but sleeping quarters would not be required until duty crews are assigned to the station during overnight hours.

An alternative approach to duty crews is to hire part-time firefighters from outside the organization. Typically, these are individuals who may work as a paid-on-call or duty crew firefighter with other organizations in the area while looking for a job with a career department. By combining several duty crew positions at Cities around the region, they can develop what is effectively a full-time job. There would be some savings on existing paid on call personnel responding from their home since a single duty crew could handle most routine calls without additional staff.

A hybrid Duty Crew model would utilize existing personnel to provide evening coverage at a fire station from 7 pm until 7 a.m. either daily or on a peak potential demand basis. A crew of three would staff the crew between these hours for a flat rate plus the current compensation rate for actual responses. This model would require new or significant remodels or expansions of existing facilities.

Resident Firefighters

This is a model used by some communities to provide personnel at the station on a somewhat consistent basis. This involves personnel who live at the station as if it were their apartment and receive a monthly stipend. These individuals would have a shift as a duty crew member and be compensated at a duty crew rate. If they were able to respond during their off hours, they

would receive additional compensation per Dayton Fire pay scales. However, personnel living at a station full time requires considerably more supervision and a very structured set of policies, procedures and rules and regulations. It would require new or significant remodels or expansions of existing facilities to provide living quarters for the resident firefighters. This model is difficult to staff and does not guarantee full time coverage. This model would require new or significant remodels or expansions of existing facilities.

Personnel Cost: This is a bit difficult to cost. Full time chief: \$130K, 12 residents' yearly stipend-\$57,600

Volunteer Department (Paid-on-Call)

This is the current operational model of the Dayton Fire Department. However, it does not address the increasing volume and personnel availability issues identified in this study. This model would require new or significant remodels or expansions of existing facilities for safe operations.

Personnel Cost- Status quo plus yearly increase.

Regional Department, whether Combination or Career

This would require the creation of a Joint Powers agreement or a Fire District. However, in general current Minnesota law limits the creation of fire districts. There is a pending legislation supported by the Minnesota Fire Chiefs Association (MNFCA) but the status is unclear at this time. There would be economies of scale in a larger regional force in a labor-intensive job, even with state legislative authority this would entail a great deal start up time. This model would require new or significant remodels or expansions of existing facilities.

Merger through a Joint Powers Agreement (JPA)

Currently, state law limits the development of fire districts. (A fire district is a geographical area with taxing authority to provide fire protection) However, some cities have effectively merged their fire department through a JPA. A local example of this is the JPA developed between Anoka and Champlin. This option would require one or both existing facilities to be utilized and necessitate either a new station(s) or significant remodels or expansions of existing facilities.

Personnel Cost – Typically, Joint Powers Agreements (JPA) would share total costs of the operation under a formula with personnel being part of the cost basis. These formulas can be based on call volume and incorporate facility cost, level of service, capital costs etc.

Contract for Service with another Community

This option is very straight forward but would require a great deal of time to implement. It would involve the development and implementation of a contract for fire protection with a neighboring jurisdiction. A local example of this is the City of Otsego which, in lieu of their own fire department, contracts with several jurisdictions to provide fire protection. This model would require new or significant remodels or expansions of existing facilities.

Personnel Cost – A contract for service would typically not have a identified personnel cost. The best contract for services utilized a performance based contract that is all inclusive. The use of any facilities, use of current apparatus, etc. would also be incorporated in a contract. Generally, speaking, the cost is based on the level of service desired and negotiated.

Recommendations

1. Retain the \$11/hour pay rate for POC firefighters but institute a system where the pay would increase in steps based on experience, performance evaluations and certifications.
2. Change the vesting requirement to ten (10) years for new volunteer firefighters.
3. Hire a full-time fire chief. This will provide leadership and direction for any future staffing models, analyze funding alternatives, and provide a higher level of public education and visibility in the community. The new chief would respond to calls as well as provide administrative direction to the department. Comparable communities that recently moved in this direction are Albertville MN and Zimmerman, MN

Data from the 2017 U.S. Fire Department Profile study shows that, between 5,000 and 10,000 population, about half of “volunteer” departments nationwide have hired at least a full-time Fire Chief.

Population Protected	All Career	Mostly Career	Mostly Volunteer	All Volunteer
1,000,000 or more	67%	33%	0%	0%
500,000 - 999,999	81%	14%	5%	0%
250,000 - 499,999	73%	23%	0%	3%
100,000 - 249,999	92%	7%	1%	0%
50,000 - 99,999	74%	18%	8%	1%
25,000 - 49,999	51%	24%	21%	4%
10,000 - 24,999	22%	30%	33%	15%
5,000 - 9,999	9%	10%	40%	41%
2,500 - 4,999	2%	4%	23%	72%
Under 2,500	1%	1%	7%	91%

4. Develop and implement a duty crew model to provide coverage during the traditional business hours and other difficult response times as identified. Concurrently, develop dispatch protocols that would only dispatch the duty crew for routine calls.
5. Research the feasibility of incentives such as a small property tax credit for individuals to serve as a volunteer. Research the feasibility of extending a small property tax incentive to businesses who employ firefighters and make them available for emergency response.
6. Renew the focus on recruiting by examining the feasibility of using cadet programs, job fairs and internet options.

Future Considerations

1. Under the direction of the Fire Chief, consider other ancillary duties and revenue options for the fire department in the fire code, standard property insurance provisions, and ordinance changes.
2. Move towards a full-time fire marshal for code enforcement, emergency response, and revenue generation (plan review fees).
3. Initiate a more robust no-boundary Automatic Aid agreement with surrounding departments to provide the best possible response times for all calls. This concept involves sending the closest units regardless of jurisdiction. However, it would require agreements

between all entities involved, coordination and standardization of operating practices, and significant work with the 9-1-1 fire dispatch system.

Facility Condition Assessments

The purpose of this section of the Study is to document the condition of the current Fire Stations. This information provides the necessary data to enable the Department to make informed decisions regarding how to best address any repairs, upgrades and/or replacements. There are two components to the Assessment:

An on-site *Physical Condition Assessment* of the building was performed to determine maintenance issues, safety and code concerns, building systems and finishes that have exceeded their useful life, and to review how current conditions affect building system operations and energy costs.

A *Functional Assessment* was performed through visual observations and discussions with key staff. It determined how existing building conditions are affecting staff operations and the ability to serve the community. The Functional Assessment also examined how present operations and workflows compare to current recommended best practices in the industry.

The assessments are intended to provide an indication of the capital maintenance requirements, potential code and regulatory required upgrades, and other building conditions which should be considered as part of the facility's general upkeep as well as part of any building project. This study does not address areas of the building that are concealed behind walls or locked doors.

A building element or system listed as being in "good" condition should be interpreted to mean that it is in the first part of its anticipated useful life or that it is aging but has been maintained exceptionally well such that its useful life is extended beyond normal expectations. With the exception of motor-driven equipment and finishes exposed to hard wear, "good" systems and elements are not expected to need replacement for 15 or more years.

A building element or system listed as being in "average" condition should be interpreted to mean that it is in the middle part of its anticipated useful life. "Average" systems and elements are not expected to need replacement within the next 15 years.

A building element or system listed as being in "poor" condition should be interpreted to mean that it is in the last part of its anticipated useful life and that the need for replacement is imminent.

The facility assessments were conducted on April 3, 2019 by the following individuals:

- Craig Carter, AIA
Associate Partner, BKV Group
- Chad Kurdi, PE
Partner, BKV Group
- Alex Hoffman, EIT
BKV Group

A Note on Facility Assessments for Fire Stations:

Firefighters are at significantly higher risk than the general population to develop cancer (21% higher colon cancer risk, 32% higher brain cancer risk, 39% higher skin cancer risk, 102% higher testicular cancer risk, etc.). This risk is a direct result of their firefighting activities – they are frequently exposed to highly toxic and carcinogenic compounds at the fireground (arsenic, benzene, acrylonitrile, polycyclic aromatic hydrocarbons, etc.), and they bring those compounds back to the fire station on every hose, ladder, fire truck, and piece of personal protective equipment that was anywhere near the fire. In addition, operating diesel fire trucks inside the fire station every day for years has resulted in massive amounts of diesel particulates permeating the apparatus bay (one large study showed a typical apparatus bay has concentrations 16 times above EPA Standards). Both the fireground toxins and the diesel particulates are so small that they hang suspended in the air for long periods of time, so the risk does not go away between calls but rather is consistent every time the apparatus bay is entered. Apparatus Bays are not a safe place to work, not a safe place to store equipment and supplies (especially absorptive materials like paper products), and not a safe place to walk through to gain access to adjoining spaces. Any adjoining space that is not properly protected through air pressure differentials and air locks also becomes contaminated. The increased risk of cancer becomes a major factor in evaluating the functionality of a fire station, and it will be covered in detail.

Station #1 is in generally good physical condition except for the restrooms, which are in the process of being renovated. There are many accessibility concerns due to the age of the facility and many functional concerns due to lack of necessary space. Most importantly, there are significant health/safety concerns due to a lack of separation between clean areas and contaminated areas. For the list of Physical and Functional issues identified, see Appendix A.

Station #2 is in generally good physical condition. There are many accessibility concerns due to the age of the facility and many functional concerns due to lack of necessary space. Most importantly, there are significant health/safety concerns due to a lack of separation between clean areas and contaminated areas. For the list of Physical and Functional issues identified, see Appendix B.

Capital Improvement Estimates

Using conceptual estimating techniques, BKV Group estimated the construction cost for each issue or set of issues identified in the Facility Assessments, breaking them into Urgent, Short Term Medium Term, and Long Term recommendations. This estimate does not resolve all of the issues identified in the Assessment, especially those that would require major renovation or building additions. More information on those can be found in the Master Planning section of the report.

Urgent	recommend completion within one year
Short Term	recommend completion in one to five years
Medium Term	recommend completion in five to ten years
Long Term	recommend completion in more than ten years in the future

The preliminary capital improvement estimates represent BKV Group's judgment as a design professional and are intended to allow for order-of-magnitude planning of capital expenditures. Actual costs should be expected to vary from these numbers based upon the exact solution chosen to address each issue; the availability of labor, materials, or equipment; the Contractor's methods of determining bid prices; and the competitive bidding, market, or negotiating conditions. The estimates should be confirmed at the time of planned implementation.

We estimate that Fire Station #1 requires \$785,800 worth of repairs over the next 10 years. We estimate that Fire Station #2 requires \$854,000 worth of repairs over the next 10 years.

These estimates are based on construction costs in July 2019. Construction costs increase significantly over time and are especially sensitive to changes in the economy. Reports suggest construction escalation could be as high as 8% per year, compounded, at the time of writing. This escalation should be factored into any capital planning.

More information on the costs of each proposed repair can be found in Appendices A and B. An excel file that can be used to balance the cost of repairs over time has been provided to the City Manager and the Fire Chief.

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Station Location Assessment

BKV Group used GIS mapping software to plot expected travel times for current and potential fire station locations. This process communicates to citizens the status quo with regards to expected response time to their home and reveals any existing coverage gaps. It can also help to provide City Administration with information about achievable response times under various Station location scenarios. The Station Location options presented in this section of the report will be revisited in the Master Planning section, where they will be evaluated with regards to cost and level-of-service.

While GIS mapping is the most accurate method of mapping response times ever created, it is still a crude tool. The maps generated by this process cannot account for weather impacts, traffic, new intersections, the difference in speeds used by different apparatus operators, etc. so should not be viewed as a precise predictor of future performance. With this comes some latitude with regards to selecting locations. Slight adjustments to find a more cost-effective site will not result in perceptible impacts to response times.

It is important to recognize that the maps generated by this process do not account for the time it takes for volunteers to travel to the station from home or from work, nor can it account for the time it takes firefighters to put on PPE, start the apparatus, and open the garage doors. It only provides an indication of the expected duration between pulling out of the station and arriving on-scene under ordinary driving conditions.

A Note on Response Times for Fire Departments:

The term “response time” is used frequently in the fire service because it ties closely to customer outcomes. As the customer perceives it, Total Response Time is the interval between when they make contact with 9-1-1 and when the emergency vehicles arrive on scene. Within public safety circle, this is measured in three categories. Call Processing Time is measured from when a telecommunicator at the Public Safety Answering Point answers the telephone call (or responds to a text message) through when an alarm is issued to the responding units. Turnout Time is measured from when the alarm sounds at the station, over the radio, or on a pager and when the individual apparatus report that they are leaving the station. It includes getting into the PPE and assembling the responding crew in the apparatus. For volunteers, it also includes grabbing the keys to their personal vehicle, getting to their car, safely driving to the station, parking, and walking to the station door. The third component, Travel Time, is measured from when the apparatus driver reports that they are en route until they arrive at the scene of the emergency.

Response time is critical for many types of calls. Research shows that a using an Automatic External Defibrillator on a person under cardiac arrest within 6 minutes improves their chance of recovery from 6% to 74%. After six minutes without expertly performed CPR, tissue death in the brain will start to occur. Thus, providing CPR and defibrillation is a critical function of the fire department in medical emergencies. Transport to the hospital and advanced life support (medication, IV, intubation, etc.) is important but has less impact on outcomes and therefore is not expected to arrive as quickly. In Dayton, it can take twenty minutes for an ambulance to arrive.

For a working fire, studies show that a flashover event can occur within 3 to 5 minutes due to the high combustibility of modern furnishings. Flashover is the sudden combustion of smoke, gasses, and particulates that occurs when the temperature of a space reaches a critical threshold. However, if firefighters can vent the heat or use a hose stream to cool the fire before flashover occurs, there is a good chance of saving the house.

NFPA 1720 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments gives fire departments guidance on many aspects of running a volunteer organization. The standard contains Table 4.3.2 (adapted below) which provides a standard for response time to a low-hazard structure fire, such as a two-story single-family home without a basement.

Demand Zone	Demographics	Minimum Staff to Respond	Total Response Time (minutes)*	Meets Objective
Urban area	>1,000 people/sq. mi.	15	9	90%
Suburban area	500-1,000 people/sq. mi.	10	10	80%
Rural area	<500 people/sq. mi.	6	14	80%
Remote area	Travel distance >8 mi.	4	Directly dependent on travel distance	90%
Special risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90%

* Response time for the purposes of this table begins upon completion of the dispatch notification

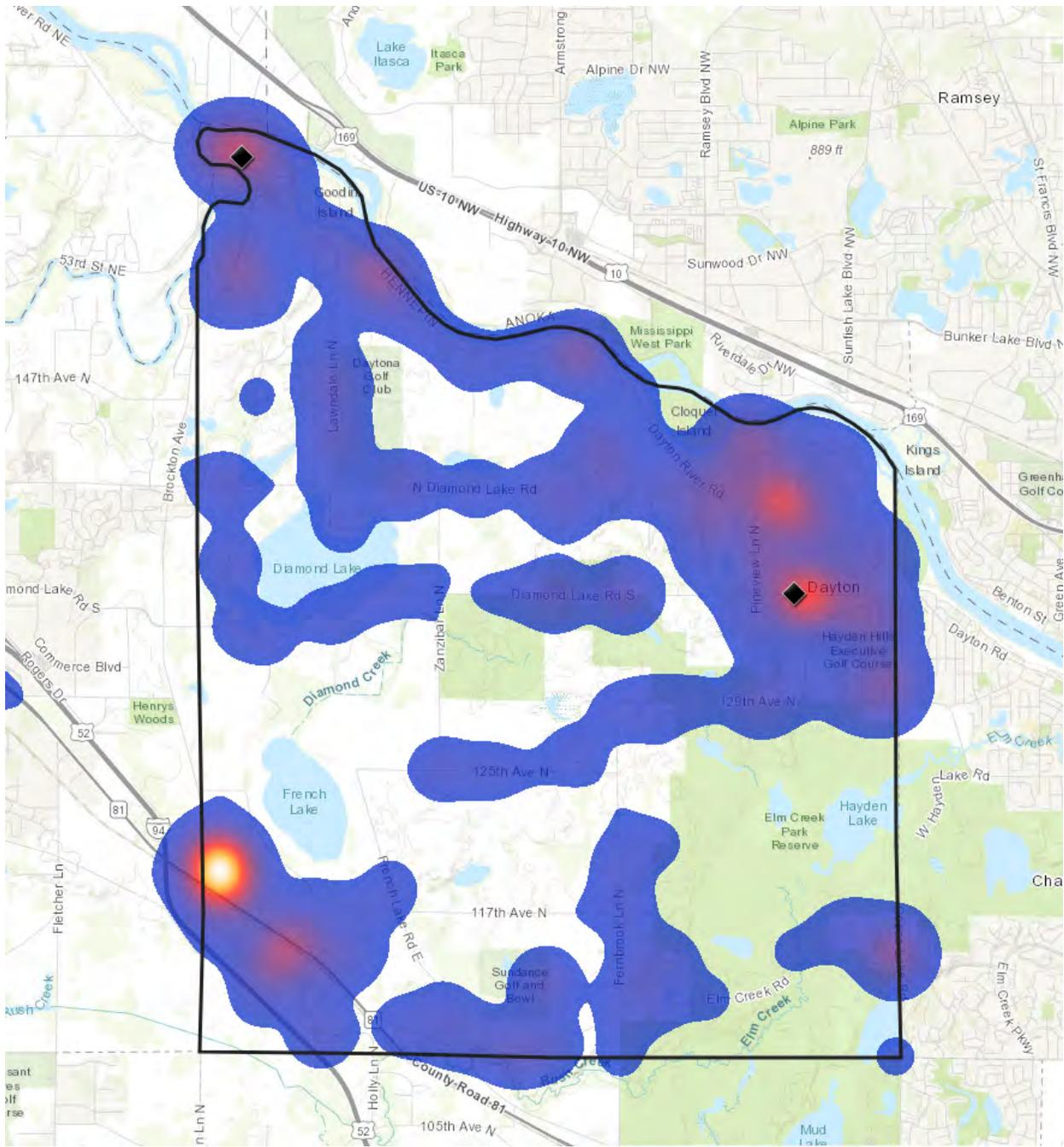
The northeast and northwest corners of Dayton reach the Suburban threshold, while the bulk of the City falls into the Rural category. With currently planned development, there will be many portions of the City that fall into the Urban area category. As a point of comparison, the northwest portion of Champlin reaches densities of more than 3,000 people/ sq. mi.

Chapter 4 of NFPA 1710 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments calls for the Total Response Time of the first-due company to be less than 6:24 at least 90% of the time and a second-due company to be less than 8:24 at least 90% of the time. Additional time for call processing is allowed for certain types of calls.

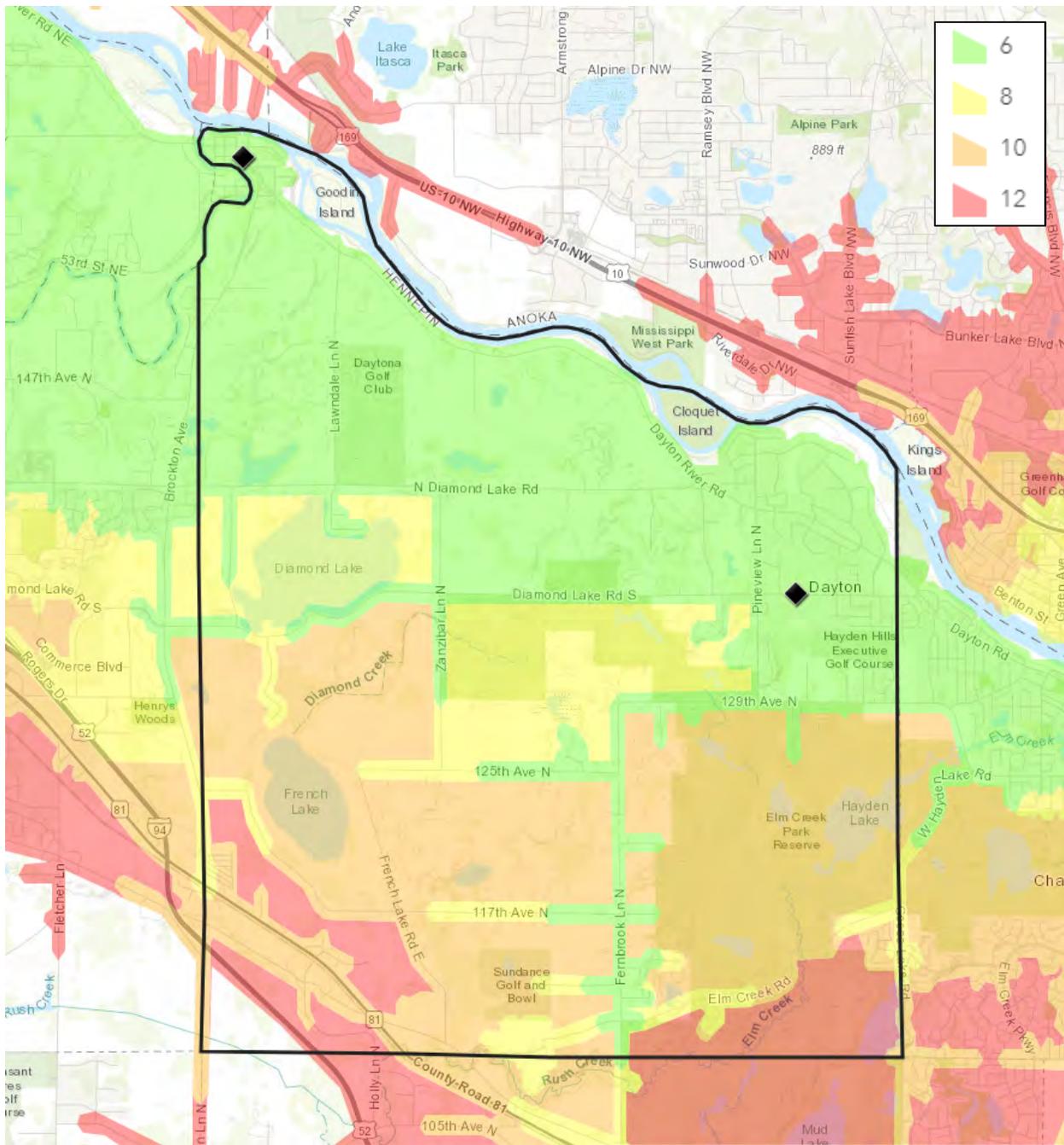
There is no NFPA standard that addresses goals for combination departments, but it is also important to recognize that the response times shown in NFPA 1720 and NFPA 1710 are not mandated by law and that each municipality must create response time goals that balance the citizens' expectations for service and their ability to fund that service. Many suburban municipalities with staffed fire stations have Travel Time goals of 4 minutes, 5 minutes, or 6 minutes.

For the purposes of this Study, a travel time of 6 minutes is indicated in Green, 8 minutes in Yellow, 10 minutes in Orange, and 12 minutes in Red. This should not be construed to be a recommendation from BKV Group that a 6-minute travel time is the appropriate goal for the City of Dayton. It is simply that the future roadway network is not currently developed to the point where a 4-minute travel time can be effectively modeled.

There are portions of the maps that are not colored – these are large fields or park land that currently have no internal road network, so the software calculates an excessively long travel time. It can be assumed that future developments in this area will have response times only slightly longer than those of the existing roadways nearby.

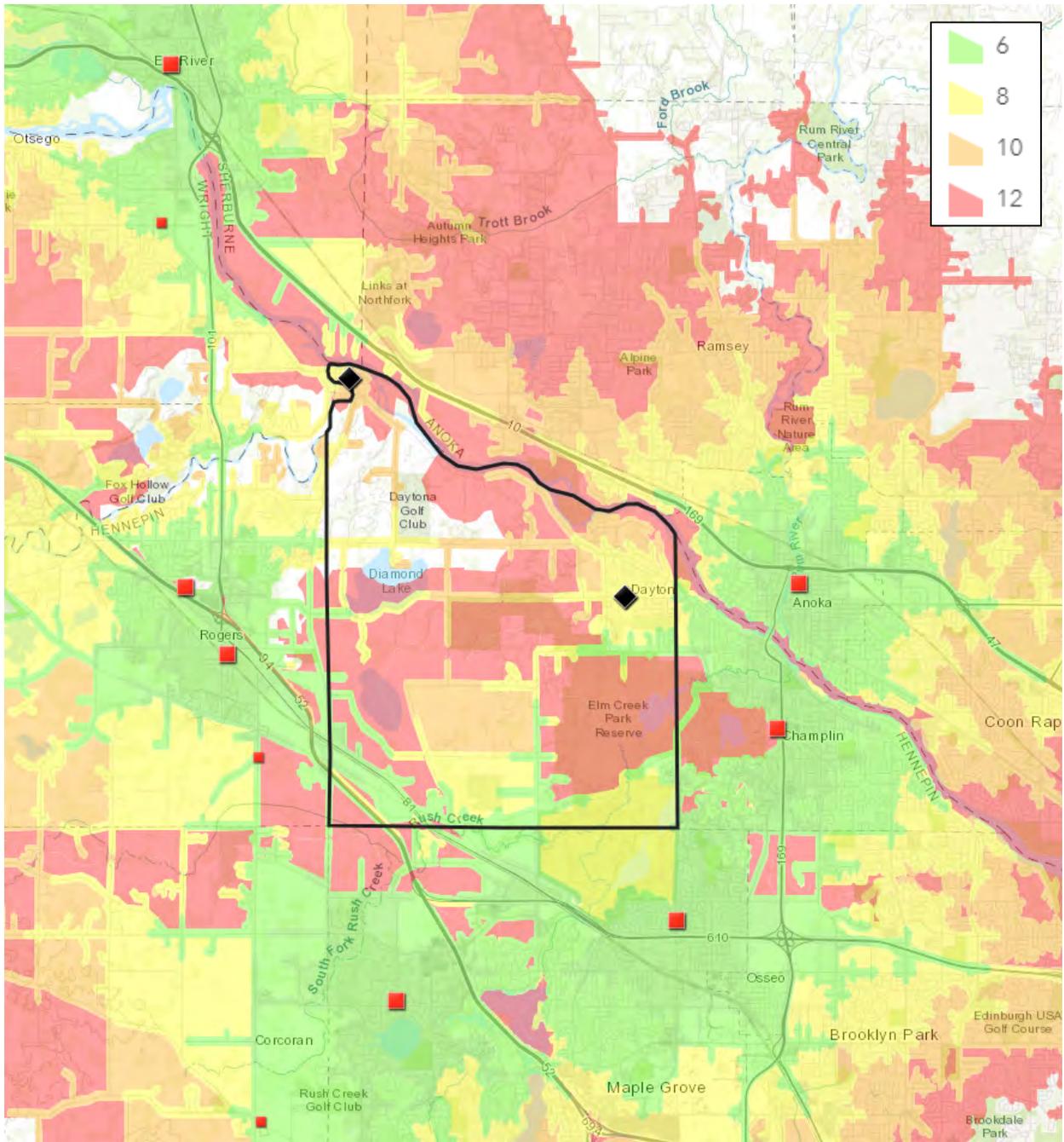


The locations of all calls for service from 2014 through 2018 were mapped to provide a visual idea of the areas of town where calls originate. As might be expected, hot spots occur around the old Town, at the northeast corner, and at the mobile home park.



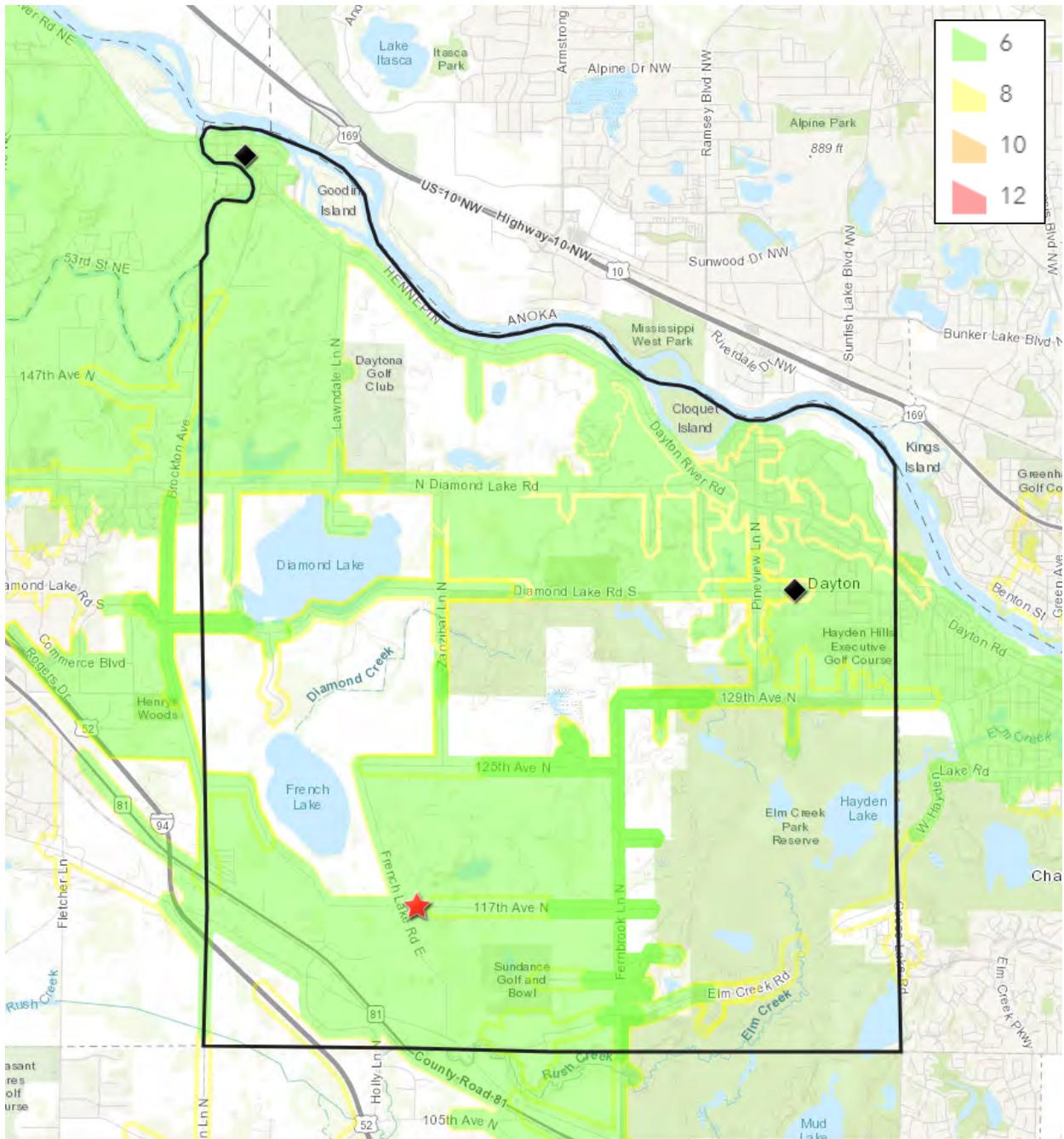
Response time from existing Fire Stations #1 and #2 is shown above. The existing stations (black diamonds) are located conveniently for the firefighters to respond from their homes and close to two of the historic hot spots. However, because the stations are located in the corners of the community, much of the zone of fastest response occurs outside the City boundary. Large areas of the southern portion of the City cannot be serviced effectively from the existing Stations. This will become a larger issue with the ongoing development of this area and the forthcoming Interstate interchange.

As a reminder, these maps indicate travel time between the Station and the incident. They do not include time spent getting to the Station or donning PPE.



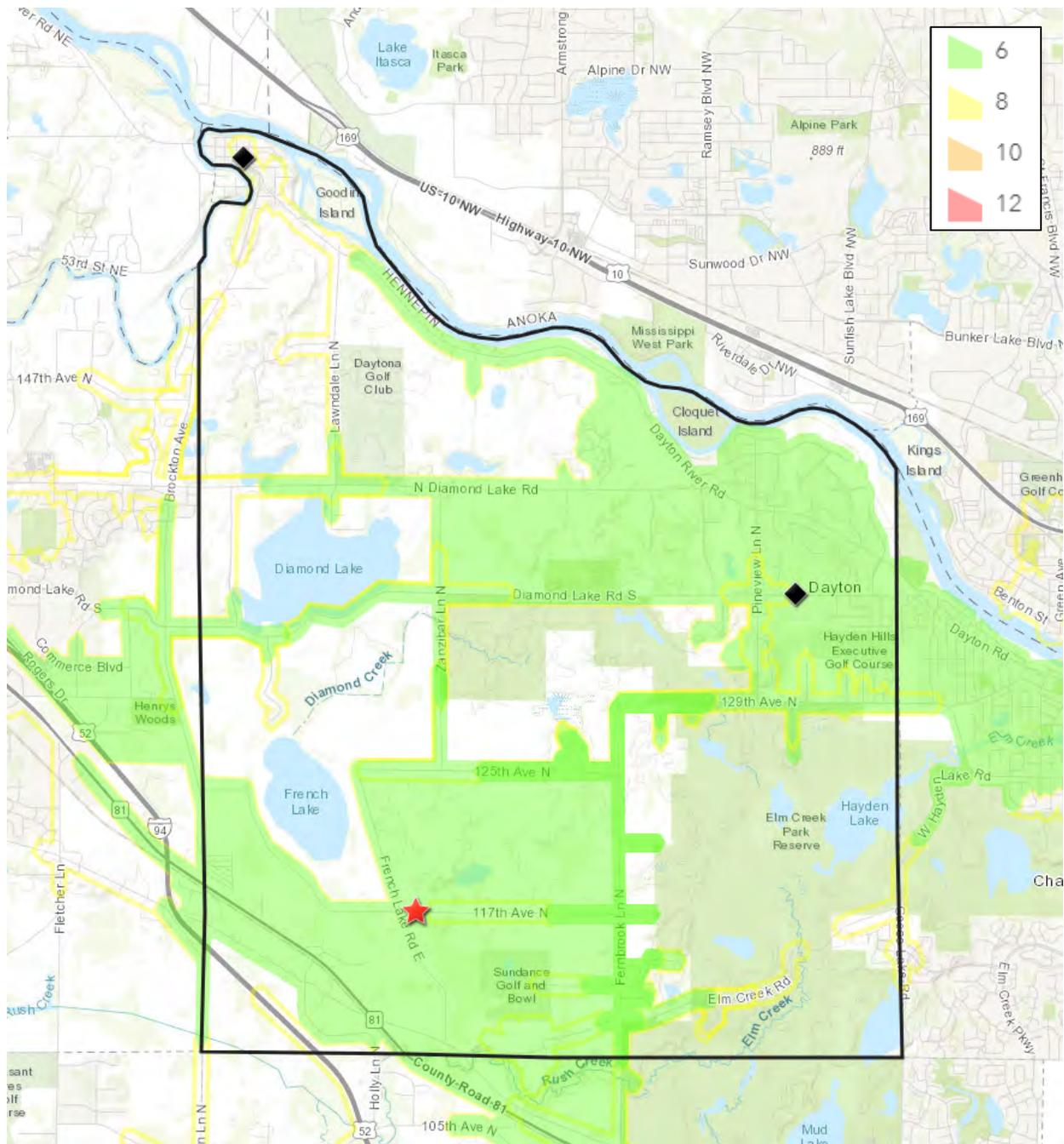
Dayton has Automatic Aid agreements with Maple Grove, Anoka-Champlin, Elk River, and Rogers (large red squares). Response times from those Departments are shown below. In the southernmost portion of the City these Departments can arrive on scene before the Dayton Fire Department can, simply due to proximity. Potential future stations in Otsego and Rogers (small red squares) will improve automatic aid response times further.

However, automatic aid is only dispatched when a 9-1-1 caller reports a fire and reports that they see smoke. Any other type of call, regardless of urgency, is handled by Dayton Fire alone. Therefore, Automatic Aid agreements are only a portion of the puzzle when considering response times.

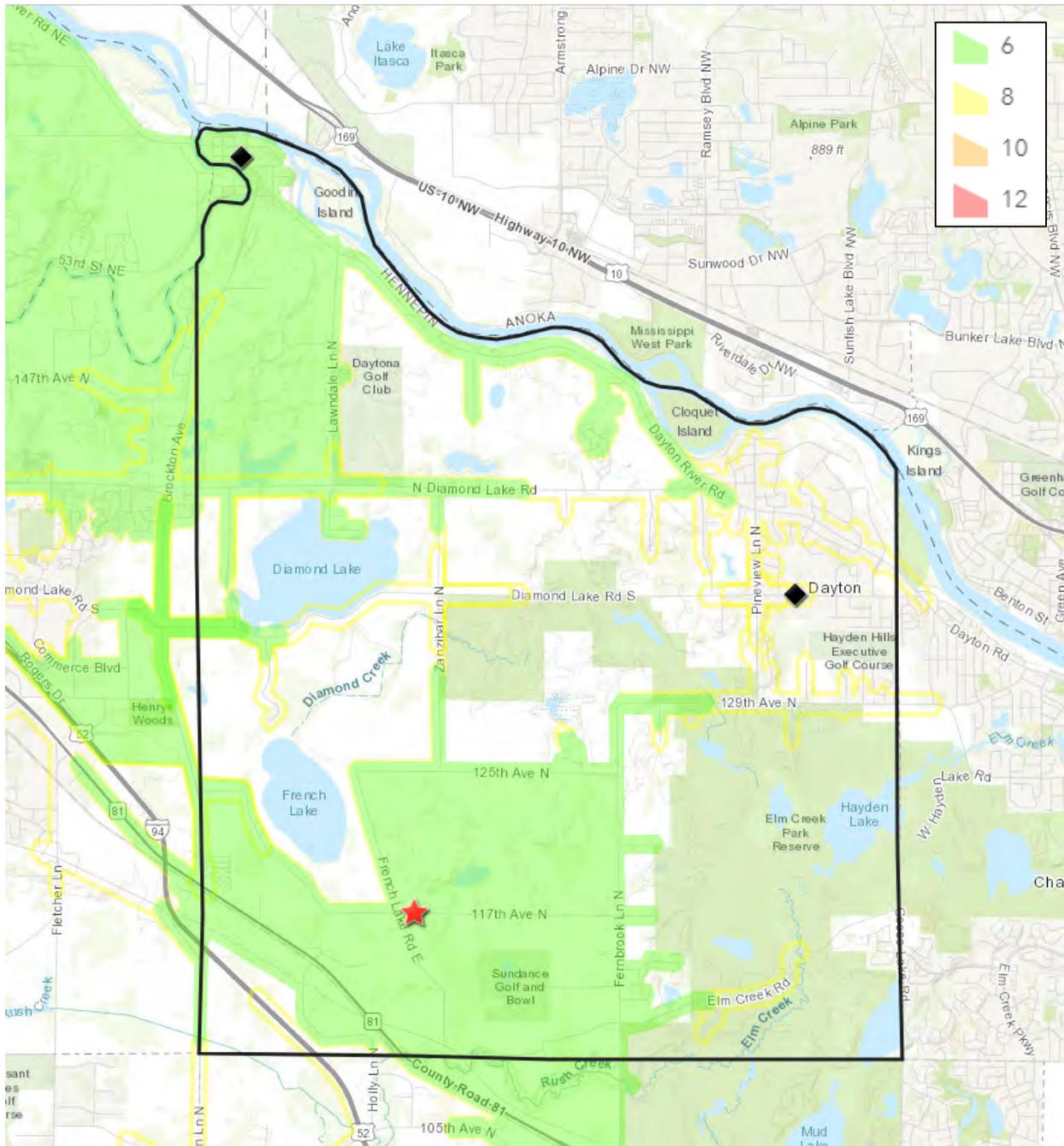


As development occurs in the southern portion of Dayton, a South Station becomes more critical. Because response times will be optimized if a new station is located near an intersection of a major north-south roadway and a major east-west roadway, and because the precise location of that intersection has not yet been determined, a precise recommendation cannot be made. We have instead projected response times from the closest current intersection (red star). Once additional information is available, the City should evaluate several sites for a new station to compare property costs, development costs, response time, etc.

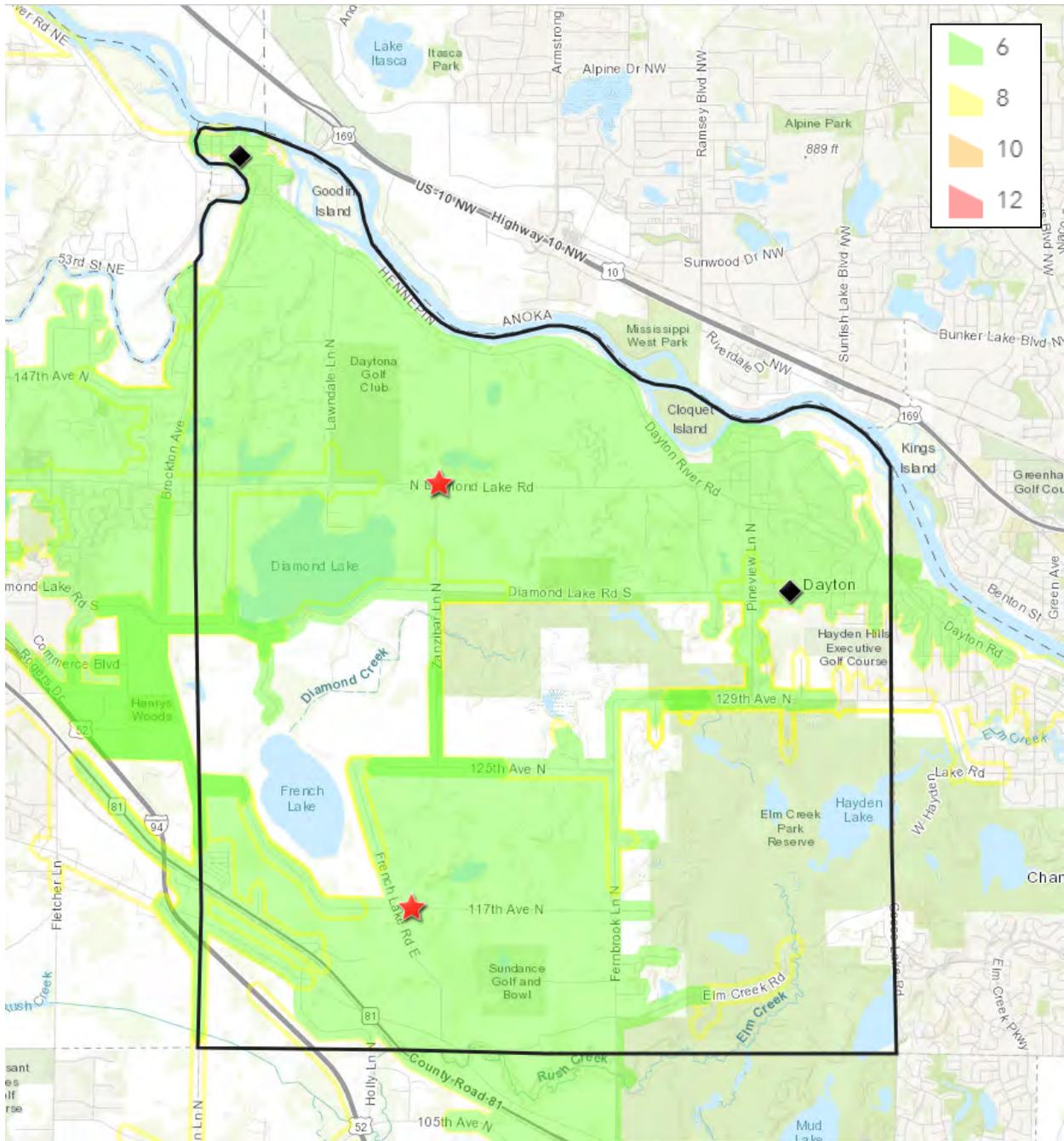
A south station should bring the entire community within a 6-minute Travel Time except for the Nature's Crossing subdivision, which will see improvement but not to the 6-minute threshold. The City might investigate an agreement with Anoka Champlin to help protect this subdivision.



As demonstrated in the map above, if the Fire Department closes Station #1 and operates out of Station #2 and a new South Station, the Travel Time to the northwest portion of the community will be in the 7.5-minute to 9-minute range, which is likely unacceptable to the citizens living in that area.



As demonstrated in the map above, if the Fire Department closes Station #2 and operates out of Station #1 and a new South Station, the Travel Time to the northeast portion of the community will be in the 8-minute to 10-minute range, which is likely unacceptable to the citizens living in that area.



If the City elects to move forward with a two-station model, the existing stations will cease operations in favor of a new facility located in the north central part of town. The location of this station should take advantage of an intersection of a major north-south roadway and a major east-west roadway, and it should provide appropriate coverage to the areas of town where the existing fire stations will be removed. River Road is a little too far north to effectively cover the middle of town and South Diamond Lake Road is a little too far south to get units to the northwest corner of Dayton in a timely manner, so a location near the intersection of Zanzibar and North Diamond Lake is optimal. Between the South Station and a new North Station, as roadways are improved, the entire community would be within a 6-minute Travel Time except Nature's Crossing, as previously discussed.

Space Needs Assessment

BKV Group assessed the Fire Department's space requirements based on national standards, interviews with the department leadership, current staffing levels, and demographic information. Two types of stations were programmed – a headquarters station with space for a large training room and administrative staff, and a satellite station which does not have those spaces. There may be multiple satellite stations, but only one headquarters station will be necessary.

Each section of the proposed work is programmed at the level of individual rooms or spaces. The areas identified for each are based on solid experience and familiarity of these types of facilities by the planning team, as well as data collected from Department staff. Consolidating this information, BKV Group developed a draft space needs matrix and reviewed, developed and refined the information with the project team.

The programming effort considers the current space allocation for each function, the number of firefighters, number of workstations and offices necessary, and current support spaces provided and projects these needs forward into the future. Once the program information is reviewed and confirmed with the team, this then forms the basis of the Master Planning Concepts and should be the basis of further exploration in Concept and Schematic Design phases.

A Note on the Validity of Long-term Space Needs Projections:

The development of the program is based on planning for a 20-year projected need. Although government buildings are commonly built to the quality of a 50- or 100-year life span, it is not financially feasible, nor reliable to construct spaces that may or may not be needed within that extended time frame. A community's population might vary 10% from projections within 20 years but could vary 50% from projections after 50 years. Rather, the building should be designed to easily accommodate renovation and expansion. A forecast of 20 years is the practical limit of reasonably accurate projections. It is important to note however, that as time passes, particularly if funding for a project is not immediately available, the original program should be updated upon project commencement to incorporate changing growth patterns.

Each space required for the department is listed in the matrix along with the area required for those spaces. The number of such spaces expected to be needed is shown, then the net area is calculated by multiplying the size of the room by the number of such rooms. These are tallied at the bottom of the page into a Total Net Square Footage. This Net Square Footage does not factor in the area occupied by wall thicknesses, columns, plumbing and mechanical shafts, corridors, etc. that cannot be precisely identified at this early phase of the project. To account for these other functions, architects use a "Circulation Factor" (typically 15% to 20%) and an "Envelope Factor" (typically 12% - 15%) that is added to the Net Square Footage to arrive at a Total Proposed Square Footage. Generally speaking, buildings that require greater circulation, wide public waiting areas or large public interface functions require larger efficiency factors.

	Headquarters			Satellite			
	count	unit area (sf)	net total (sf)	count	unit area (sf)	net total (sf)	
Public Areas							
Vestibule	1	80	80	2	80	160	
Lobby/ Waiting Room	1	200	200			0	
Public Restrooms	2	135	270				2 fixtures, 1 lav
Single User Restroom				1	56	56	
Training Room	1	1,520	1,520			0	seats 60 at tables
Training Room Storage	1	150	150			0	
<i>subtotal, Public Areas</i>			2,220			216	
Administration Areas							
Chief's Office	1	180	180			0	
Assistant Chief's Office	1	140	140			0	
Training Office	1	140	140			0	
Fire Prevention Office	1	140	140			0	
Conference Room	1	240	240			0	12-person table
Workstation	2	64	128			0	
Copy Room	1	108	108			0	
Kitchenette						0	use station kitchen
Admin Restrooms						0	use FF restrooms
Quartermaster Storage	1	300	300			0	spare uniforms, PPE, etc.
Storage Room	1	120	120			0	
<i>subtotal, Admin. Areas</i>			1,496			0	
Firefighter Areas							
Captain's Office	1	120	120	1	120	120	
Station Office/ Radio Room	1	140	140	1	140	140	
Shared Locker Room	24	10	240	24	10	240	
Single User Shower Rooms	3	85	255	3	85	255	
Bunk Room	3	80	240	3	80	240	severe weather spaces
Janitor/Laundry	1	120	120	1	120	120	
Kitchen	1	144	144	1	144	144	
Kitchen Table	1	144	144	1	144	144	seats six
Dayroom	1	400	400	1	400	400	debriefing, team building
Physical Conditioning Room	1	600	600	1	600	600	
<i>subtotal, FF Areas</i>			2,403			2,403	

	Headquarters			Satellite			
	count	unit area (sf)	net total (sf)	count	unit area (sf)	net total (sf)	
Apparatus Bays							
Apparatus Bays	4	1,620	6,480	3	1,620	4,860	18'x90'
<i>subtotal, Apparatus Bays</i>			6,480			4,860	
Apparatus Bay Support Areas							
Decon Vestibules	2	80	160	2	80	160	size for volunteer response
Turnout Gear Storage	24	12	288	24	12	288	
Turnout Gear Laundry	1	100	100	1	100	100	
Equipment Decontamination	1	120	120	1	120	120	
Hose Storage	1	100	100	1	100	100	
Bay Restroom	1	64	64	1	64	64	
SCBA Compressor/ Fill	1	120	120	1	120	120	
SCBA Maintenance	1	180	180				
Medical Supply Closet	1	20	20	1	20	20	
Training Tower	1	400	400				
General Storage	1	400	400	1	400	400	
Maintenance Shop	1	150	150	1	150	150	
<i>subtotal, App. Bay Support</i>			2,102			1,522	
Building Support							
Mechanical	1	300	300	1	150	150	excludes mezzanine area
Sprinkler Riser	1	40	40	1	40	40	
Electrical	1	100	100	1	100	100	
Communications	1	100	100	1	100	100	
Mezzanine	1	1,000	1,000	1	1,000	1,000	
<i>subtotal, Building Support</i>			540			390	
Exterior Areas							
Visitor Parking	5			3			
Firefighter Parking	60			24			
Total Programmed Area (sf)			15,241	9,391			
Circulation Factor (sf)			10% 1,524	10% 939			
Envelope Factor (sf)			12% 1,829	12% 1,127			
Building Footprint (sf)			18,594	11,457			

Community Comparisons

To provide a check to make certain that the stations being considered are neither too large nor too small, BKV Group collected data on similar stations. Though we do not advise utilizing such comparisons as the only means of projecting space needs, and while a direct comparison is never truly possible as no two cities are identical, the process can identify irregularities and can confirm the projected program numbers, providing validity to the developed program.

While a police station or city hall may base size comparisons on the population of one city versus another, for fire stations the drivers of square footage are the number of apparatus bays. This corresponds closely with apparatus counts and the number of firefighters assigned to a station. Because fire departments grow by adding stations instead of adding square footage to a station, we can compare stations from communities of widely varying population as long as the number of bays is the same and the staffing model is the same (volunteer vs. career).

The stations listed below are all located in the Minneapolis-St. Paul area and have been completed relatively recently. It is difficult to find direct comparables for four-bay Headquarters stations that have been built recently because most newer headquarters stations are accommodating the transition to full time by consolidating many vehicles in one location, and they tend to be five, six, or seven bays. Therefore, we have also shown headquarters stations of three and five bays to aid comparison.

For both the Four-Bay Headquarters program and the Three-Bay Satellite program, it is evident that the proposed square footage is within a typical range for similar facilities.

Square Footage of Recently Constructed Headquarters Fire Stations with Four Apparatus Bays		
Long Lake	5 bays	17,500 sf
Eden Prairie #1	4 bays	18,200 sf
Shakopee #2	5 bays	25,000 sf
Lino Lakes	3 bays	15,014 sf
Proposed for Dayton	4 bays	18,594 sf

Square Footage of Recently Constructed Satellite Fire Stations with Three Apparatus Bays		
Maple Grove #5	3 bays	9,181 sf
Chisago	3 bays	11,725 sf
Ramsey #2	3 bays	11,850 sf
Plymouth #3	3 bays	14,845 sf
Proposed for Dayton	3 bays	11,457 sf

Master Planning Concepts

Based upon the space needs identified during programming, BKV Group examined, at a high level, five master planning options. Each has implications for capital costs, functionality in the long- and short-terms, response times, etc.

The budgets outlined for each option below represent BKV Group's judgment as a design professional and are intended to allow for order-of-magnitude planning of capital expenditures. BKV Group's database of construction cost information, plus information about recent fire station construction projects in Minnesota, show that a suburban fire station built in summer 2019 might be expected to cost between \$250 and \$300 per square foot. Actual costs should be expected to vary from these numbers based upon the level of quality; the availability of labor, materials, or equipment; the Contractor's methods of determining bid prices; and the competitive bidding, market, or negotiating conditions. Construction costs increase significantly over time and are especially sensitive to changes in the economy. Reports suggest construction escalation could be as high as 8% per year, compounded, at the time of writing. We have used \$275 per square foot as a median construction cost and a 5% annual escalation. Contingencies are shown at 12% where existing construction complicates the process and 10% for new construction. **We stress that these are order-of-magnitude estimates that should not be interpreted as recommendations for final budget goals.** Project costs should be confirmed at the time of planned implementation once other critical information has become available.

Each option indicates some expenditure for repairs to the existing buildings. These values are based upon the findings of the Condition Assessments and most of the expense should be covered by the City's annual repair/maintenance budget. However, some of the options involve reworking the existing buildings, which would eliminate the need to address some of the repairs. To compare the overall financial impact of each option, a repair number has been included in each estimate.

Options that were not explored in depth include:

- Upgrade Station 1 to meet long-term needs, replace Station 2 on a new site in the south portion of town.
- Upgrade Station 2 to meet long-term needs, replace Station 1 on a new site in the south portion of town.

These concepts were not explored in depth because the response times to the portions of the City where stations were removed would be unacceptable, as demonstrated in the Station Location Assessment section of this report.

Option Zero: Upgrade existing Stations for critical functionality but build nothing new.

The authors of this report cannot recommend a status quo option where no investments in facilities are made. The health risk to the firefighters and their families is simply too great to ask the firefighters to continue operating without decontamination facilities for equipment and personnel. At a minimum, the City should plan to invest in the existing Stations to provide minimum acceptable facilities as soon as financially feasible, which would include shower rooms, equipment decontamination space, dedicated turnout gear storage that can be safely accessed, space for lockers, and laundry space. This option still requires investment in the code issues, maintenance issues, and end-of-expected-life issues identified in the Condition Assessments to prevent the buildings from becoming unusable.

This option does not address the long response times in the south portion of the City, it does not provide enough space for all recommended apparatus, nor does it provide any accommodation for duty crews or full-time administrative staff that are recommended for covering calls during traditional business hours. Sprinkler systems were not included in these estimates.

	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
Repairs at Station 1			\$ 646,000	2020	\$ 678,300
Minimal Addition at Station 1	2,400	\$ 275	\$ 660,000	2020	\$ 693,000
Repairs at Station 2			\$ 654,000	2020	\$ 686,700
Minimal Addition at Station 2	2,400	\$ 275	\$ 660,000	2020	\$ 693,000
Contingency		12%			\$ 330,120
Total Estimated Construction Costs					\$ 3,081,120
Property Purchase					\$ 0
Property Sale					\$ 0
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 616,224
TOTAL ESTIMATED PROJECT COSTS					\$ 3,697,344

Option One: Build a South Station and use the two existing facilities as Response Garages.

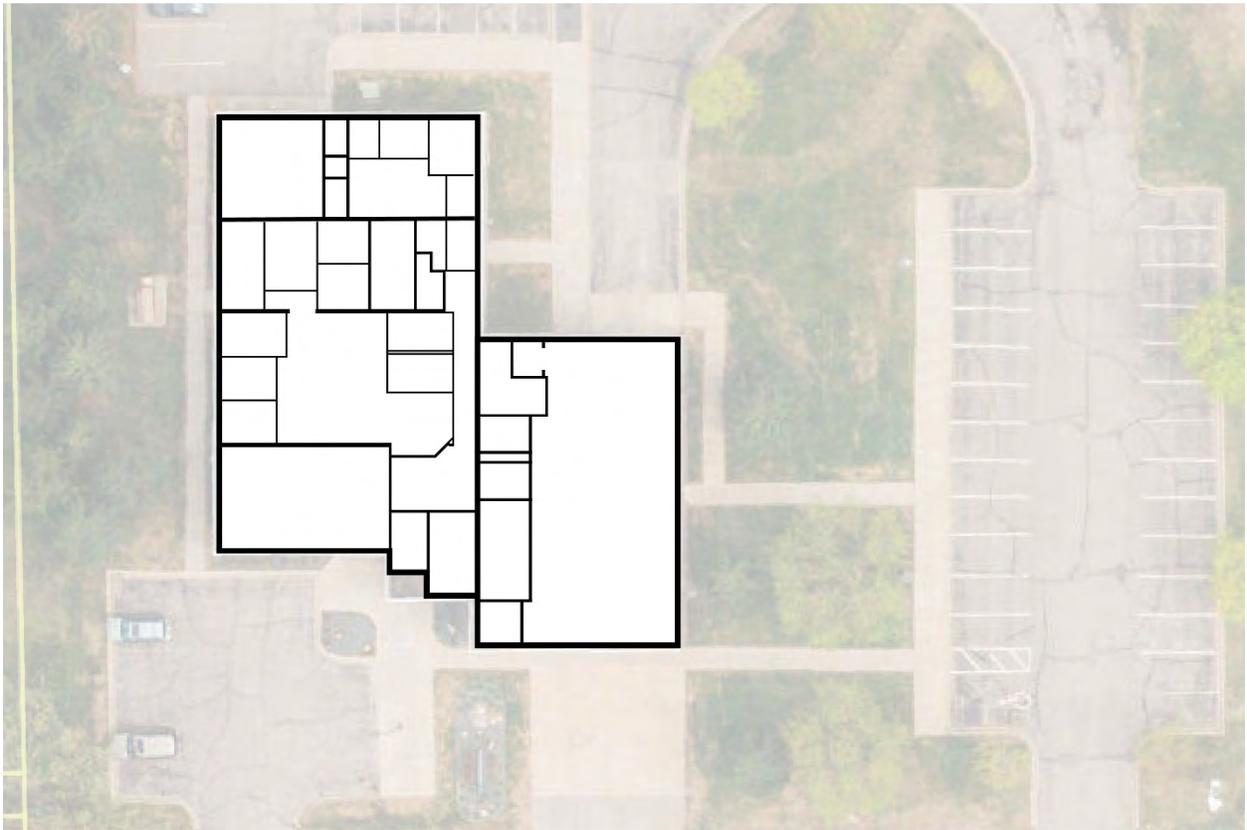
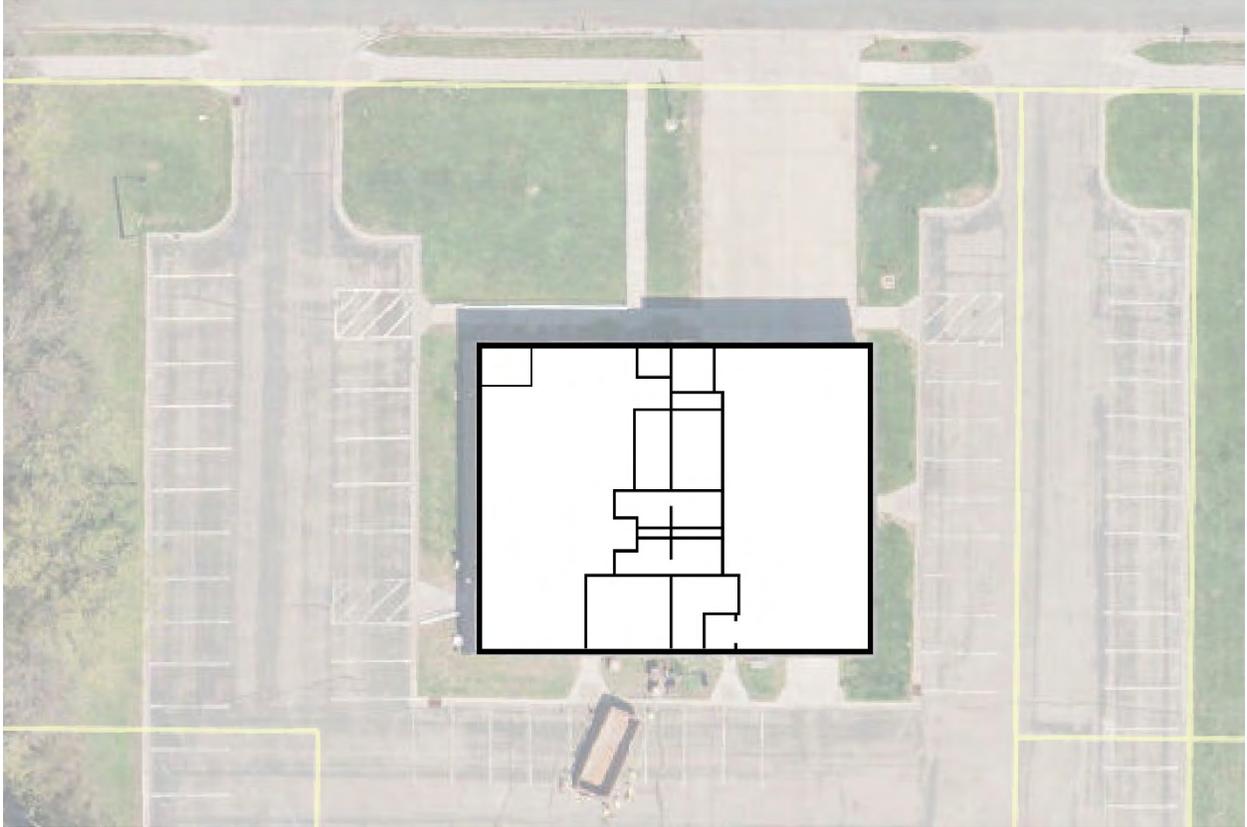
If state-of-the-art decontamination facilities are available at a new Station, they might not be needed at the existing facilities. The department could implement a policy where all staff and vehicles returning from a response first report to the new Station for equipment and personnel decontamination, and when this is complete the apparatus and PPE can be returned to the Station of origin and put back in service for the next call. The existing Stations would serve as a point of response only, and simply store the apparatus and the PPE. All other activities would occur at the new Station. Vehicles will be out of service for a longer period of time between calls and staff would be on-duty for longer after each call.

This strategy relies upon policies to protect the health of the firefighters and would create some long-term strain on the department for that reason. In addition, the existing stations could not support duty-crews so the long-term feasibility of this option is limited. However, it serves as an excellent temporary solution on the way to other options. If a 24/7 duty-crew is staged from the South Station, the response times to all portions of the City will improve compared to current metrics simply because the firefighters are already at the Station and don't have to respond from their home or place of work.

Due to the lack of decontamination facilities in the current Stations, time is of the essence to build the South Station. If this cannot be accomplished within an acceptable time frame, a "temporary" addition could be added to Station #2.

This option still requires some minor investment in the code issues, maintenance issues, and end-of-expected-life issues identified in the Condition Assessments to prevent the buildings from becoming unusable.

	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
Repairs at Station 1			\$ 322,500	2020	\$ 338,625
Repairs at Station 2			\$ 232,200	2020	\$ 243,810
New South Station	18,594	\$ 275	\$ 5,113,350	2021	\$ 5,637,468
	Contingency	10%			\$ 621,990
Total Estimated Construction Costs					\$ 6,841,894
Property Purchase	2.5 acres	\$ 60,000			\$ 150,000
Property Sale					\$ 0
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 1,368,379
TOTAL ESTIMATED PROJECT COSTS					\$ 8,360,272

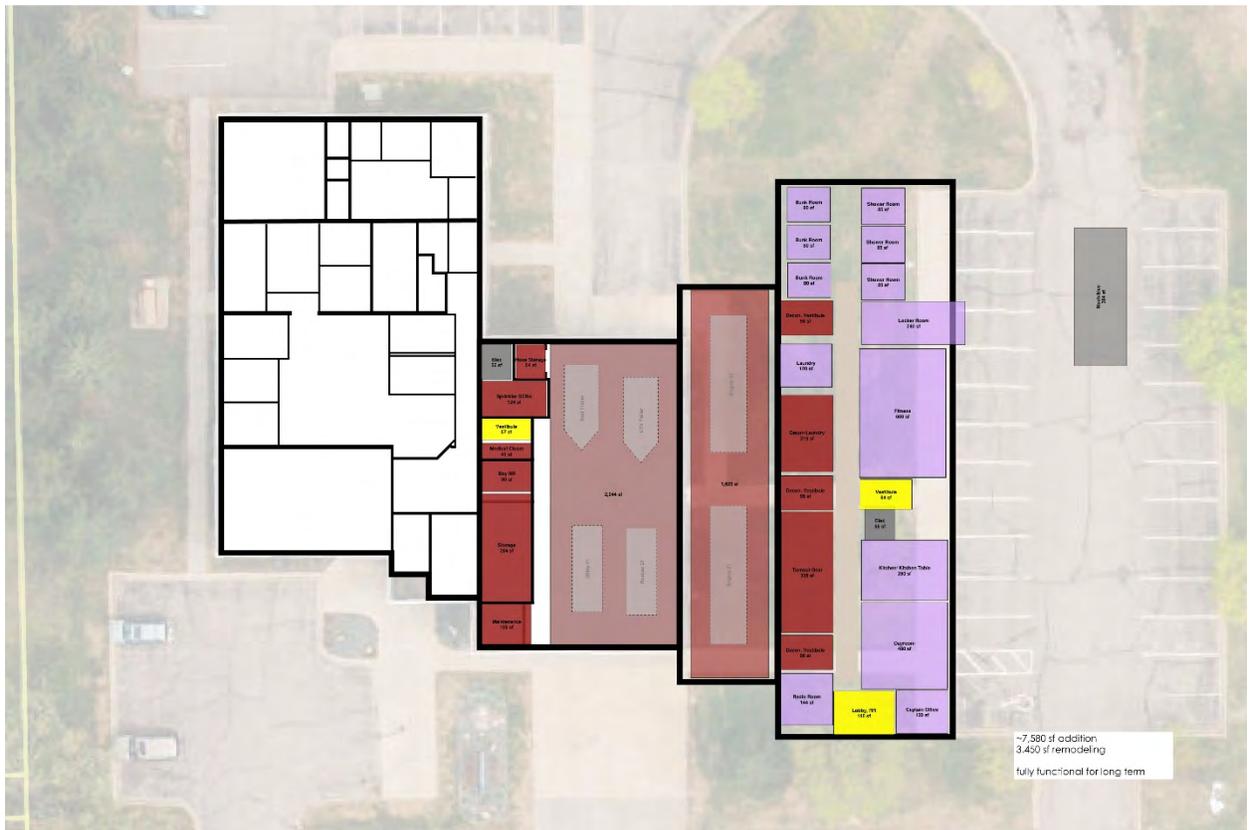
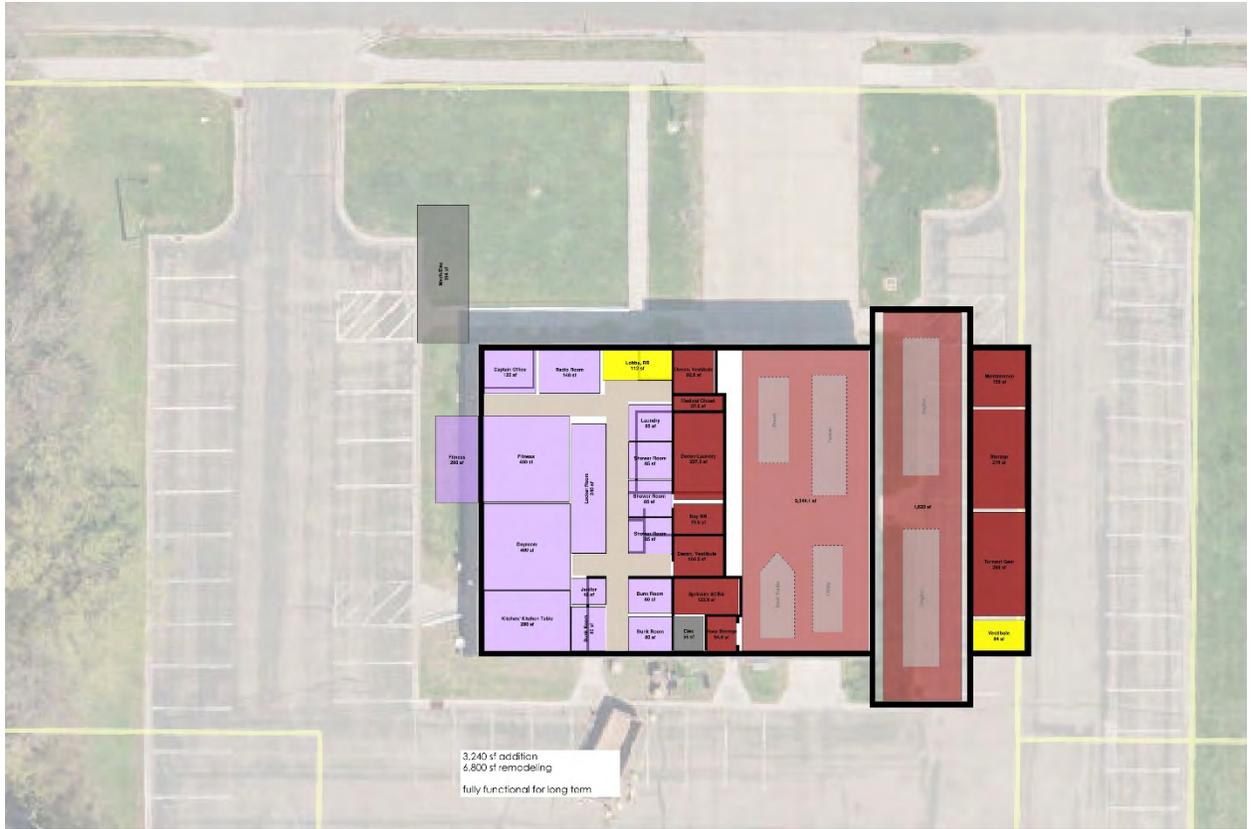


Option Two: Build a South Station and upgrade existing Stations to meet long-term needs.

The structural systems of the existing buildings are in good condition, so the current facilities can be expanded and remodeled to provide state-of-the-art Fire Stations. Because the current locations are at the north end of town, a South Station would be required to provide acceptable response times throughout the City. One of the Stations can be utilized as a headquarters facility. The locations of the two existing stations are not optimal for response even to the north half of the City, so a 4-minute drive time would not be expected to all locations in the City. However, remodeling the two existing stations would reduce the City's required financial investment compared to three new facilities in optimal locations. In addition, the City could move forward with this plan immediately because identifying and purchasing property would not be necessary.

This option would require relocation of the Senior Center because the only feasible way to remodel Station 1 for full functionality requires that the Fire Department expands into the west half of the building. However, there are many locations that could host the Senior Center, for instance the existing City Hall (once a replacement City Hall is constructed in the City Center). Some of the code issues, maintenance issues, and end-of-expected-life issues identified in the Condition Assessments would be rendered moot by the major remodeling efforts required by this option, but sprinkler systems would need to be added to comply with building codes if the facilities will be used as stations over the long-run.

	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
Repairs at Station 1			\$ 743,400	2020	\$ 780,570
Major Remodel Station 1	6,800	\$ 90	\$ 1,190,000	2021	\$ 1,311,975
Addition at Station 1	3,240	\$ 275	\$ 891,000	2021	\$ 982,328
Relocate Senior Center	3,200	\$ 90	\$ 288,000	2020	\$ 302,400
Repairs at Station 2			\$ 749,400	2020	\$ 786,870
Minor Remodel Station 2	3,450	\$ 90	\$ 310,050	2021	\$ 342,326
Addition at Station 2 (temp HQ)	7,580	\$ 275	\$ 2,084,500	2021	\$ 2,298,161
New South Station	18,594	\$ 275	\$ 5,113,350	2031	\$ 9,182,842
Contingency		12%			\$ 1,918,497
Total Estimated Construction Costs					\$ 17,905,969
Property Purchase	2.5 acres	\$ 60,000			\$ 150,000
Property Sale					\$ 0
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 3,581,194
TOTAL ESTIMATED PROJECT COSTS					\$ 21,637,162



Option Three: Build three new Stations at optimal locations.

If City leadership anticipates a current or future desire among the citizens for drive times to be within 4 minutes 90% of the time (in compliance with NFPA 1510 guidelines), we anticipate that three new stations would be required. The first would be a South Station to improve response times in that section of Town, with the two existing Stations operating as Response Garages as discussed in Option One. When funds allow, the second Station would be a replacement for Station #1 because it is furthest from its optimal location. When Station #1 moves operations to the new facility, we recommend also relocating the Senior Center and selling the property as it likely has value for single-family or multi-family residential development, although that has not been included in the costs. Finally, Station #2 would be relocated.

This option still requires investment in the code issues, maintenance issues, and end-of-expected-life issues identified in the Condition Assessments to prevent the buildings from becoming unusable. Due to the anticipated phasing, both existing stations would require repairs to fire-specific elements as well, which means an increase in repair costs compared to Option 1.

	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
New South Station	18,594	\$ 275	\$ 5,113,350	2021	\$ 5,637,468
Repairs at Station 1			\$ 646,000	2020	\$ 678,300
Relocate Station 1	11,457	\$ 275	\$ 3,150,675	2026	\$ 4,433,316
Repairs at Station 2			\$ 654,000	2020	\$ 686,700
Relocate Station 2	11,457	\$ 275	\$ 3,150,675	2031	\$ 5,658,160
Contingency		10%			\$ 1,709,394
Total Estimated Construction Costs					\$ 18,803,339
Property Purchase	6.5 acres	\$ 60,000			\$ 390,000
Property Sale					
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 3,760,668
TOTAL ESTIMATED PROJECT COSTS					\$ 22,954,006

Option 4: Build two new Stations.

With two Fire Stations optimally located, the Fire Department can likely respond to the entire City within a 6-minute drive time. This will depend largely upon the street network developed in new neighborhoods – a grid network will result in lower response times than curving streets with cul-de-sacs, but Fire Department response times are hardly the only factor under consideration when designing the street layout. If City leadership anticipates that this level of response will be acceptable to the citizens for the next 40-50 years, it makes sense to pursue a two-station model. This will be less expensive to operate over the long-term and will be slightly less expensive to construct even when compared to a three-station model that renovates the existing facilities.

Quick Phasing	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
New Headquarters Station	18,594	\$ 275	\$ 5,113,350	2022	\$ 5,919,342
New Satellite Station	11,457	\$ 275	\$ 3,150,675	2021	\$ 3,473,619
Repairs at Station 1 (non-fire)			\$ 322,500	2020	\$ 338,625
Repairs at Station 2 (non-fire)			\$ 232,200	2020	\$ 243,810
Contingency		10%			\$ 997,540
Total Estimated Construction Costs					\$ 10,972,936
Property Purchase	4.5 acres	\$ 60,000			\$ 270,000
Property Sale					
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 2,194,587
TOTAL ESTIMATED PROJECT COSTS					\$ 13,437,523

Long Phasing	Area	Cost / SF	Estimated Total	Year of Work	Escalated Total
New Headquarters Station	18,594	\$ 275	\$ 5,113,350	2031	\$ 9,182,842
New Satellite Station	11,457	\$ 275	\$ 3,150,675	2021	\$ 3,473,619
Repairs at Station 1 (non-fire)			\$ 322,500	2020	\$ 338,625
Repairs at Station 2 (non-fire)			\$ 232,200	2020	\$ 243,810
Contingency		10%			\$ 1,323,890
Total Estimated Construction Costs					\$ 14,562,786
Property Purchase	4.5 acres	\$ 60,000			\$ 270,000
Property Sale					
Soft Costs (FF&E, design, testing, etc.)		20%			\$ 2,912,557
TOTAL ESTIMATED PROJECT COSTS					\$ 17,745,343

Disposition of Existing Facilities

If the Fire Department moves out of Station #1 before repairs need to be made, the City may choose to make repairs to the exterior envelope and site to prevent it from falling into disrepair, which we estimate will cost ~\$378,000. Expanding the Senior Center into the vacated space would cost another ~\$310,500. Alternately, the City could relocate the Senior Center into another building for a cost of ~\$288,000 and sell the Station #1 parcel, which we estimate may bring \$126,000 into City coffers.

If the Fire Department moves out of Station #2, the obvious candidates to claim the vacant space are City Hall or the Senior Center.

The 2009 Facility Needs Assessment Study recommended a new City Hall be constructed in 2025. If that remains in the City's plans, Station #2 may become empty. The safe and effective flow from firefighter parking areas into the apparatus bays means that renovating the City Hall side of the building for fire department use is impractical, at least as long as paid-on-call staff remain on the Department. Since the authors do not expect a move to a fully career department within the planning window, the practicality of renovating the City Hall for Fire use was not explored.

Recommendations

1. Due to the flexibility it represents for the City, we recommend pursuing Option 1. This is not a long-term solution, but it will provide some time to allow the City to evaluate Options 2, 3, and 4 in the light of long-term Department goals and the final layout of transportation infrastructure.
2. City Council should begin the process of discussing expectations for response times overall and drive times specifically. This will help guide the City to a decision about how many stations are necessary to meet the expectations of the citizens.
3. The development of a South Station is dependent upon the City Center plan to move forward enough to determine the final layout of roadways and intersections. The City should move that process forward as quickly as feasible.
4. As developers submit preliminary subdivision plans, the City should work with them to reserve 2-acre parcels at locations throughout the City that would serve well in a two-station, three-station, and four-station model. This will provide flexibility for the long-term and the very-long-term. Land can be used as green space if it is not ultimately required for emergency response.
5. The City should implement a financial plan that allows new Fire Stations to be constructed at the earliest feasible dates to reduce the impacts of construction escalation and to improve the Department's operational safety and capabilities.

Recommendations

This report provides the data necessary to make informed decisions about the future of the Dayton Fire Department but is only the first step of the process. The following summarizes the recommendations made throughout the report, each of which require action by the City or the Fire Department.

Immediate Recommendations

Many of the recommendations can be accomplished over time, but to maintain momentum in the short term we recommend the following immediate actions:

1. Continue to push forward on the conceptualization and design of Dayton Parkway and the City Center to enable the prompt purchase of property for a south fire station.
2. Work with financial planners to understand the financial impacts of the projects over time. Adopt goals for project completion dates that will be economically feasible for the community.
3. Make this report available for the public and set up times for the public to visit the facilities and observe the conditions firsthand.

Staffing Recommendations

1. Retain the \$11/hour pay rate for POC firefighters but institute a system where the pay would increase in steps up to a maximum of \$14/hour
2. Under the direction of the Fire Chief and City leadership, consider incentives such as a small property tax credit for individuals to serve as a volunteer. In addition, a small property tax incentive or some other benefit could be extended to businesses who employ firefighters.
3. Under the direction of the Fire Chief, research the feasibility of a firefighter cadet program among area high schools.
4. Change the vesting requirement to ten (10) years for new volunteer firefighters.
5. Develop and implement a duty crew model to provide coverage during the traditional business hours and other difficult response times as identified.
6. Develop dispatch protocols that would only dispatch the duty crew for routine call
7. Hire a full time chief. This will provide leadership and direction for any future staffing models, analyze funding alternatives, and provide a higher level of public education and visibility in the community. The new chief would respond to calls as well as provide administrative direction to the department. Comparable communities that recently moved in this direction are Albertville MN and Zimmerman, MN

Fleet Recommendations

1. Replace Utility 21 with an additional engine that is consistent with the current Engine 11 and Engine 21.
2. Future apparatus should utilize the "clean cab" concept.
3. Replace the tank on Tanker 11. The chassis is in good condition with low miles and reusing the chassis will be cost effective.

4. Ensure that both rescues are consistent is layout. All future vehicles of this type should be 4-wheel drive.
5. Obtain an ATV access to incidents in forested areas of the city.
6. Develop a replacement schedule for all vehicles in the fire department fleet.
7. Consider leasing or bonding for large expenditures is cash flow concerns are important

Facility and Station Location Recommendations

This recommendation is integrated with fleet and staffing recommendations to provide optimal coverage and response time for the city.

1. Build a new south station as soon as is feasible. The demand for service in the southern part of the jurisdiction will continue to grow. Call volume will undoubtedly increase as a result of the new I-94 interchange.
2. As developers submit preliminary subdivision plans, the City should work with them to reserve 2-acre parcels at locations throughout the City that would serve well in a two-station, three-station, and four-station model. This will provide flexibility for the long-term and the very-long-term. Land can be used as green space if it is not ultimately required for emergency response.
3. Plan to build one or two new north stations.
4. Provide minimal updates to existing stations – The existing stations are not ideally located to provide response to the city. A good portion of their response time profile is located outside of the city limits. As a result, it would be prudent to make the new station the hub of the department and utilize the existing stations for housing apparatus for response purposes. The expenditure of funds on the existing stations to update them would be viable if the station locations were located appropriately. This would require operational changes where crews would return from calls to a new south station to restock, decontaminate if needed and then return the vehicle to the appropriate station.
5. Integrate a duty crew operation with the new south station- A duty crew operating out of this station during peak weekday hours will address response time and coverage issues. A duty would be capable of handling most responses without a general alarm.
6. Integrate the selection and hiring a fulltime Fire Chief – The hiring of a full time fire chief would provide management and leadership to the department. In addition, the fire chief would be a response resource during the peak weekday hours.

General Policy Recommendations

1. City Council should begin the process of discussing expectations for response times overall and drive times specifically. This will help guide the City to a decision about how many stations are necessary to meet the expectations of the citizens. This is partially about choosing to follow NFPA 1710 or 1720, which guides career and volunteer departments, respectively.
2. Develop a strategic plan with Fire Department and City Admin