

# Morrisville Fire / Rescue Department Deployment Analysis



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Town Council  
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# Traditional Model Advantages

- C.A.M. relationship
- Quint concept vs traditional
- Built environment
- Call volume
- Apparatus maintenance
- Staffing levels
- Station 22 relocation



# Community Benefits and Success

- More continuity with C.A.M. partners leading to more effective fireground operations, dispatching, and policy and procedures
- Move from Swiss Army knife approach
- Allowing for resiliency in long-range planning
- Higher level of employee pride and ownership, leading to more productive staff
- Aligning the Town with industry best practice as outlined by NFPA 1710

(NFPA – National Fire Protection Agency)



# Strategic Plan Alignment

## Town Strategic Plan

Goals	
Goal 4: Public Safety Readiness	Provide a safe and secure community through prevention, education, readiness, and response
Goal 5: Operational Excellence	Deliver exceptional service with an engaged workforce that effectively manages public assets and promotes transparency

## Fire Department Strategic Plan

(Note: Currently being updated)

Goals	
Goal 3: Apparatus Effectiveness and Sustainability	Ensure the apparatus purchased are meeting the needs of all the Town's stakeholders
Goal 4: Deployment Analysis	Deliver the needed resources and capabilities to all emergencies in our dynamic and diverse ISO district

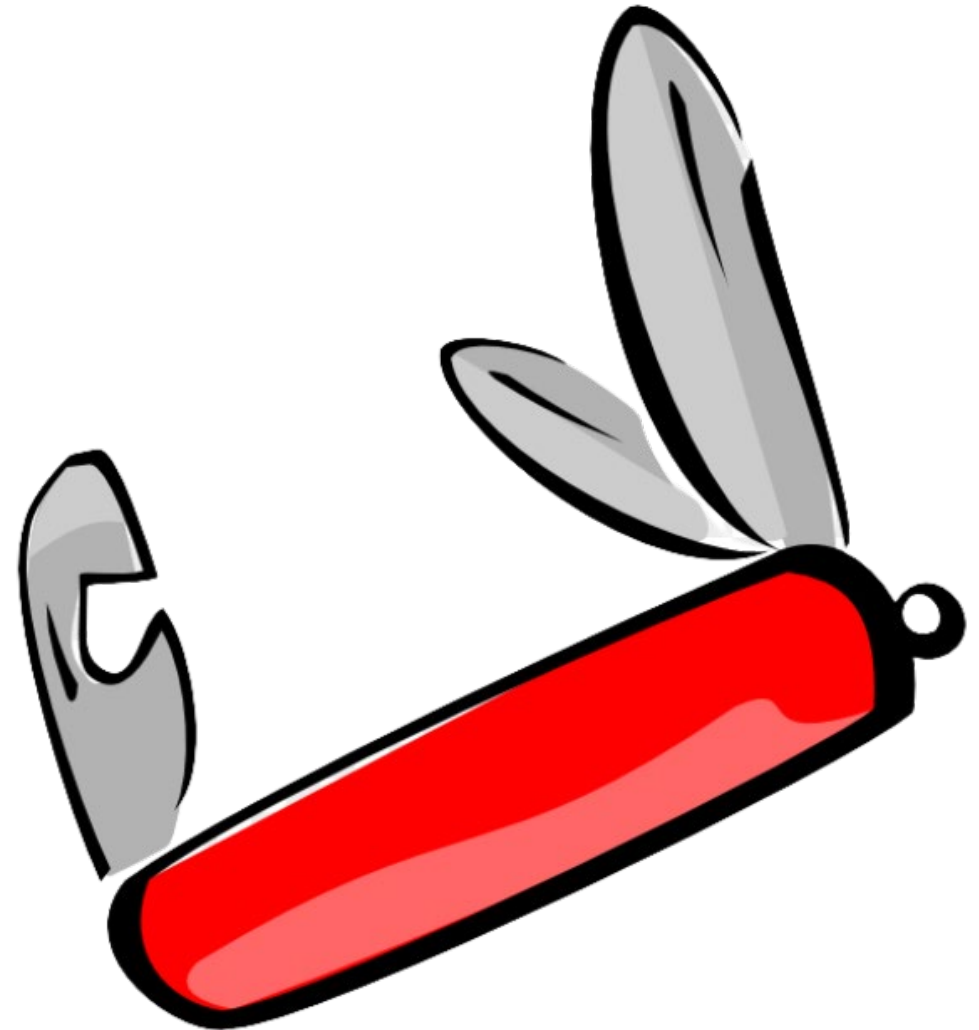
# C.A.M. Relationship

- Morrisville is the only fire department operating in a unique deployment model – the quint model
- Creates difficulty and a lack of continuity with:
  - Policy/procedure/critical task assignment on the fire ground
  - Dispatching of apparatus to all emergency types
  - Efficiency/effectiveness of firefighters
- This also creates difficulty in developing guiding documents and self-assessment manual



# What is a Quint Apparatus?

- Apparatus capable of meeting 5 functions:
  - Pump
    - 300 gallons
  - Water Supply
    - 600' of supply line where it can fit
  - Pre-connected attack line
    - Limited to 3 (200') lines often located at the midsection of the truck
  - Aerial Device
    - Minimum 75'
  - Ground Ladders
    - Minimum 115'



# True Ladder

- Primary functions defined:
  - Ventilation
  - Rescue
  - Extrication and rope rescue equipment
  - Pump, primarily for elevated water streams.
  - 145' minimum ground ladder complement
  - Aerial platform

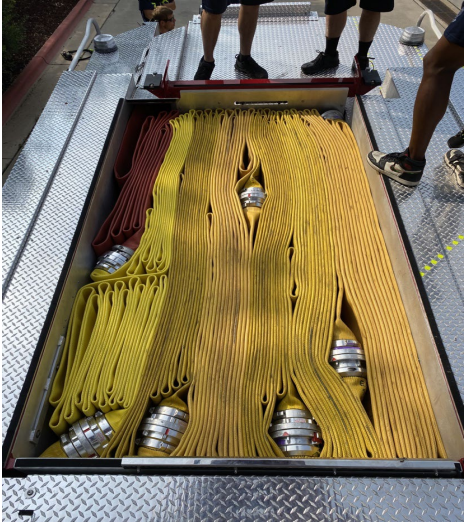


# True Engine

- Primary function: Fire attack and water supply
- Pre-connected attack lines
  - 600' pre-connected cross lays
  - Additional 800' of deployable attack line from the rear
- 1200' of 5" supply line
- 1200' of 3" supply line
- 500-750 gallon onboard tank capacity



# Quint Deployment Model - Challenges



- Quint has limited storage for hose, limiting hose deployment options for fire attack and supply lines
- Requires a multiple-unit response to meet critical tasking needs
- Does not meet NFPA 1710 staffing recommendations
- Modern apartments and buildings require longer hose lays and ground ladder deployments to better reach occupied spaces
- Lack of continuity with C.A.M. partners for fire ground operations and the dispatching of unit protocols

# Deployment Model Opportunities

- Efficiency in fire ground operations
- Engines have the hose beds necessary to deploy the needed hose lengths to access all areas efficiently
- More fire attack package options (hose & nozzles) to adapt to current and growing environment
- Allows ladder trucks to carry more ground ladders for building and victim access



Cary Engine-3

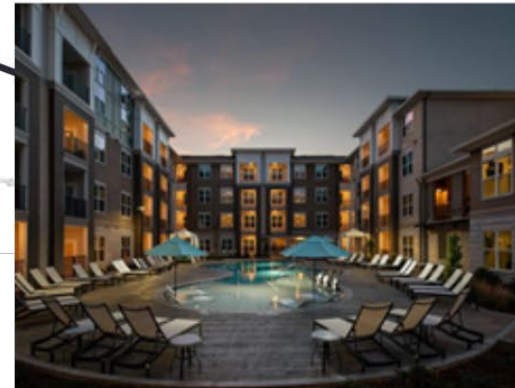
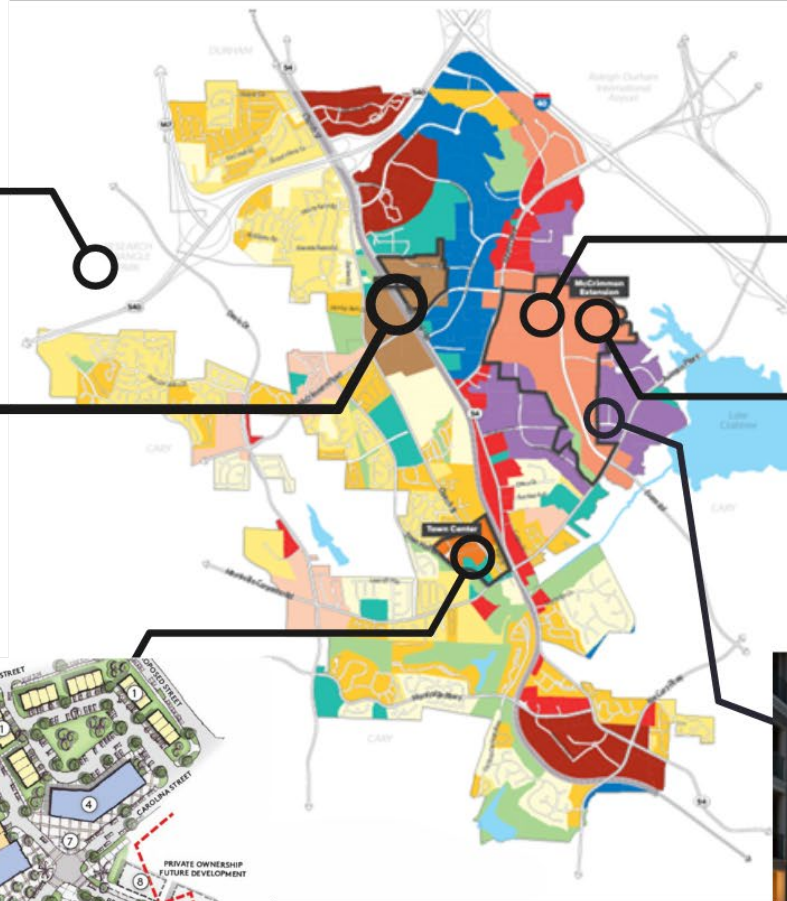


Winston-Salem Ladder-1



Durham Engine-6

# Built Environment Challenges



# Requirements for Predicted Built Environment

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- Modern Apartment Designs
  - Brier Point
  - Pointe at Lake Crabtree
  - Broadstone Trail Apartments
  - Aviation Crossing (Bainbridge)
  - Bristol Creek
  - Shiloh Crossing
  - Crescent Community
  - Alta Wren
  - Kit Creek alleyways
- Taller buildings that require significant resources
- Denser development
- More complicated corporate and residential campuses with large fire flows
- Migration from garden-style apartments to ones with large center atriums

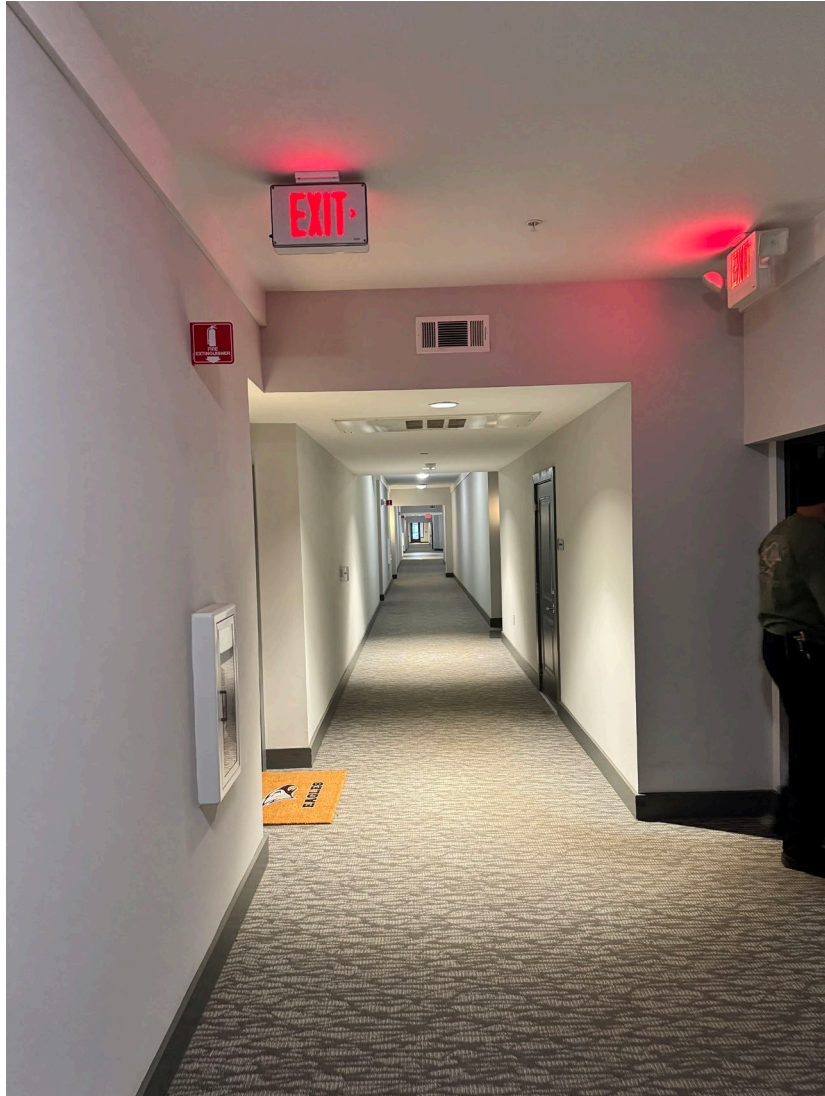
# 2599 Aviation



# Atrium-Style Apartments

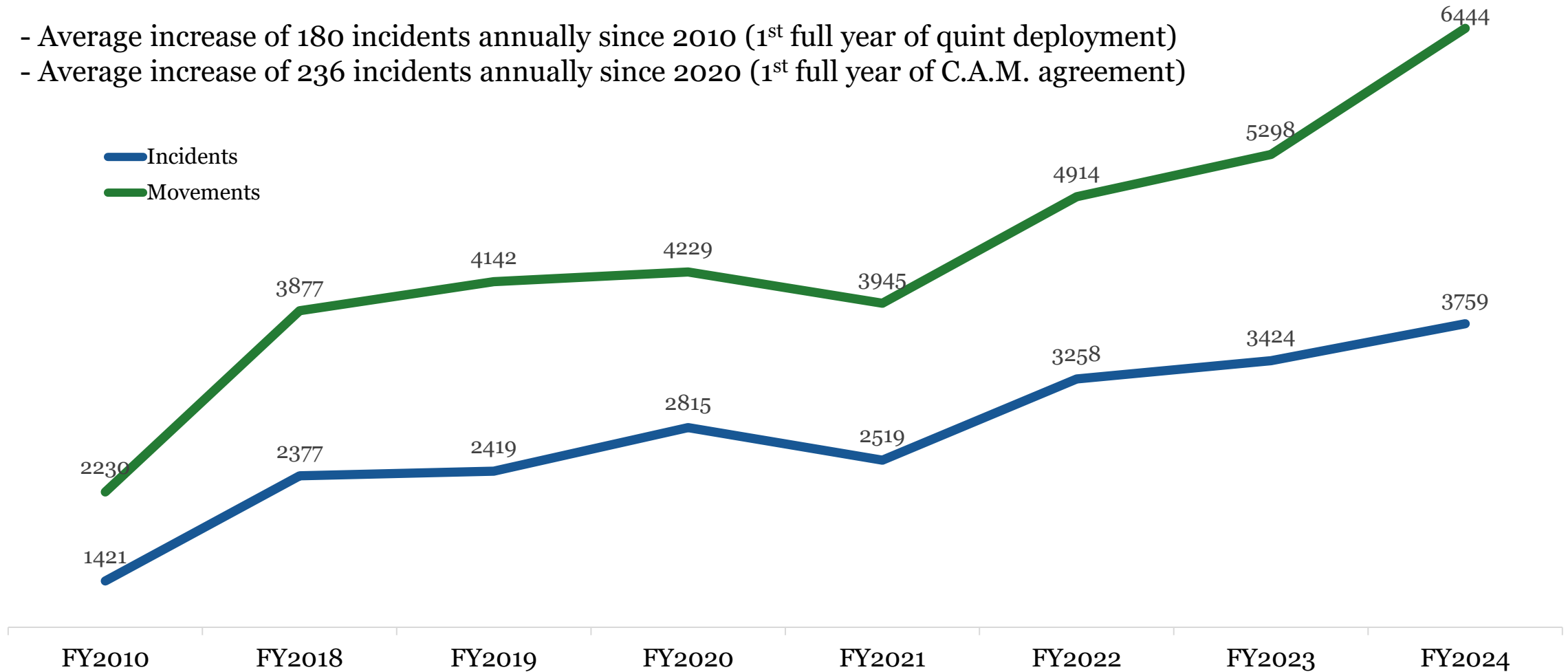


# Atrium- Style Apartments



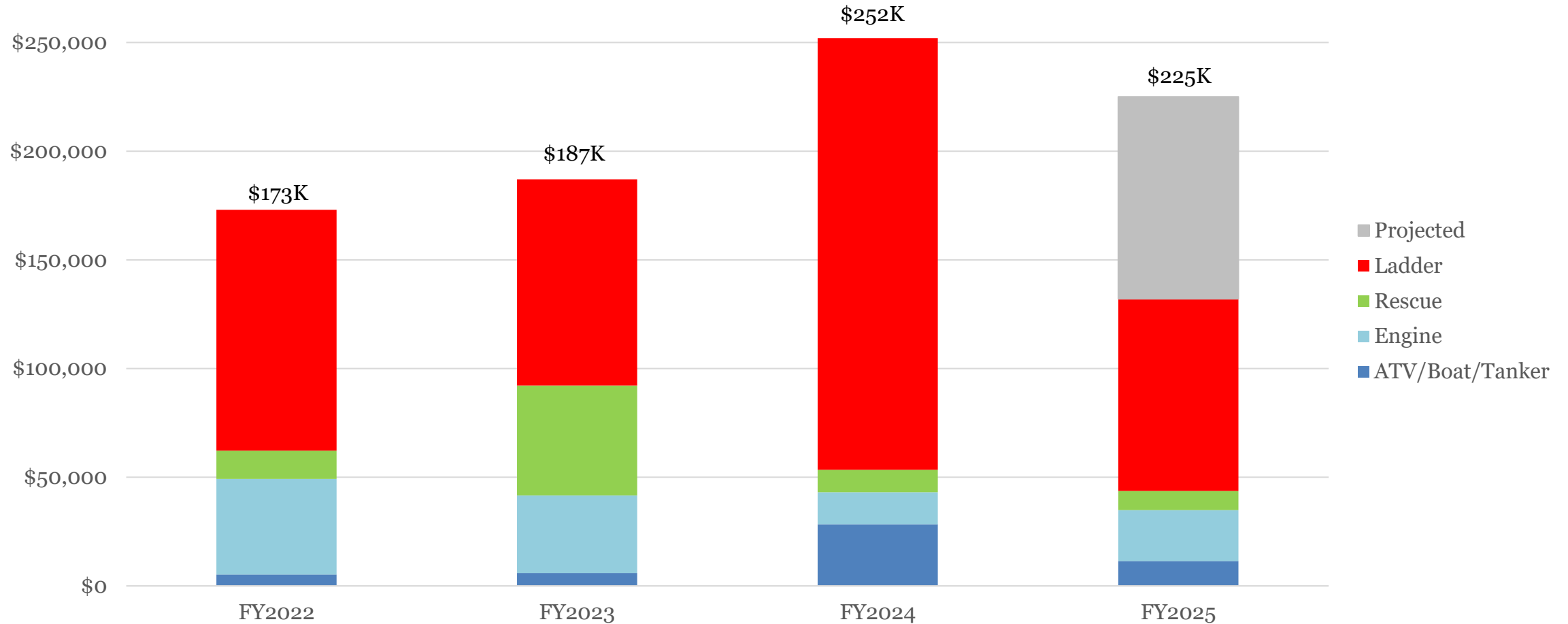
# Call Volume Demands

- Average increase of 180 incidents annually since 2010 (1<sup>st</sup> full year of quint deployment)
- Average increase of 236 incidents annually since 2020 (1<sup>st</sup> full year of C.A.M. agreement)



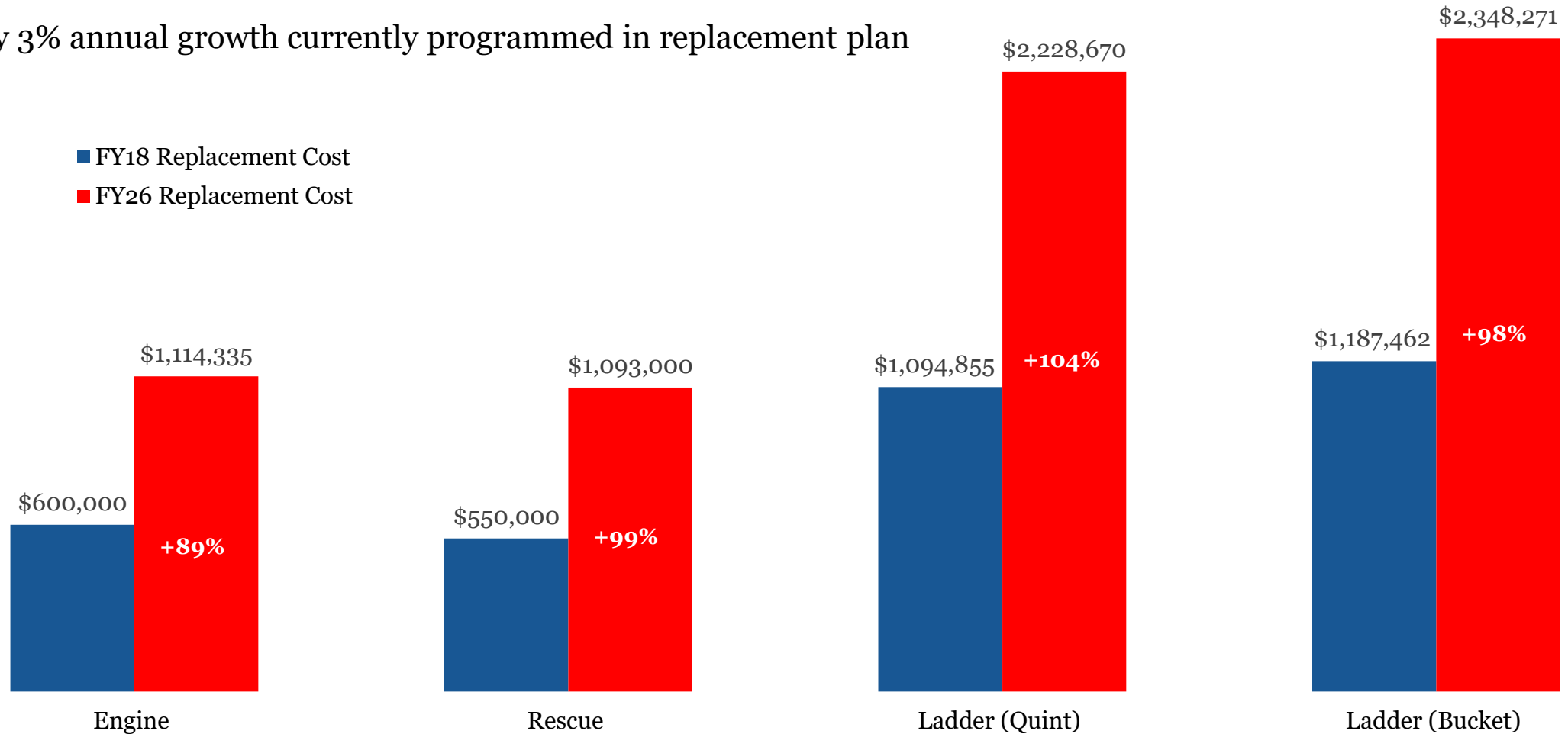
*Note: An incident is a single call, where a unit movement refers to the number of fire trucks responding to an incident.*

# Apparatus Maintenance Costs *(as of 2/1/2025)*



# Apparatus Replacement Challenges

- Only 3% annual growth currently programmed in replacement plan



# Apparatus Replacement Plan

## Current

2026	Ladder 21	\$2,228,670
2030	Ladder 23	\$3,048,564
2031	Squad 22	\$1,132,867
2032	Ladder 22	\$3,670,288
2036	Rescue 21	\$1,756,976
2038	Ladder 21	\$5,042,016
12 Yrs	<b>Total</b>	<b>\$16,879,381</b>

## Proposed

2026	Engine 21, 22	\$2,228,670
2030	Ladder 23	\$3,048,564
2031	Squad 22	\$1,132,867
2032	Ladder 22	\$3,670,288
2036	Rescue 21	\$1,756,976
2038	Engine 21, 22	\$3,093,244
12 Yrs	<b>Total</b>	<b>\$14,930,609</b>

# Staffing

- Industry Standards
  - NFPA 1710
    - Engine 4 minimum
    - Ladder 4 minimum
- C.A.M. Partners
  - Minimum staffing to place a truck into service
    - System-wide policy
    - Individual department policy
- Recruitment/Retention
  - Area departments use traditional fire response model as a recruiting tool
  - We averaged 16% turnover annually since 2016, approximately half of those personnel losses are to other agencies



# FTE to Fill NFPA 1710

Annual Individual Profile		
Leave Time	361	12.36%
<b>FTE to Fill One Position</b>	3281	<b>1.13</b>

Minimum Staffing		
Unit	Current	Proposed
Engine 21	4	4
Rescue 21	4	4
Ladder 22	4	4
Engine 22	0	4
Ladder 23	4	4
Battalion 4	1	1
<b>Total</b>	<b>17</b>	<b>21</b>
<b>Constant Staffing</b>	<b>19.21</b>	<b>23.73</b>

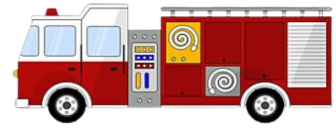
# Proposed Apparatus / Staffing Plan



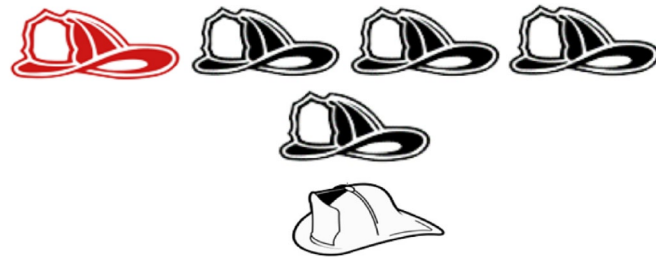
1



2



3



 - Battalion Chief    - Fire Captain    - Firefighter

# Staffing Plan

Staffing						
Station 1		Station 2		Station 3		
Engine 21		Ladder 22		Ladder 23		
Captain	1	Captain	1	Captain	1	
Engineer	1	Engineer	1	Engineer	1	
MFF	1	MFF	1	MFF	1	
FF	1	FF	1	FF	1	
FF	1	FF	1	FF	1	
Rescue 21		Engine 22		Battalion 4		
Captian	1	Captain	1	BC	1	
Engineer	1	Engineer	1			
MFF	1	MFF	1			
FF	1	FF	1			
<b>Station Staffing</b>	<b>9</b>		<b>9</b>			<b>6</b>
					<b>Shift Staffing</b>	<b>24</b>
					<b>Supression</b>	<b>72</b>

# Annual Personnel Requests

Personnel Requests											
Position	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Firefighter		3		3			3				
Fire Captain						3					
Fire Engineer					3						
<b>Per Shift</b>	19	20		21	22	23	24				
<b>Cost per person</b>	109,445.49	113,823.31	118,376.24	123,111.29	138,035.74	149,035.19	138,483.46	144,022.79	149,783.71	155,775.05	162,006.06
<b>Cost Per Year</b>	0.00	341,469.92	0.00	369,333.86	0.00	447,105.57	415,450.37	0.00	0.00	0.00	0.00
											<b>1,573,359.72</b>

FY27 – The department commits to C.A.M. and NFPA 1710 standards of 4 personnel on units

FY29 – Starts the staffing preparation for Engine 22

FY30– The addition of an Engineer allows for Engine 22 to be in service when staffing allows

FY31– Engine 22 is in service full time / Department will allow Rescue to staff 3 personnel

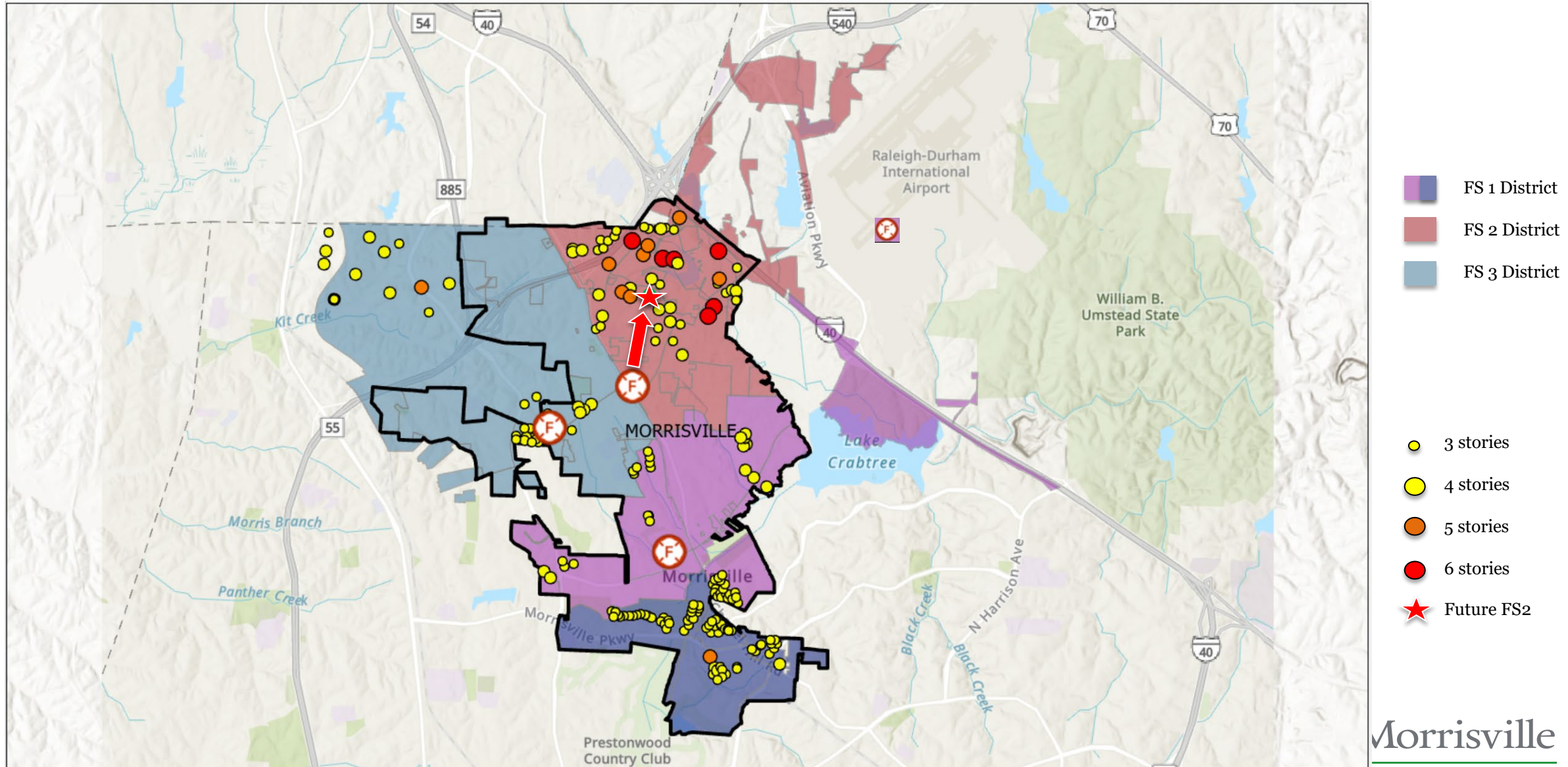
FY32– C.A.M. and NFPA 1710 standards of 4 personnel full build-out

# Station 22 Relocation

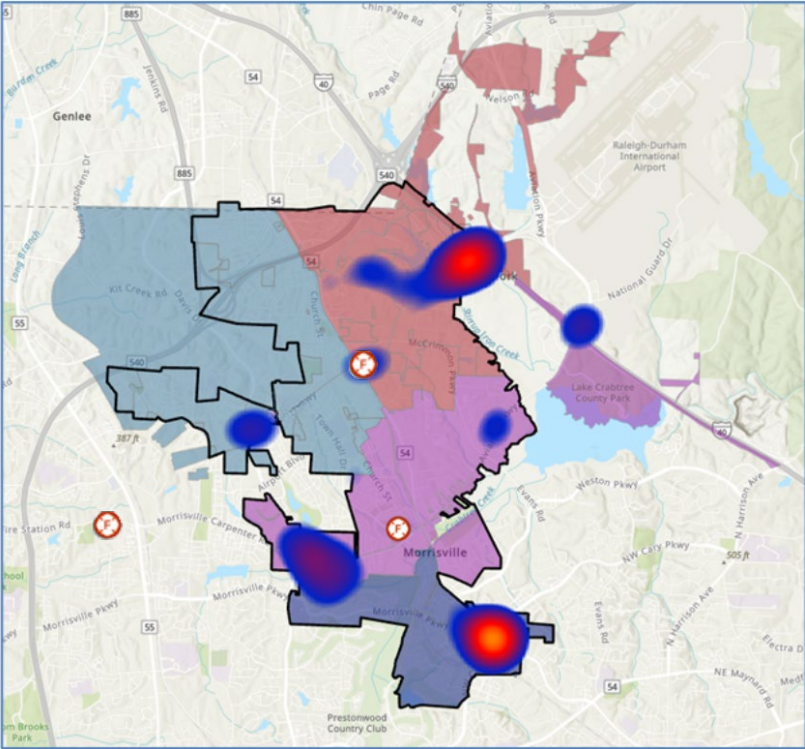
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- NC54 widening and McCrimmon widening project starting 2026
- Proximity to Station 23
- Concentration of building 3 stories or more
- Concentration of call volume
- Access to I-40 and I-540

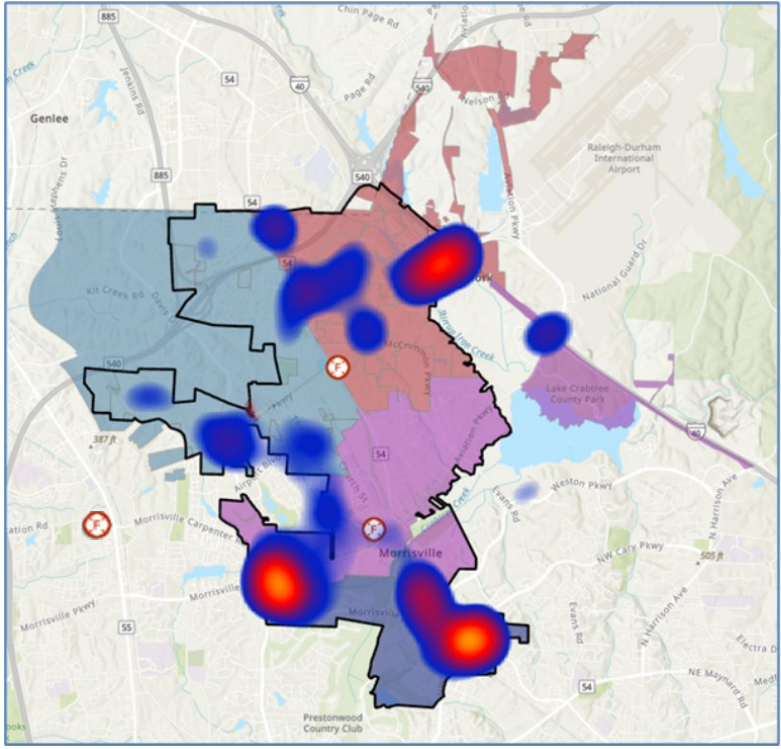
# # of >2-Story Buildings by Fire District



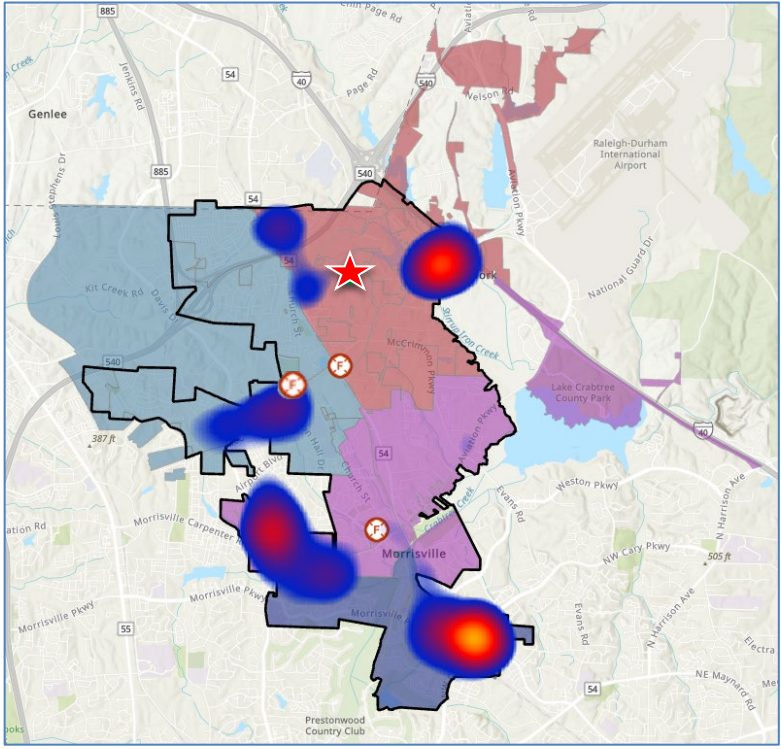
# All Incidents by Fire District, 2014-2024



2014



2019



2024

FS 1 District    FS 2 District    FS 3 District    ★ Future FS 2

# Deployment Model Goals

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- Replacing a ladder with two engines will save \$1,692,309 in the 12-year apparatus replacement plan
- Replacing ladder 21 with an engine, and adding an engine to Station Two will reduce maintenance cost by reducing calls run by a ladder truck
- Bring consistency of operations in the C.A.M. model
- Achieve staffing compliance with NFPA 1710
- Provide increased resiliency to the changing built environment
- Seamless interpretations for accreditation and ISO

# Next Steps

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- FY26 - start implementation of the new plan
- Beyond – continue to implement and analyze the effectiveness of the plan based on outcomes
- The transition to the new deployment model will be evaluated with the budget process moving forward

# Questions?

