



# ANN ARBOR FIRE DEPARTMENT FIRE STATION MASTER PLAN



# CURRENT FIRE STATIONS

## Summary

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Over the last seven months, work has been completed with numerous City of Ann Arbor units and external consultants to develop a sustainable fire station master plan. The sustainability planning efforts has encompassed financial and environmental stewardship priorities balanced with providing fire protection commensurate with historical expectations of City of Ann Arbor residents. The current staffing and deployment of the Ann Arbor Fire Department employees is meeting current and projected needs. This document shows current fire station locations along with model locations developed from a geographic information system (GIS) modeling software. A review of the infrastructure condition of the current fire stations was also conducted. Although the quantity and location of the current fire stations meets current and forecasted needs, most of these facilities are in significant need of renovation or replacement. Recommended facility upgrades noted below align with the City of Ann Arbor's [Sustainability Action Plan](#) goals

## Recommendations

1. Maintain five fire stations for City of Ann Arbor fire protection. The current model of five fire stations allows for an approximate citywide travel time of under six-minutes. Additionally, the five station model provides redundancy when the primary station is already assigned to an incident.
2. Sell Station 2, which was closed in 2003. Selling this facility will save ongoing utility and maintenance costs and the proceeds could help fund recommended station renovations and replacements for 1, 3 and 4.
3. Renovate Station 1. The fire prevention bureau is currently located at Station 2. This renovation would allow for new offices for fire prevention along with numerous other upgrades to improve fire department administration and operations. This renovation would also include environmental sustainability initiatives.
4. Complete replacement of Stations 3 and 4. These buildings have outlived their expected lifespan, present near constant maintenance issues, and lack any energy conservation or sustainability features. In an effort to avoid land acquisition costs, it is recommended to rebuild these stations at their current locations.
5. Determine the future of Station 5. Discussion needs to happen with the University of Michigan as to the future of Station 5. Although the City of Ann Arbor enjoys free usage of this facility, this facility presents similar challenges to Stations 3 and 4.
6. Add solar panels to Station 6. Station 6 is the newest station and recently had a kitchen renovation. It is planned for a restroom renovation in 2019. Station 6 would be a great candidate to have solar panels added as well as a strong candidate for energy efficiency improvements.

Sincerely,

Mike Kennedy  
Fire Chief, City of Ann Arbor

# CURRENT FIRE STATIONS

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## Assistance for this Document Provided By

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**City of Ann Arbor**

- Communications Office
- Facility Services
- Financial and Administrative Service Area
- Information Technology Service Unit
- Sustainability and Innovations Office

**External Consultants**

- A3C Collaborative Architecture
- Williams Architects

# CURRENT FIRE STATIONS

## Fire Station 1

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Location: 111 North Fifth Avenue

Built: 1978 (40 years old)

Square footage: 42,900

Apparatus: Battalion Chief, Ladder Company, Rescue Company, Reserve Engine Company (2)

Minimum staffing: Battalion Chief, Captain, Lieutenant, Driver Operator (2), Firefighter (2)

Fire administration, training, and mechanic work out of this station.

2017 Incidents: 2,939

2017 Travel Time: 5:14



## Fire Station 3

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Location: 2130 Jackson Avenue

Built: 1963 (55 years old)

Square footage: 5,000

Apparatus: Engine Company

Minimum staffing: Lieutenant, Driver Operator, Firefighter

2017 Incidents: 1,078

2017 Travel Time: 6:09



# CURRENT FIRE STATIONS

## Fire Station 4

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Location: 2415 Huron Parkway

Built: 1966 (52 years old)

Square footage: 5,000

Apparatus: Engine Company  
Minimum staffing: Lieutenant, Driver  
Operator, Firefighter

2017 Incidents: 1,214

2017 Travel Time: 6:06



## Fire Station 5

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Location: 1946 Beal Street

Built: 1959 (59 years old)

Square footage: 21,577

Apparatus: Ladder Company, Water  
Rescue Vehicle, Hazardous Materials  
Trailer

Minimum staffing: Lieutenant, Driver  
Operator, Firefighter

2017 Incidents: 1,013

2017 Travel Time: 7:02



# CURRENT FIRE STATIONS

## Fire Station 6

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Location: 1881 Briarwood Circle

Built: 1981 (37 years old)

Square footage: 12,077

Apparatus: Engine Company,  
Hazardous Materials Vehicle, Technical  
Rescue Vehicle

Minimum staffing: Lieutenant, Driver  
Operator, Firefighter

2017 Incidents: 1,214

2017 Travel Time: 5:49



## Fire Prevention (old Station 2)

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Location: 1510 East Stadium Blvd

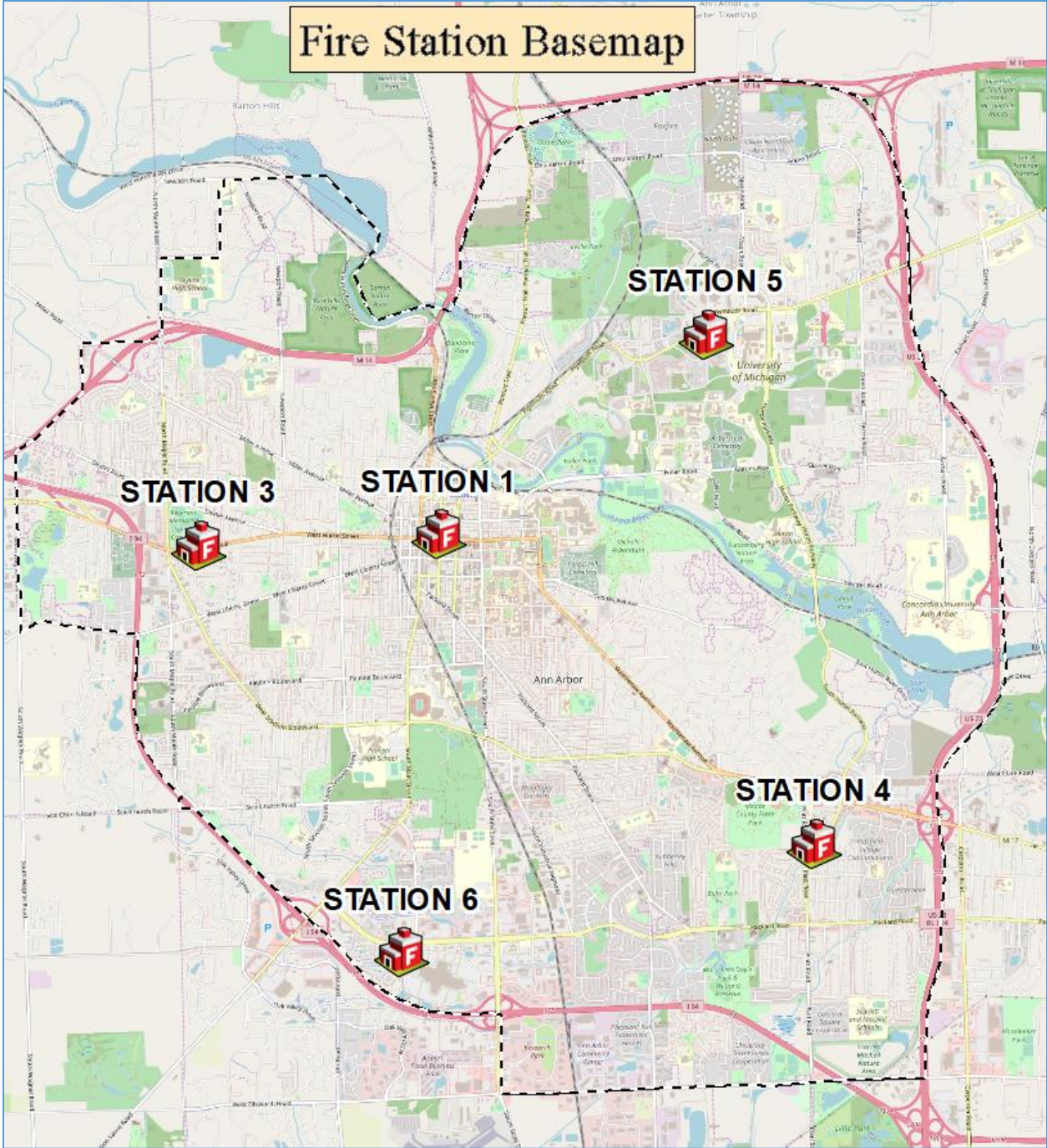
Built: 1953 (65 years old)

Square footage: unknown

This station was closed as an active fire station in 2003. Ladder Company 2 was assigned to this station and was disbanded. Fire department staffing went from 130 to 113 employees. (The fire department currently has 87 employees). The fire prevention bureau currently uses it as office space.

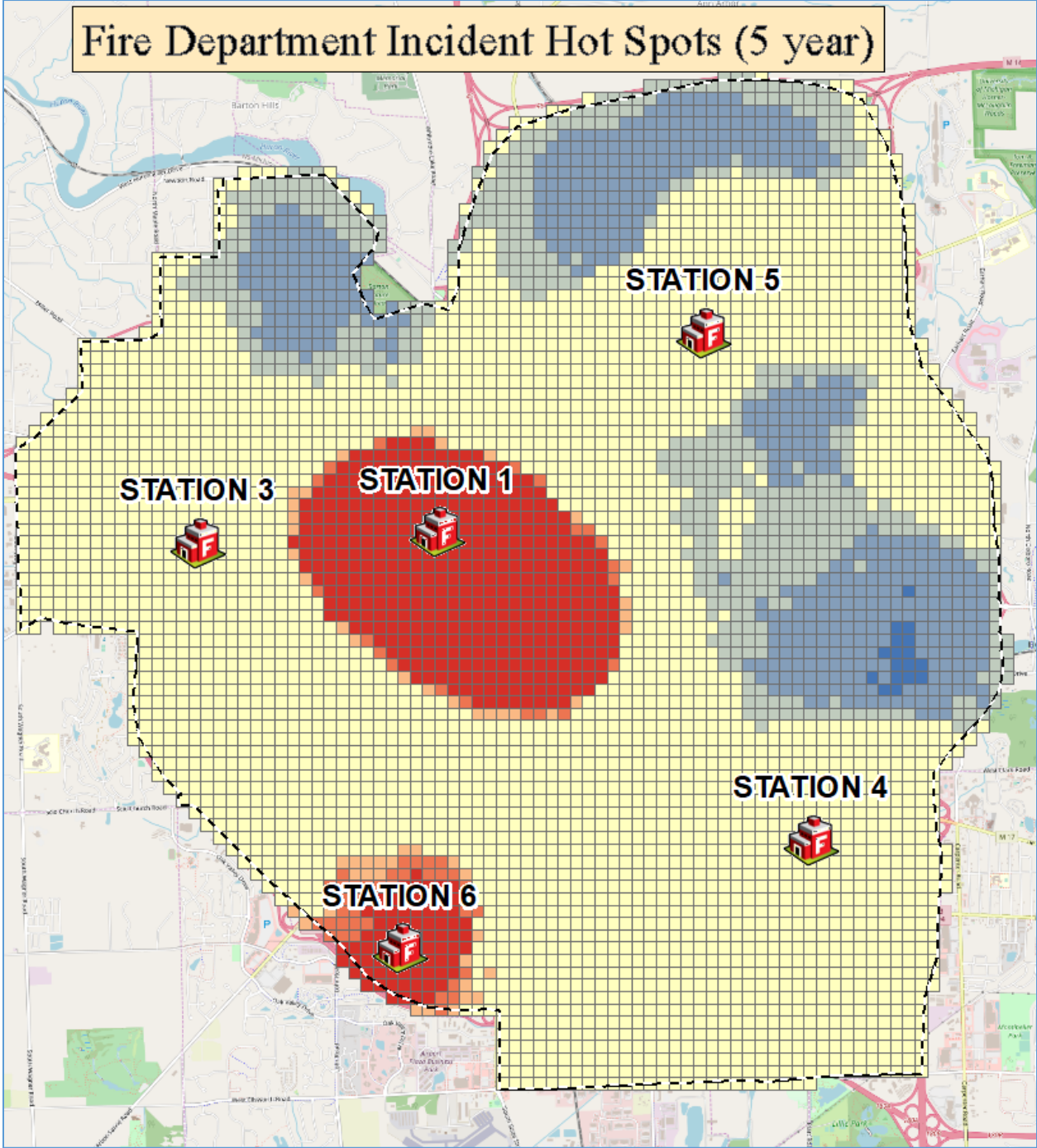


# CURRENT FIRE STATIONS



The above graphic shows the locations of the five current fire stations along with the City of Ann Arbor boundary.

# CURRENT FIRE STATIONS



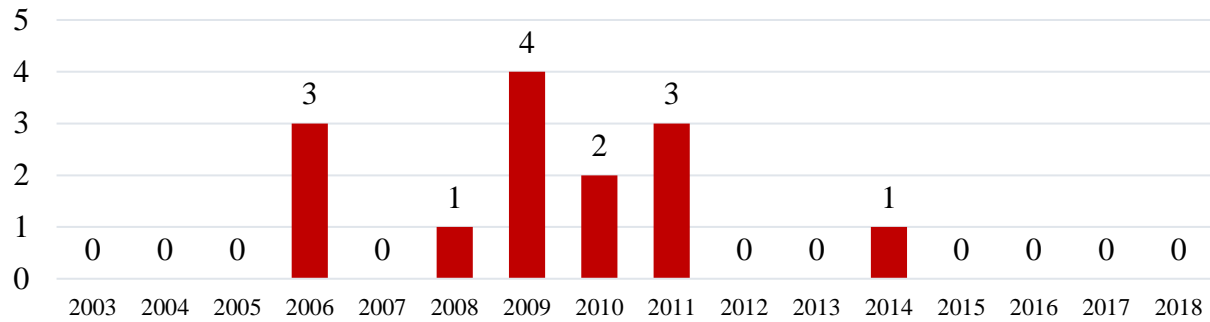
The above graphic shows the locations of the five current fire stations along with the City of Ann Arbor boundary. The red areas are the highest incident density. The area around Station 1 contains the downtown district, the University of Michigan Central Campus, University Hospital, Delonis Shelter, and numerous high rise apartments. The area around Station 6 contains a cluster of senior citizen facilities. The blue shaded areas are mainly parkland, undeveloped areas, or low density housing.



# HISTORICAL FIRE INCIDENT DATA

## Civilian Fire Fatalities: 15-year Detail

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## Civilian Injury and Mortality from Fire Incidents: 15-year Summary

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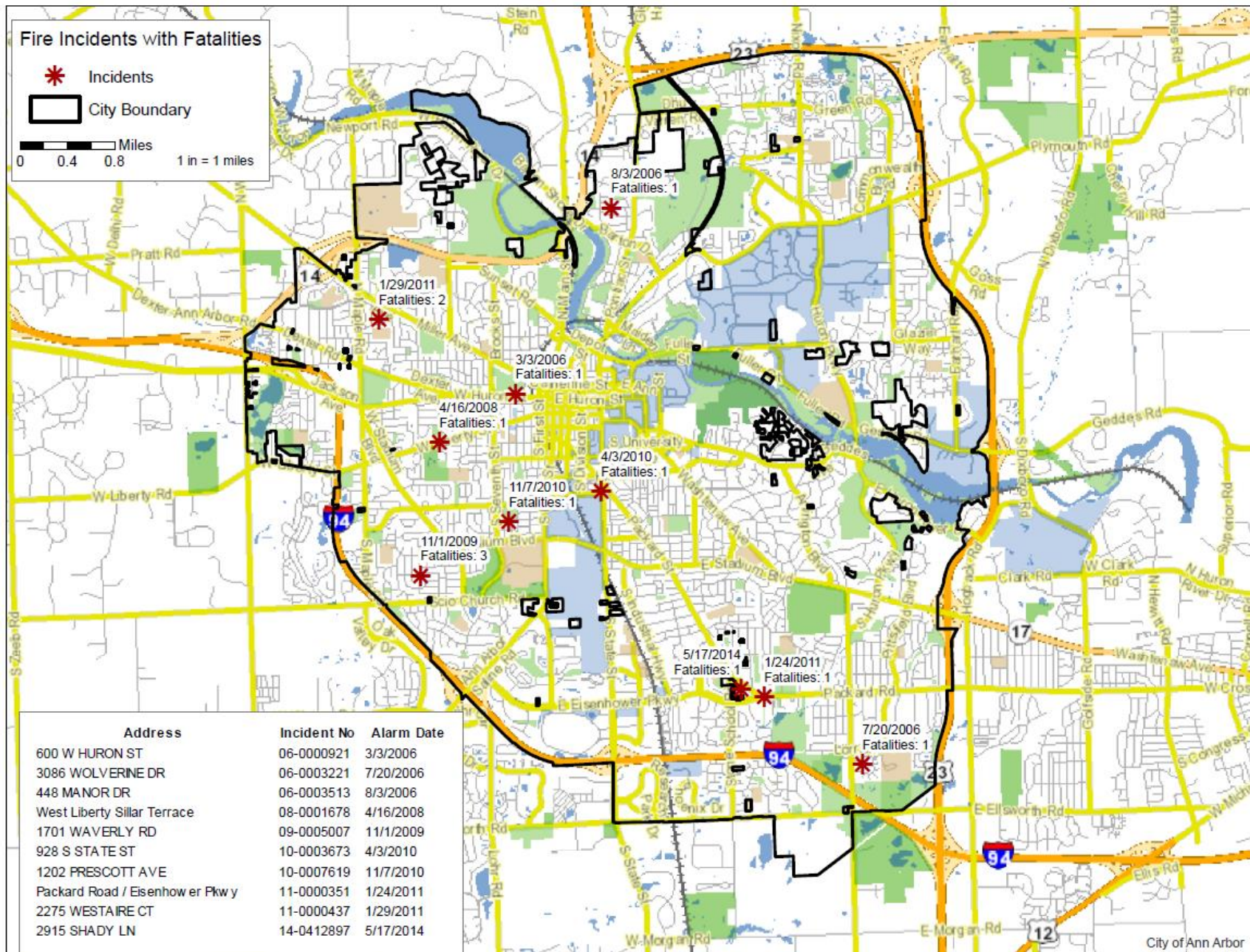
- Deaths: 14
- Life Threatening Injuries: 6
- Severe Injuries: 10
- Moderate Injuries: 18
- Minor Injuries: 50
- Undetermined Injuries: 20

## Firefighter Injury and Mortality from Fire Incidents: 15-year Summary

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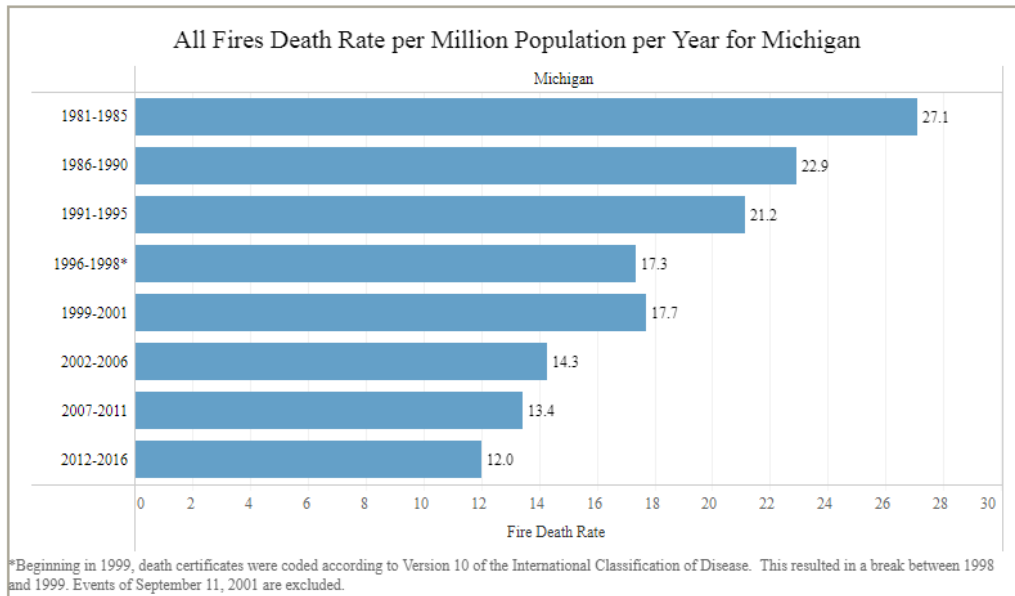
- Deaths: 0
- Life Threatening Injuries: 0
- Severe Injuries: 0
- Moderate; Lost Work Time: 22
- Treated by Physician; No Loss Time: 12
- First Aid Only: 5
- Injured; Report Only: 11
- Undetermined Injuries: 2

# HISTORICAL FIRE INCIDENT DATA



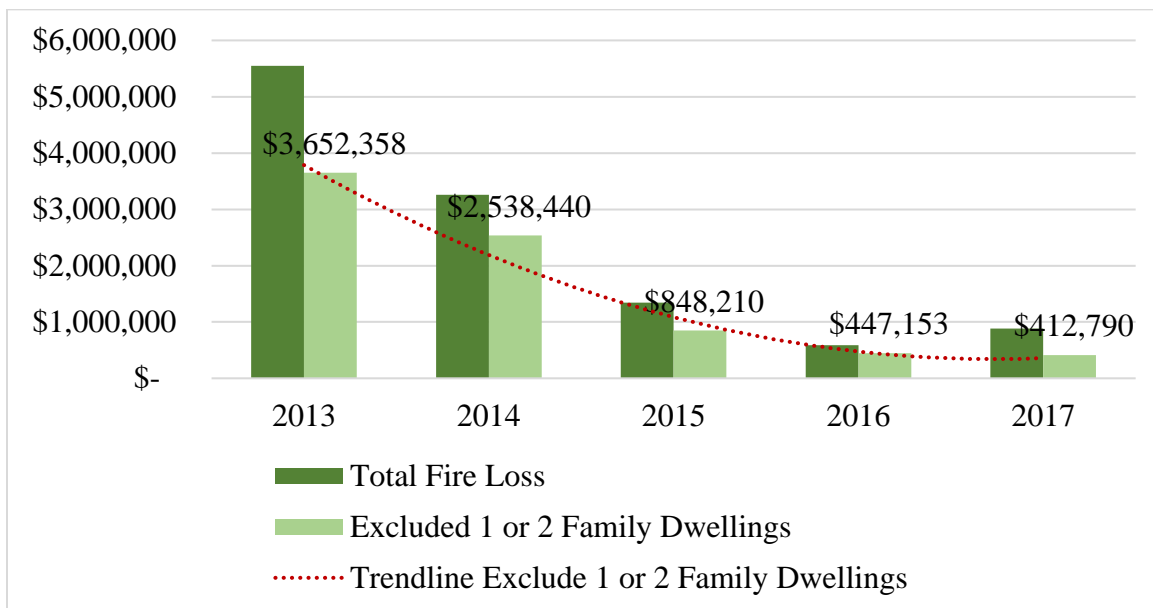
# HISTORICAL FIRE INCIDENT DATA

## Michigan Civilian Death Rate per Million (NFPA): 35-year Summary



- Between 2007 and 2011, there were 1.34 civilian deaths per 100,000 population in the State of Michigan. The City of Ann Arbor was above the State of Michigan average during this period.
- Between 2012 and 2016, there were 1.2 civilian deaths per 100,000 population in the State of Michigan. The City of Ann Arbor was below the State of Michigan average during this period.

## Fire Property Loss: 5-year Summary



# TRAVEL TIME MODELING

The National Fire Protection Association (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* is an organized approach to defining levels of service, deployment capabilities, and staffing levels for substantially career fire departments. Figure A.3.3.53.6 (below) is from this standard and depicts how the NFPA defines “total response time.” Travel time is drive time. The location and number of stations within a community has a direct effect on “travel time.” It is measured from when the unit is called to “respond” to when the unit arrives on scene.

Three phases are included in total response time. They are as follows:

1. Phase One: Alarm Handling Time, which includes alarm transfer time, alarm answering time, and alarm processing time.
2. Phase Two: Turnout Time and Travel Time.
3. Phase Three: Initiating Action/Intervention Time.

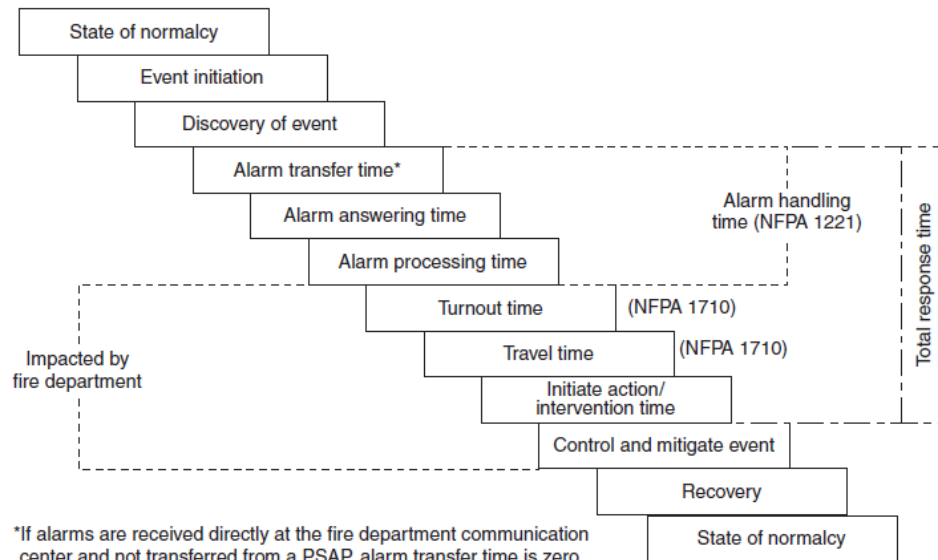
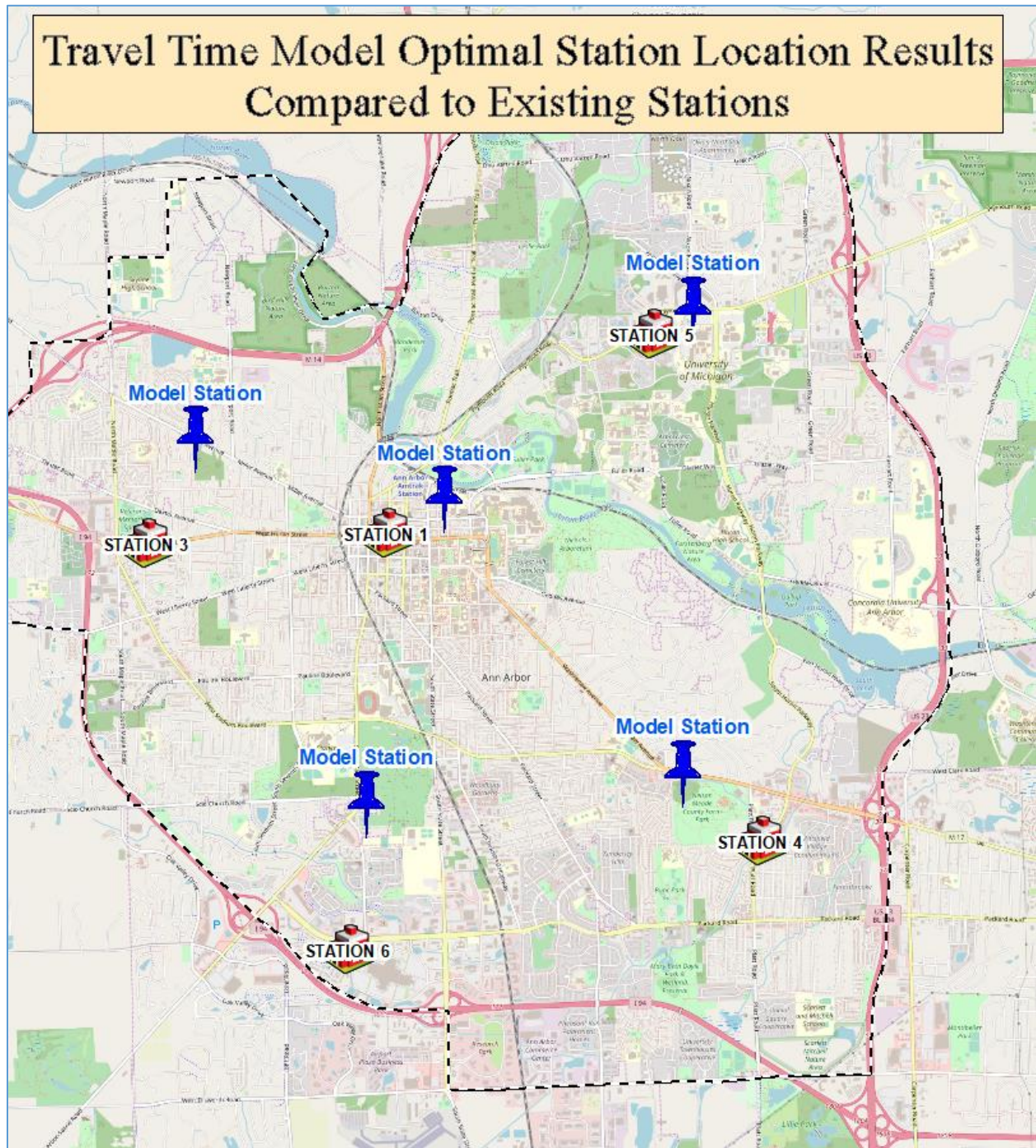


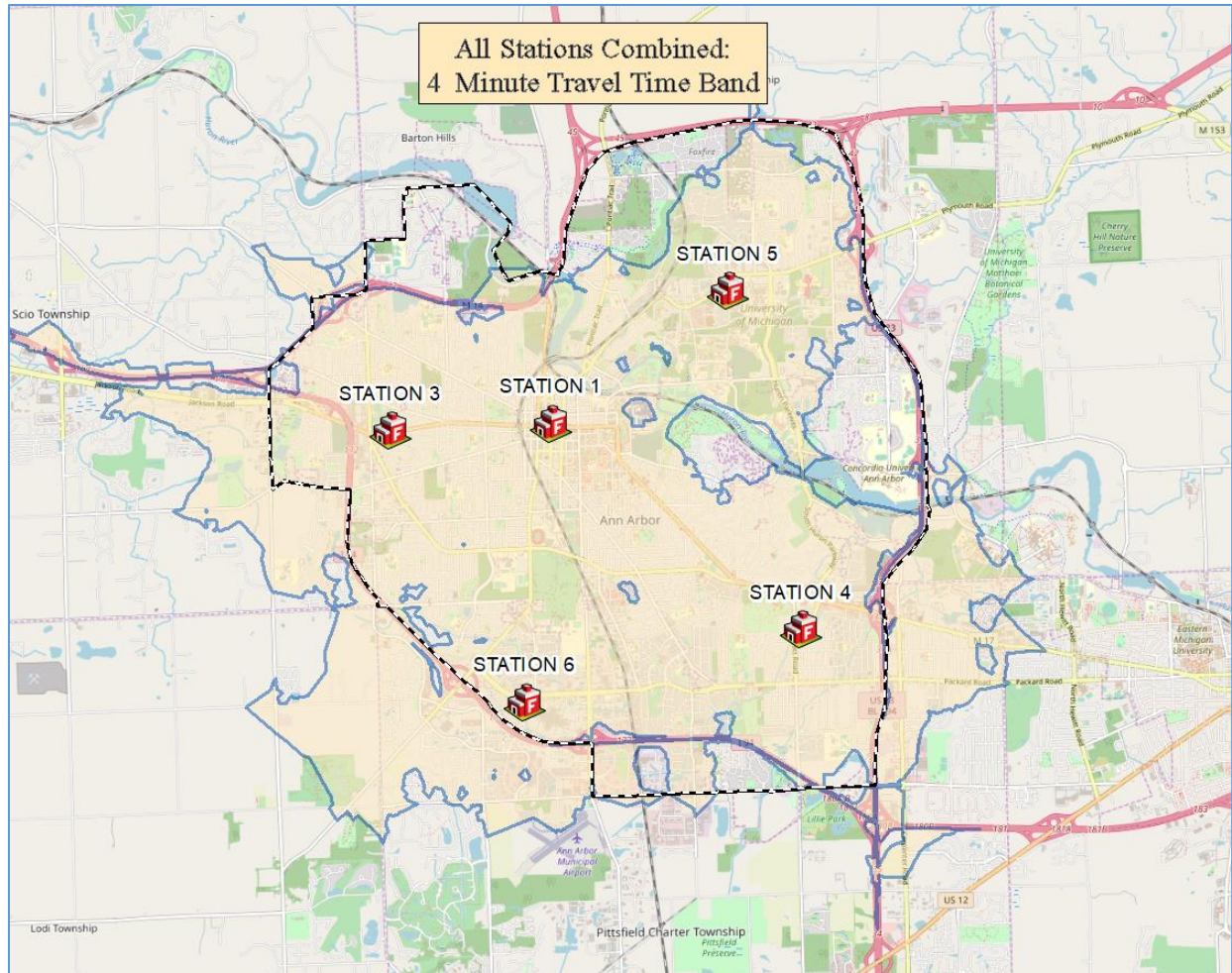
FIGURE A.3.3.53.6 Cascade of Events Chart.

# TRAVEL TIME MODELING



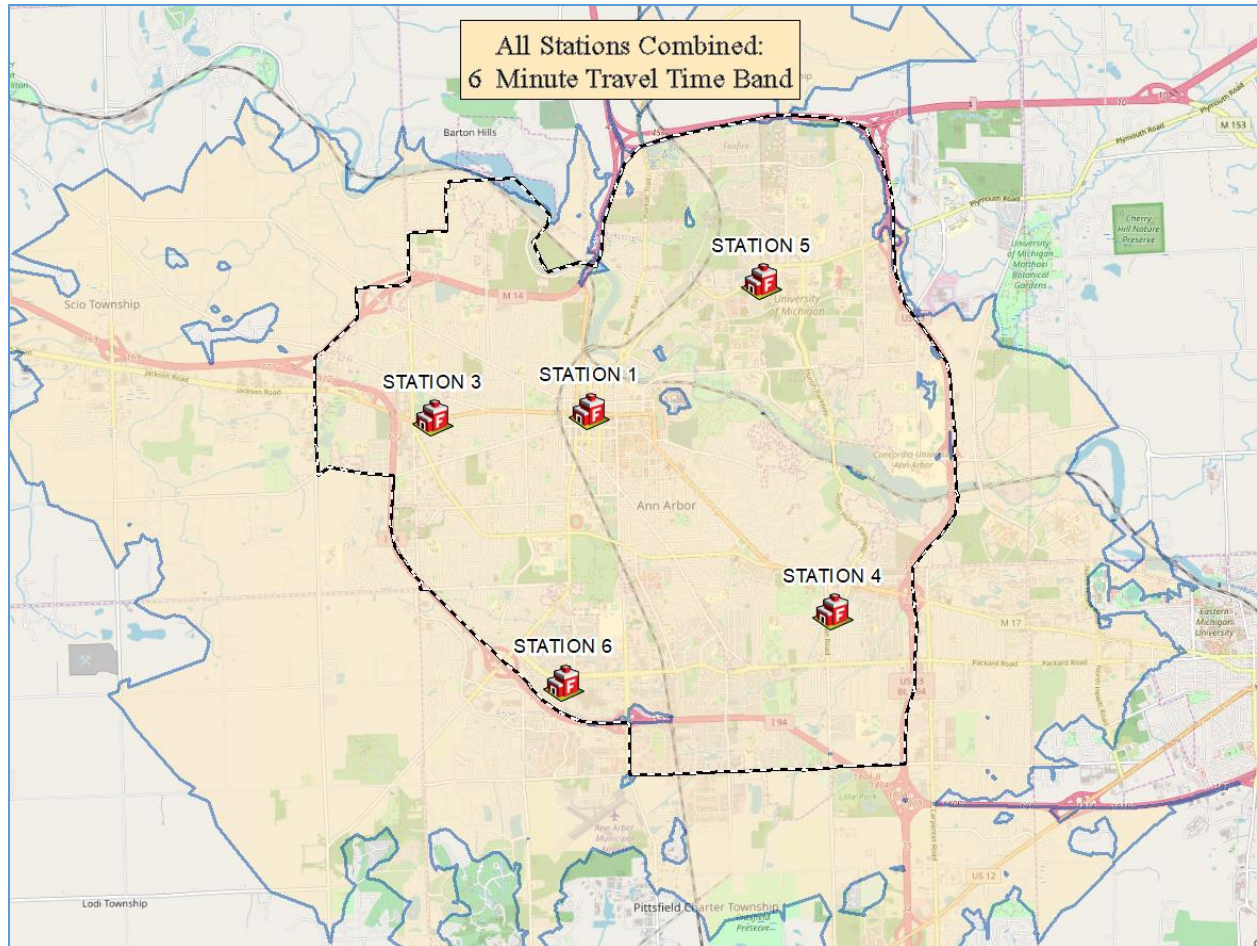
The above graphic shows model station locations compared to the location of the five current fire stations. This model was created by the City of Ann Arbor Information Technology Unit using geographic information systems (GIS) modeling. This model was based on incident density and shortest response times. Overall, it shows the current station locations are placed close to ideal distribution. The notable exceptions are moving Stations 4 and 6 closer to the city core, which would allow for better coverage. The current location of these stations place some of their effective coverage area outside of the City of Ann Arbor.

# TRAVEL TIME MODELING



The above graphic shows the coverage area of a four minute travel time from the current stations. Travel time is drive time. It is measured from when the unit is called to “respond” to when the unit arrives on scene. This coverage area was generated using geographic information systems (GIS) modeling. This GIS model uses a speed limit of 35 mph without impact of traffic congestion, traffic signals, or stop signs. It does account for one-way streets. The four minute travel band includes all travel times up to four minutes flat. This model is showing coverage for a four minute travel time citywide

# TRAVEL TIME MODELING



The above graphic shows the coverage area of a six minute travel time from the current stations. Travel time is drive time. It is measured from when the unit is called to “respond” to when the unit arrives on scene. This coverage area was generated using geographic information systems (GIS) modeling. This GIS model uses a speed limit of 35 mph without impact of traffic congestion, traffic signals, or stop signs. It does account for one-way streets. The six minute travel band includes all travel times up to six minutes flat. This modeled six minute travel time does not exactly align with historical response data presented with each station at the beginning of this report. It is surmised that actual traffic congestion, traffic signals, and stop signs account for the difference between theoretical and actual response times.

# RECOMMENDATIONS

1. **Five Station Model** - The current five fire stations serve as a functional model to deliver a citywide response time of approximately six minutes. Accounting for fiscal realities along with a [projected plateau of population growth \(SEMCOG\)](#), this five station model will serve the City of Ann Arbor for the foreseeable future. This five station model does not allow for compliance with NFPA 1710, i.e., four minute response time for the first arriving engine and an eight minute arrival of an initial full alarm assignment at a fire suppression incident.
2. **Station 2** – Station 2 is used for the fire prevention offices. This building is the oldest of the fire stations and has never had a major renovation. The building lacks Americans with Disabilities Act (ADA) compliance, is extremely energy inefficient, and is in need of renovation. Eliminating this facility will save utility and maintenance costs. Based on initial conversations with a real estate broker, Station 2 “could be sold as is” with current R1C zoning for approximately \$1,000,000. The recommendation includes using the sale proceeds to fund Station 1 renovations with remaining funds going towards the construction of a new Station 4.
3. **Station 1** – Washtenaw Metro Dispatch is operated by the Washtenaw County Sheriff’s Office. It serves as the public safety access point for 911 calls and dispatches for the Ann Arbor Police Department along with the majority of law enforcement agencies in Washtenaw County. Metro Dispatch currently occupies the southern one-third of the third floor of Station 1. Planning is underway to relocate Metro Dispatch to a facility on Zeeb Road (Scio Twp) in mid-2020. With this vacancy, it is recommended to do a total renovation of the third floor to achieve the following:
  - i. Relocate the fire prevention bureau to Station 1.
  - ii. Establish a more robust and functional City of Ann Arbor Emergency Operations Center. This space would be dual purposed as a fire department training room. This room would be available for other City of Ann Arbor activities and training.
  - iii. Reconfigure administrative offices to allow for ADA accessibility.
  - iv. Upgrade restrooms, sleeping area, and locker room to be gender neutral.
  - v. Complete kitchen remodel.
  - vi. Asbestos removal.
  - vii. Incorporate energy efficient building design and facility features.
    1. Lighting upgrades: fewer fixtures, increase efficiency.
    2. Better daylight incorporation.
    3. Heating, cooling, ventilation upgrades.
    4. Water conservation.
    5. Insulation improvements.
    6. Installation of smart control features

A local architecture firm has quoted a study phase fee of \$12,500. This would include a building program and building assessment, conceptual design, and opinion of probable costs. The sale proceeds from Station 2 are expected to cover Station 1 renovations with remaining funds going towards the construction of a new Station 4.



# RECOMMENDATIONS

- 4. Complete Replacement of Stations 3 and 4** - It is recommended that Station 3 (west side) and Station 4 (east side) be completely replaced. In an effort to avoid land acquisition costs, it is recommended to rebuild these stations at their current locations. These buildings have outlived their expected lifespan, present near constant maintenance issues, and lack any energy conservation or sustainability features. By replacing these stations with net-zero energy facilities, the City of Ann Arbor could make progress towards its Sustainability Action Plan and climate-related goals. Any remaining funds from the sale of Station 2 would be applied towards design and initial construction costs for Station 4. The building and infrastructure of Station 4 are worse than Station 3. The cost of each station is expected to be around \$4,000,000 - \$4,500,000, however, building and conceptual designs are needed to identify exact costs. West Bloomfield Township is in the process of building a similar size station that will cost \$4,200,000.
- 5. Determine the Future of Station 5** - Discussion needs to happen with the University of Michigan as to the future of Station 5. Although the City of Ann Arbor enjoys free usage of this facility, this facility presents similar challenges to Stations 3 and 4. Based on historical experience with Station 5, it is recommended that the University of Michigan build a new facility and turn the maintenance of the facility over to the City of Ann Arbor on a 50-year lease.
- 6. Add Solar Panels to Station 6.** Station 6 is the newest station and recently had a kitchen renovation. It is planned for a restroom renovation in 2019. Station 6 would be a great candidate to have solar panels added to improve the station's energy efficiency. This would contribute towards the City's Sustainability Action Plan and climate-related goals.

# NET-ZERO FIRE STATION

It is recommended that Station 3 and Station 4 be completely replaced. These buildings have outlived their expected lifespan, present near constant maintenance issues, and lack any energy conservation or sustainability features. By replacing these stations with net-zero energy facilities, the City of Ann Arbor could make progress towards its Sustainability Action Plan and climate-related goals. In addition to advancing sustainability goals, there is added benefit to the cost avoidance of utility costs and likely improved indoor air quality. In twenty years with 3% annual utility increases, the estimated cost avoidance for Station 4 utilities is estimated at \$264,017.55.

## Station 3 Utility Expenses

FY16 - \$7,462.83	FY17 - \$7,983.39	FY18 - \$8,102.23
Natural Gas - \$2,645.61	Natural Gas - \$2,331.71	Natural Gas - \$2,534.39
Electric - \$4,817.22	Electric - \$5,651.68	Electric - \$5,567.84

## Station 4 Utility Expenses

FY16 - 8,914.24	FY17 - \$9,476.91	FY18 - \$9,825.60
Natural Gas - \$4,542.98	Natural Gas - \$4,228.68	Natural Gas - \$4,650.28
Electric - \$4,371.26	Electric - \$5,248.23	Electric - \$5,175.32

Station 5 is owned by the University of Michigan. The University of Michigan provides this facility free of charge to the City of Ann Arbor and pays all utilities. Ideally, this station would be replaced with a net-zero energy copy of future Stations 3 and 4. The personnel and apparatus requirements of all three of these stations are identical. The current Station 5 occupies significantly more square footage than is currently utilized or needed. This footprint reduction also aligns with sustainability initiatives.

# NET-ZERO FIRE STATION

## First Net-Zero Fire Station in the United States

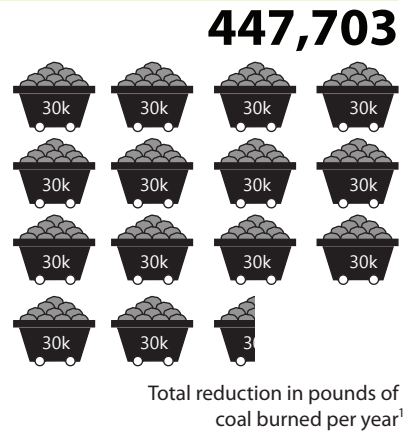
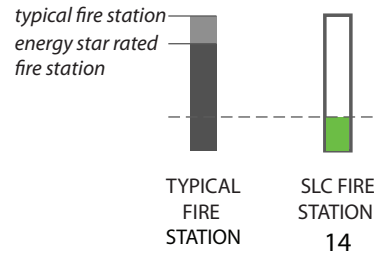
In May 2018, Salt Lake City, Utah opened the first net-zero energy fire station (Fire Station 14) in the United States. The City of Ann Arbor could be the **first community in Michigan** or even the Midwest to show initiative on such an endeavor.

Key sustainability features of Salt Lake City, Fire Station 14:

- The 300 solar panels on the roof (totaling 108 kW) generate enough electricity to offset 100% of the power consumption of the building. This is enough to power 27 SLC homes annually.
- High performance, triple-paned, argon gas-filled glass with ceramic frit (small dots) reduce solar heat gain and improve overall efficiency.
- Electrical systems were thoughtfully designed to conserve energy. From LED lighting and occupancy sensors to an in-depth study of plug loads and appliance selections, efficiency was sought out in all phases of design.
- The apparatus bays were designed to avoid excess energy use through the implementation of “passive” cooling via shading and high-performance glass in conjunction with high-speed fans.
- Heating is delivered to the apparatus bays by a radiant floor system tied to the geothermal heat.
- Contact switches turn off the mechanical heating and cooling units when a window or door is open in the respective space to avoid wasting energy.
- Energy efficient, fast-acting folding doors help reduce heat loss and require less maintenance.
- The walls achieved an r-value of R-34 and the roof achieved R-60.
- Just on efficiency alone, Fire Station 14 is projected to be five times more energy efficient than a typical fire station, contributing to a carbon emission reduction of nearly 902,000 pounds of carbon per year.
- To save water, Fire Station 14 incorporates low-flow plumbing fixtures, xeriscaping, and drought-tolerant plantings. Water use is expected to be reduced by 20% for plumbing fixtures and 50% for landscaping from the typical baseline.
- YouTube [https://www.youtube.com/watch?v=N2SQ5L1H\\_W4](https://www.youtube.com/watch?v=N2SQ5L1H_W4)

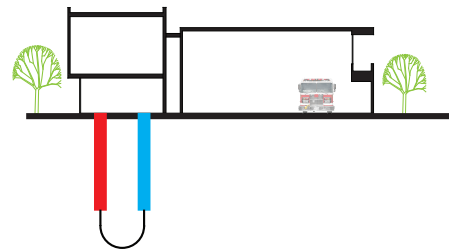
### Carbon Emissions Reduction:

SLC Fire Station 14 is projected to be 5X more energy efficient than the typical fire station contributing to a carbon emission reduction of nearly 902,000 pounds of carbon per year



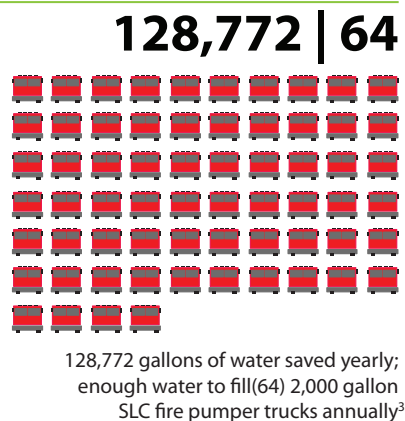
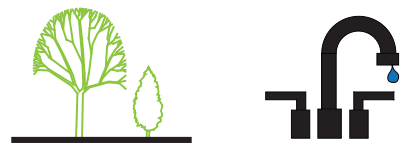
### Geothermal Heating & Cooling:

SLC Fire Station 14 utilizes a geothermal heating & cooling system which makes use of the earth's ambient temperature to heat and cool the building. (40) vertical bores extend 300' down into the earth.



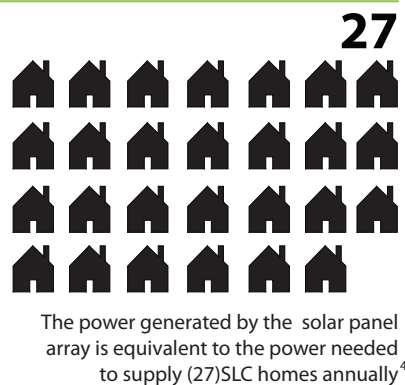
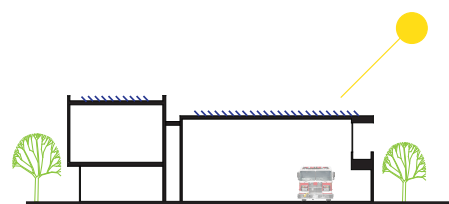
### Water Efficiency:

SLC Fire Station 14 utilizes several strategies for reducing water consumption including; low flow plumbing fixtures, xeriscaping and drought tolerant plantings. Water use is expected to be reduced by 20% for plumbing fixtures and 50% for landscaping from the typical baseline.



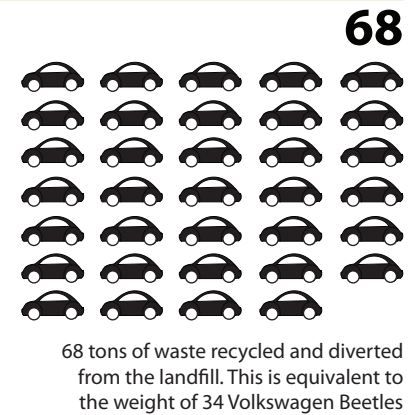
### Photovoltaic Energy:

The solar panel array mounted on the roof of SLC Fire Station 14 contains 300 panels which generate 108,000 watts of power at any point in time.



### Construction Waste Management:

Over 55% of all construction waste was recycled and diverted from landfills



### Sustainable Design Strategies:

SLC Fire Station 14 employs a variety of active and passive energy saving measures to meet the goals of NET ZERO energy, meaning all energy consumed by the fire station is created on site.



Electrical systems were thoughtfully designed to conserve energy. From LED lighting and occupancy sensors to an in depth study of plug loads and appliance selections, efficiency was sought out in all phases of the design. Contact switches turn off the mechanical heating and cooling units when a window or door is open in the respective space to avoid wasting energy.



Glass used for the Fire Station windows consists of a triple paned, argon gas filled unit with a ceramic frit dot pattern screen printed onto the glass to help reduce heat gain within the building. 75% of the heat gain of a typical clear single paned window is eliminated with the glazing used on Fire Station 14.



The apparatus bays within the Fire Station were designed to avoid excess energy use through the implementation of "passive" cooling via shading devices and high performance glass in conjunction with high speed fans. Heating is delivered to the Apparatus Bays by a radiant floor system tied to geothermal heat.



The design team conducted ongoing evaluations of design decisions through the use of energy models and continual discussions with the owner and building users. A working energy model allowed for the design team to assess impacts of MEP systems, selection and nuances of envelope design including window placement and r-values of walls and roof assemblies. The wall types used on Fire Station 14 incorporate continuous rigid exterior insulation as well as a highly insulated roof assembly to achieve r-values of R-34 at the walls and R-60 at the roof.

### Footnotes Sources:

1. Energy consumption is compared to typical Fire Station EUI as reported by Energy Star Portfolio Manager 2016. Carbon emission reduction was estimated through the use of energy model projections as compared to ASHRAE code required minimums.
2. BTU's of a typical 2,000 sf residence were based on EIA reported averages as of 2012 as compared to Fire Station 14 energy model projections.
3. Per capita water usage based on Utah DNR Water Resources Residential Water Use Study; 62 gallons of indoor water use per capita and 134 gallons of water use per capita, daily.
4. Watts per square foot for a typical 2,000 sf residential household estimated at 2 watts per square foot.

### Design Team:

<b>Blalock and Partners Architectural Design Studio:</b>	Architectural Design
<b>Van Boerum and Frank:</b>	Mechanical Engineering & Design
<b>Spectrum Engineers:</b>	Electrical Engineering & Design
<b>Andersen Wahlen Engineers:</b>	Civil Engineering
<b>G. Brown Landscape Architects:</b>	Landscape Design
<b>TCA Architecture &amp; Planning:</b>	Architectural Consultant

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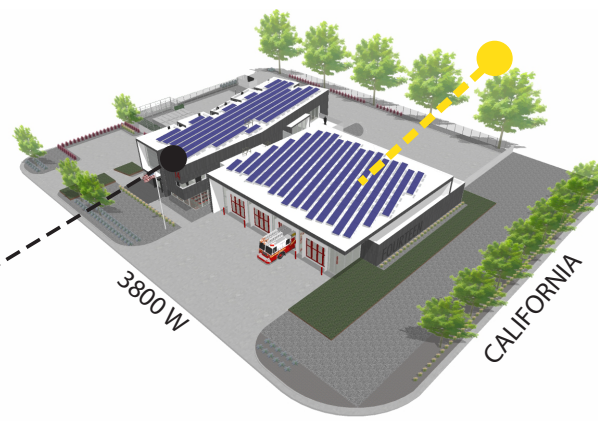
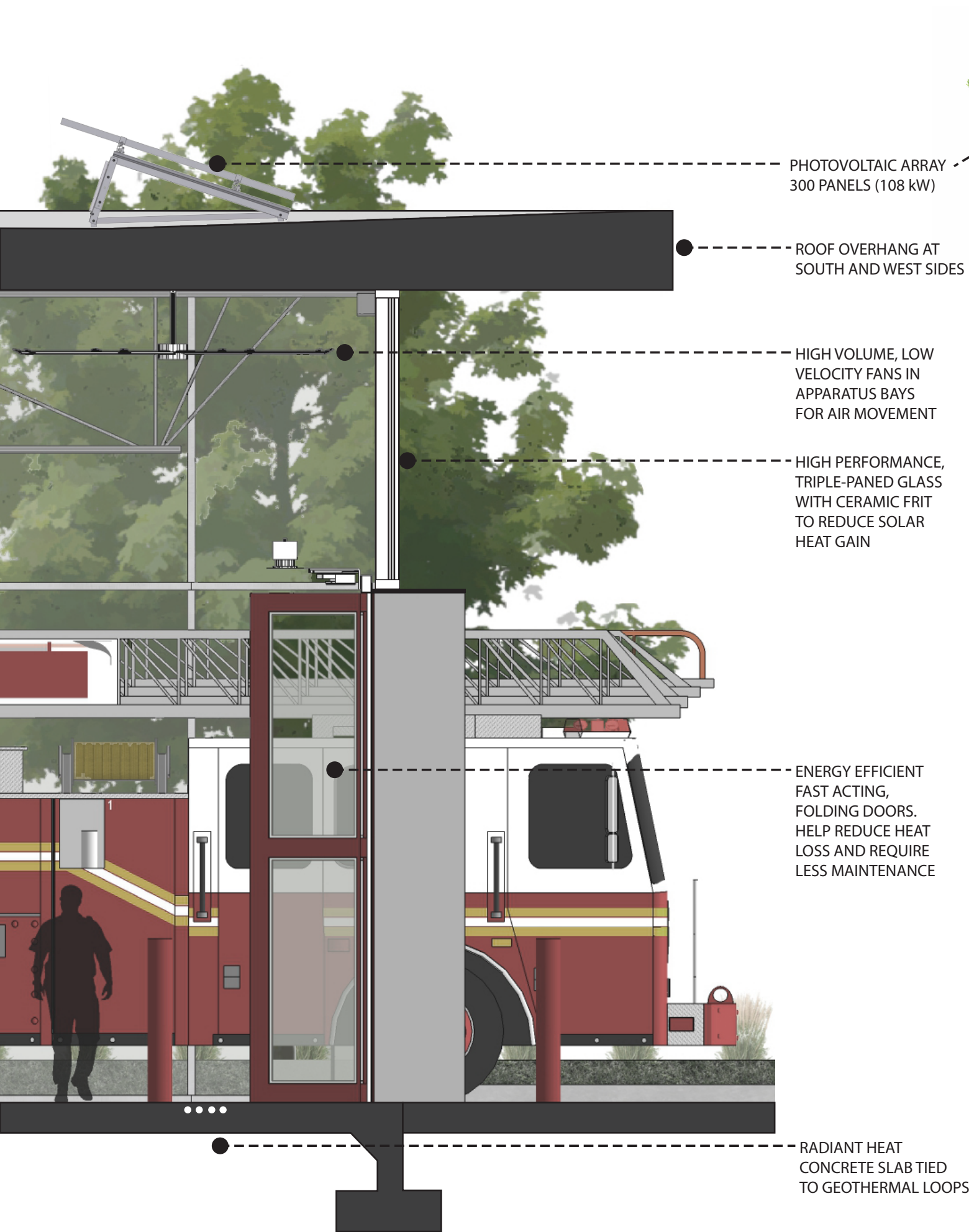
**SLC**  
FIRE STATION

**14**

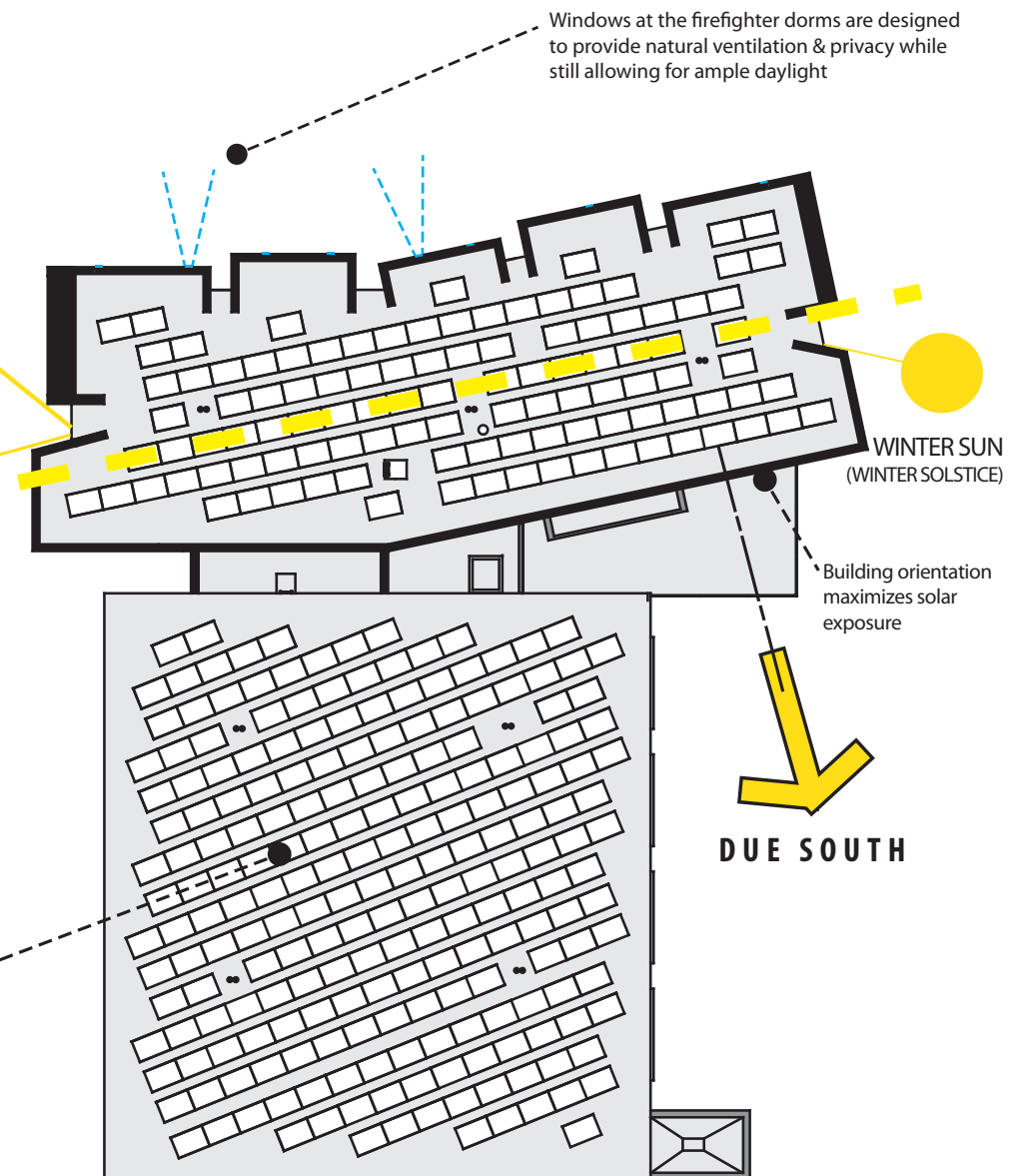


and  
**blalock**  
PARTNERS  
architectural design studio

# PASSIVE SOLAR DESIGN, BUILDING ORIENTATION & DAYLIGHTING



The form of the building and position of window openings are designed to capture daylighting during winter months while providing shading in harsh summer months



The roofs are treated as solar collectors; a total of 300 solar panels generate enough electricity to offset 100% of the power consumption of the building

Fire Station Budget Planning

**DRAFT**

Project Number 2018-???

**New 2 Bay, 4 Bunk Fire Station**

Based on Total Building Area of 7,000 SF

**EXAMPLE PROJECT BUDGET**

5-Oct-18

DESCRIPTION	SQUARE FEET	LOW	HIGH	LOW COST	HIGH COST
<b>BUILDING AREAS</b>					
Entry, Lobby	150	\$300	\$310	\$ 45,000	\$ 46,500
Office Areas	150	\$200	\$210	\$ 30,000	\$ 31,500
Kitchen, Toilets, Lockers, Laundry	1,600	\$300	\$310	\$ 480,000	\$ 496,000
Living Quarters General Areas	1,600	\$200	\$210	\$ 320,000	\$ 336,000
Building Support Areas	600	\$180	\$190	\$ 108,000	\$ 114,000
Apparatus Bays	2,300	\$170	\$180	\$ 391,000	\$ 414,000
Apparatus Support Zone	600	\$200	\$220	\$ 120,000	\$ 132,000
Mezzanine Zone	0	\$85	\$100	\$ -	\$ -
<b>Building Totals</b>	<b>7,000</b>	<b>\$213</b>	<b>\$224</b>	<b>\$ 1,494,000</b>	<b>\$ 1,570,000</b>
<b>OTHER STRUCTURES / FEATURES</b>					
Emergency Generator (Natural Gas)	7,000	\$6	\$8	\$ 42,000	\$ 56,000
A/V, Access Control, Station Alerting, LV Wiring	7,000	\$7	\$8	\$ 49,000	\$ 56,000
Patio with Masonry Screen Wall	\$ 12,000	20%	20%	\$ 9,600	\$ 14,400
Masonry Trash Enclosure	200	\$65	\$75	\$ 13,000	\$ 15,000
<b>Other Structures &amp; Features Total</b>				<b>\$ 113,600</b>	<b>\$ 141,400</b>
<b>SITE COSTS</b>					
	Allowance/Units	Low	High		
Environmental Clean-Up (by Owner)	N.I.C.			\$ -	\$ -
Demolition of Existing Building & Site Work	\$ 50,000	10%	10%	\$ 45,000	\$ 55,000
Tree & Underbrush Clearing	\$ 5,000	20%	20%	\$ 4,000	\$ 6,000
Site Earthwork, Erosion Control	2.00	\$55,000	\$65,000	\$ 110,000	\$ 130,000
Concrete Pavement	22,000	\$7	\$9	\$ 154,000	\$ 198,000
Concrete Sidewalks	2,000	\$5	\$6	\$ 10,000	\$ 12,000
Concrete Curbs	1,200	\$25	\$29	\$ 30,000	\$ 34,800
Storm Sewer Piping & Structures	\$ 80,000	20%	20%	\$ 64,000	\$ 96,000
Electrical & Gas Utilities	\$ 25,000	10%	10%	\$ 22,500	\$ 27,500
Sanitary Sewer Service	\$ 40,000	10%	10%	\$ 36,000	\$ 44,000
Water Service	\$ 40,000	10%	10%	\$ 36,000	\$ 44,000
Site Lighting	20	\$6,000	\$7,000	\$ 120,000	\$ 140,000
Landscaping (no irrigation)	2.40	\$20,000	\$40,000	\$ 48,000	\$ 96,000
Site Furniture & Flagpoles	\$ 5,000	10%	10%	\$ 4,500	\$ 5,500
Exterior Monument Sign	\$ 8,000	10%	10%	\$ 7,200	\$ 8,800
Fencing & Gate	\$ -	20%	20%	\$ -	\$ -
<b>Site Totals</b>				<b>\$ 691,200</b>	<b>\$ 897,600</b>
<b>Total Trade Contractors' Costs</b>				<b>\$ 2,298,800</b>	<b>\$ 2,609,000</b>
<b>Prime Contractor General Conditions, Insur. &amp; Fee</b>	<b>10.0%</b>			<b>\$ 229,880</b>	<b>\$ 260,900</b>
<b>Sub-Total</b>				<b>\$ 2,528,680</b>	<b>\$ 2,869,900</b>
Escalation to 2020	8.0%			\$ 202,294	\$ 229,592
Project Contingency	10.0%			\$ 273,097.44	\$ 309,949.20
<b>TOTAL CONSTRUCTION COST</b>				<b>\$ 3,004,072</b>	<b>\$ 3,409,441</b>
Construction Cost PSF				\$ 429.15	\$ 487.06
<b>OTHER COSTS</b>					
Surveys, Testing & Commissioning	3.0%			\$ 90,122	\$ 102,283
Furniture, Fixtures & Equipment	4.0%			\$ 120,163	\$ 136,378
Consultants	10.0%			\$ 300,407	\$ 340,944
Moving & Other Owner Costs	3.0%			\$ 90,122	\$ 102,283
<b>Other Costs Sub-Total</b>				<b>\$ 600,814</b>	<b>\$ 681,888</b>
<b>TOTAL PROJECT BUDGET</b>				<b>\$ 3,604,886.21</b>	<b>\$ 4,091,329.44</b>
Total Cost PSF				\$ 514.98	\$ 584.48
Alternate to add Geo-Thermal HVAC System				\$ 250,000	\$ 350,000
LEED Certification for Building				\$ 100,000	\$ 150,000
Net Zero Building Added Features (PV Electrical Panels)				\$ 300,000	\$ 500,000

Not Including: Phone System, Computers, Antenna, Land Acquisition, Escalation beyond 2020 (figure 4% per year)

# NFPA Standard 1710

## Organization and Deployment of Fire Suppression Operations, EMS and Special Operations in Career Fire Departments

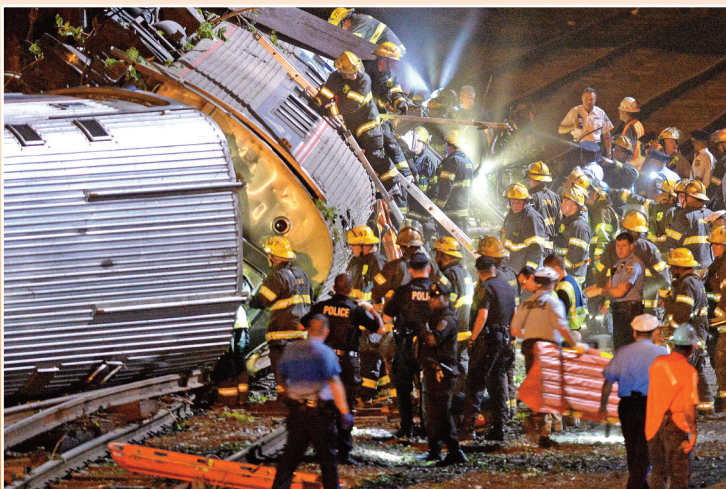
### History and Purpose

- The 1710 Standard for was originally released in 2001. Following, there have been three revisions (2004, 2010, 2016) with the most recent released in September 2016.
- The standard is applicable to substantially all CAREER fire departments and provides the MINIMUM requirements for resource deployment for fire suppression, EMS and Special Operations while also addressing fire fighter occupational health and safety.
- The 1710 Standard addresses structure fire in three hazard levels. These included low hazard (residential single-family dwellings), medium hazard (three story garden apartments or strip malls), and high hazard structures (high-rise buildings).
- The Standard addresses fire suppression, EMS, Aircraft Rescue and Firefighting, Marine Rescue and Firefighting, Wildland Firefighting, and Mutual and Auto Aid.

### Fire Suppression and Special Operations Provisions

- "Company" is defined as:
  - Group of members under direct supervision
  - Trained and equipped to perform assigned tasks
  - Organized and identified as engine, ladder, rescue, squad or multi-functional companies
  - Group of members who arrive at scene and operate with one apparatus
- EXCEPTION to company arriving on one apparatus:
  - Multiple apparatuses are assigned, dispatched and arrive together
  - Continuously operate together
  - Managed by a single officer

- An Initial Alarm is personnel, equipment and resources originally dispatched upon notification of a structure fire.
- Performance Objectives
  - Alarm Answering Time
    - 15 sec 95%
    - 40 sec 99%
  - Alarm Processing Time
    - 64 sec 90%
    - 106 sec 95%
  - Turnout Time =
    - 60 sec EMS
    - 80 sec Fire
  - First Engine Arrive on Scene Time
    - 240 sec (4 min)
  - Initial Full Alarm (Low and Medium Hazard) Time
    - 480 sec (8 min)
  - Initial Full Alarm – High Hazard/ High-Rise Time
    - 610 sec (10 min 10 sec)
- Fire departments shall set forth criteria for various types of incidents to which they are required/expected to respond. These types of incidents should include but not be limited to the following:
  - Natural disaster
  - Acts of terrorism
  - WMD
  - Large-scale mass casualty



■ Given expected firefighting conditions, the number of on-duty members shall be determined through task analysis considering the following criteria:

- Life hazard protected population
- Safe and effective performance
- Potential property loss
- Hazard levels of properties
- Fireground tactics employed

■ Company Staffing (Crew Size)

- Engine = minimum 4 on duty
  - High volume/geographic restrictions = 5 minimum on duty
  - Tactical hazards dense urban area = 6 minimum on duty
- Truck = minimum 4 on duty
  - High volume/geographic restrictions = 5 minimum on duty
  - Tactical hazards dense urban area = 6 minimum on duty

■ Initial Alarm Deployment (\*number of fire fighters including officers)

- Low hazard = 15 Fire fighters
- Medium hazard = 28 Fire fighters
- High hazard = 43 Fire fighters

## EMS Provisions

■ The fire department shall clearly document its role, responsibilities, functions and objectives for the delivery of EMS. EMS operations shall be organized to ensure the fire department's capability and includes members, equipment and resources to deploy the initial arriving company and additional alarm assignments.

■ EMS Treatment Levels include:

- First Responder
- Basic Life Support (BLS)
- Advanced Life Support (ALS)

■ MINIMUM EMS Provision = First responder/AED

■ Authority-Having Jurisdiction (AHJ) should determine if Fire Department provides BLS, ALS services, and/or transport. Patient treatment associated with each level of EMS should be determined by the AHJ based on requirements and licensing within each state/province.

■ On-duty EMS units shall be staffed with the minimum members necessary for emergency medical care relative to the level of EMS provided by the fire department.

■ Personnel deployed to ALS emergency responses shall include:

- A minimum of two members trained at the emergency medical technician–paramedic level
- AND two members trained at the BLS level arriving on scene within the established travel time.

■ All fire departments with ALS services shall have a named **medical director** with the responsibility to oversee and ensure quality medical care in accordance with state or provincial laws or regulations and must have a mechanism for immediate communication with EMS supervision and medical oversight.

