



Moorhead Fire Department

## Live Burn Plan

### Clay County Courthouse Campus Expansion

09/26/2016 through 09/28/2016

1002, 1006, 1010 & 1020 9<sup>th</sup> Ave N

Updated 09/15/2016



Casey Stotts, Lead Instructor (Minnesota State Fire Marshal Division)

IAAI Burn to Learn Program (9/26/2016 & 9/27/2016)

MFSCB Fire Investigator Certification Exams (9/28/2016)

# GENERAL TRAINING INFORMATION

## Overview

Clay County, MN has purchased most of the properties in a 2 square block area north of the existing Law Enforcement Center and Courthouse for construction of a new jail, law enforcement center, and related infrastructure. Most of these properties are being removed conventionally as highlighted in blue in figure 1. Four of these properties have been reserved for fire investigation training with final demolition by burning as highlighted in red in figure 1. All of the buildings on the western block and many on the eastern block will likely be completely removed prior to the live burn training.



Figure 1 – Area Overview

It is anticipated that the three adjacent properties at 1002-1010 9<sup>th</sup> Ave N will be used for Burn to Learn training from 8am-5pm on Monday, September 26<sup>th</sup>, 2016 and Tuesday, September 27<sup>th</sup>, 2016. This training will consist of a series of small training fires, typically one room and contents, which are setup by the instructor and students (fire investigators in ND and MN), burned and extinguished. Each fire is unique and tests hypothesis of how fire will behave under particular conditions and with particular fuels. Each fire is then investigated to determine which post-fire conditions are indicative of known pre-fire causes and contributing factors.

It is then anticipated that the property at 1020 9<sup>th</sup> Ave N will be prepared for Fire investigator certification testing by the Minnesota Fire service Certification Board (MFSCB) which will occur during the day on Wednesday, September 28<sup>th</sup>, 2016. The preparation will consist of setting several small fires, typically one room and contents, with varying contents, often following typical arson methods. The preparation should occur on Tuesday, September 27<sup>th</sup>, 2016 in the evening. Certification candidates are typically existing or prospective fire investigators working on fire departments or private companies in ND and MN. Candidates complete written testing and, investigate an assigned fire in the structure, collect evidence, and submit fire reports for evaluation by the MFSCB.

This training differs from traditional firefighter live-fire training which is meant to provide fire suppression personnel experience at extinguishing fires in a structure. Instead, the sole purpose of this training is to provide individuals with education and training in fire cause and origin investigation. The lead instructor will be Casey Stotts, Investigator with the Minnesota State Fire Marshal Division, Minnesota Department of Public Safety. He has extensive experience in live burn and fire investigation training, is active with fire investigation training programs provided by the Minnesota Chapter of the International Association of Arson Investigators and is a Minnesota Board of Fire Training and Education (MBFTE) approved live burn instructor. He will be assisted by Moorhead Fire Department (MFD) personnel who are MBFTE qualified fire instructors, are MFSCB Fire Instructors and have experience conducting live burn in Moorhead and through Minnesota State Community and Technical College.

It is then finally anticipated that all four structures will be systematically re-ignited and allowed to completely burn, under controlled conditions the evening of Wednesday, September 28<sup>th</sup>, 2016. The order of final burning will be dictated by wind and traffic conditions beginning, most likely with the westernmost structure, continuing eastward after each previous structure has reached a significant enough decay phase so the next structure can be safely ignited.

The demolition contractor that is removing the rest of the properties in this two block area will also be removing the remains of the burned properties in accordance with procedures in place at the Clay County Landfill.

## Area Site Plan

The area site plan as shown in figure 2 provides a high-level overview of the training area. Two hydrants will be used during live-fire evolutions, each supplying a separate MFD fire engine with a minimum 1250 GPM rated capacity and minimum 750 gallon water tank. The hydrants can supply a combined estimated 3,183 gallons per minute based on computer modeling number estimates by Moorhead Public Service staff. The hydrants lie on a 6" residential main, in a fully looped and cross connected system, adjacent to a 12" main as shown in figure 3. MFD personnel who are MFSCB Fire Apparatus Operators will operate the engines at all times. Primary and backup lines (fire hoses with nozzles) will be employed, one from each engine, staffed by MFD personnel and/or live burn instructors. Fire investigation students who are not MFD personnel will not be extinguishing fires, but may be operating in an investigative mode after initial extinguishment, but prior to the complete elimination of smoldering products, necessitating the use of Self Contained Breathing Apparatus (SCBA) and Structural Fire Protective Clothing (SFPC).

At this point in the area demolition process, 9<sup>th</sup> Ave N will be completely closed for demolition including vehicle parking and street access, providing ample safe vehicle parking and working areas for students and staff. The green area indicates a controlled zone (control zone) for students, instructors, fire suppression and support personnel, and their equipment. The control zone will be signed and barricaded and will grow and shrink based on the training planned at the time. It is expected that 11<sup>th</sup> St N will be closed during the final burn down of 1020 9<sup>th</sup> Ave N and possibly during other live burn times as weather conditions warrant. More detailed site plans are provided for each training event in this burn plan.

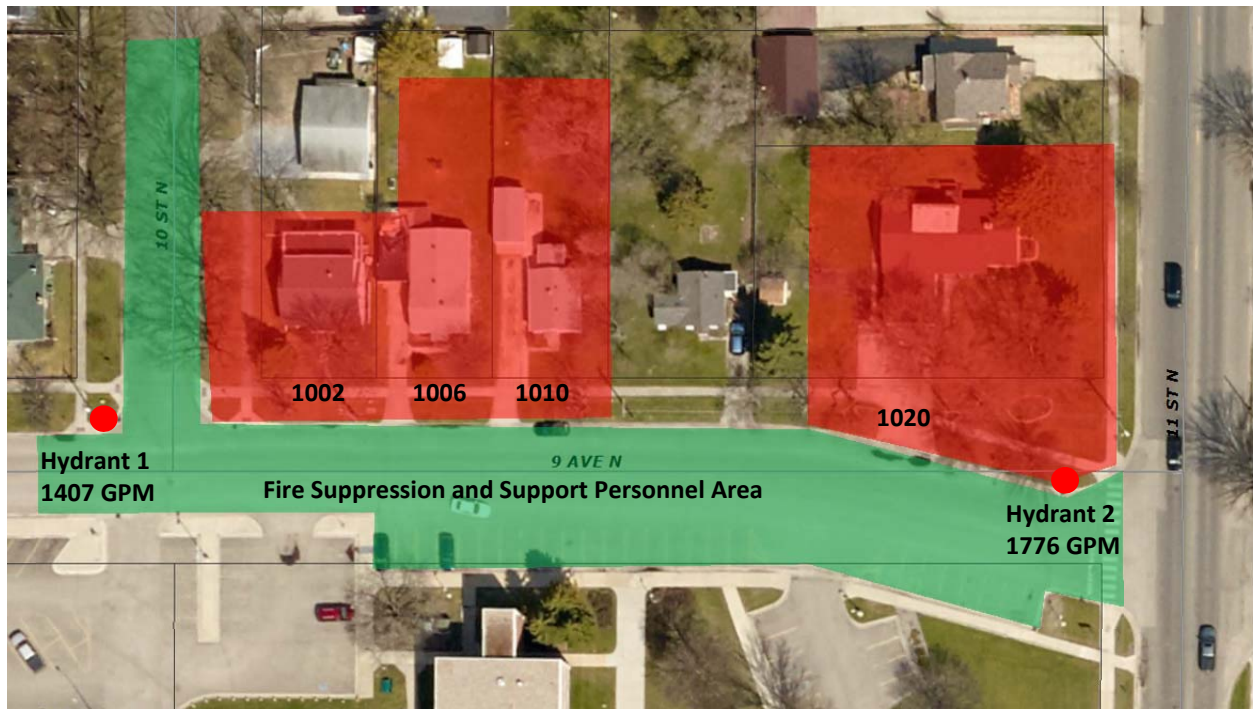


Figure 2 – Area Site Plan

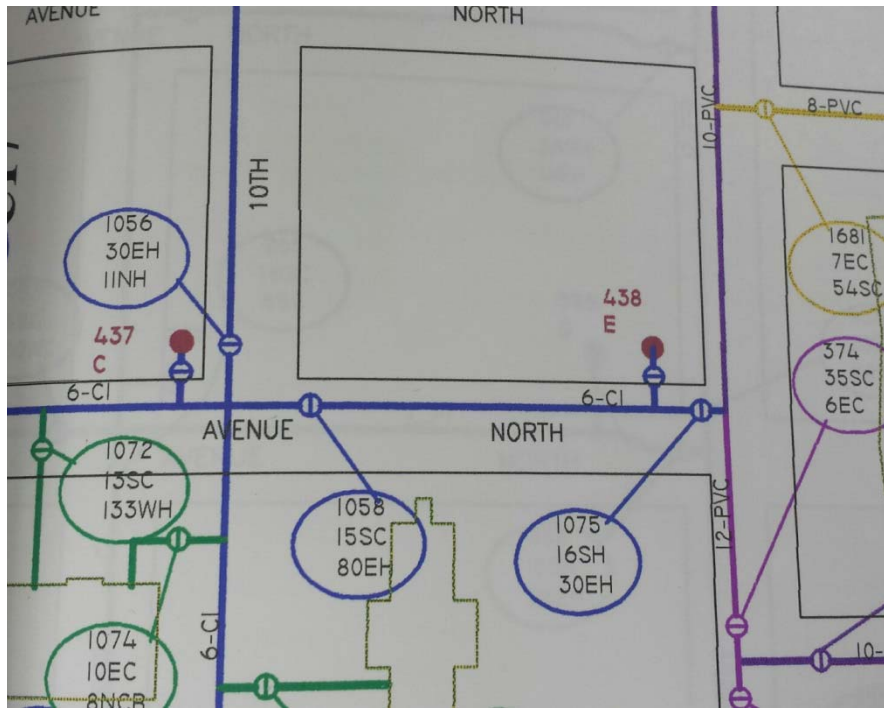


Figure 3 – Area Water Supply

## **Proof of Clear Title**

As the training properties have been purchased by Clay County, the agency which currently owns and has directed the demolition of the building as well as the agency that would provide documentation of such for third party proof of clear title and cancellation of insurance, such documentation has already occurred legally and is unnecessary of this training.

## **Owners Release to Damage or Burn Structure**

The owner, Clay County, MN, has issued contracts to demolish the properties in question as evidenced in the Minutes of the Clay County Board of Commissioners meeting on Tuesday, August 2<sup>nd</sup>, 2016.

## **Acknowledgment of Building Use Agreement & Post-Burn/Use Property Condition**

Clay County has contracted with Excavating Inc to demolish the training properties in question and haul the demolished material to approved landfills, including post-training burned materials. The City and County train with each other, on each other's property, and under conditions that are potentially hazardous in accordance with the jobs we perform. No additional documentation of responsibilities is necessary.

# PHASE 1 – BURN TO LEARN TRAINING

## Overview

This course is designed to provide the student with a detailed understanding of fire dynamics, fire testing and the combustion reactions of various materials encountered by fire and arson investigators. Numerous field demonstrations will allow students to observe a variety of combustion scenarios and gain practical experience that will help them on the fire scene and in the courtroom. This course will conduct live test burns that explore: fire-safe cigarettes; cigarettes starting potted plants on fire; spontaneous combustion of linseed oil and stains; flammable liquid pour patterns; aerosol can behavior when attacked by fire; gasoline and cigarettes, lighter behavior when attacked by fire; toaster and coffee maker fires; cellulose insulation fires; and more.



Figure 4 – Learn to Burn Site Control Plan

### KEY

-  Construction advisory signs
-  Fire training ahead sign
-  Road closed signs and/or barricades
-  Orange cones

## Burn to Learn Training Plot Plan

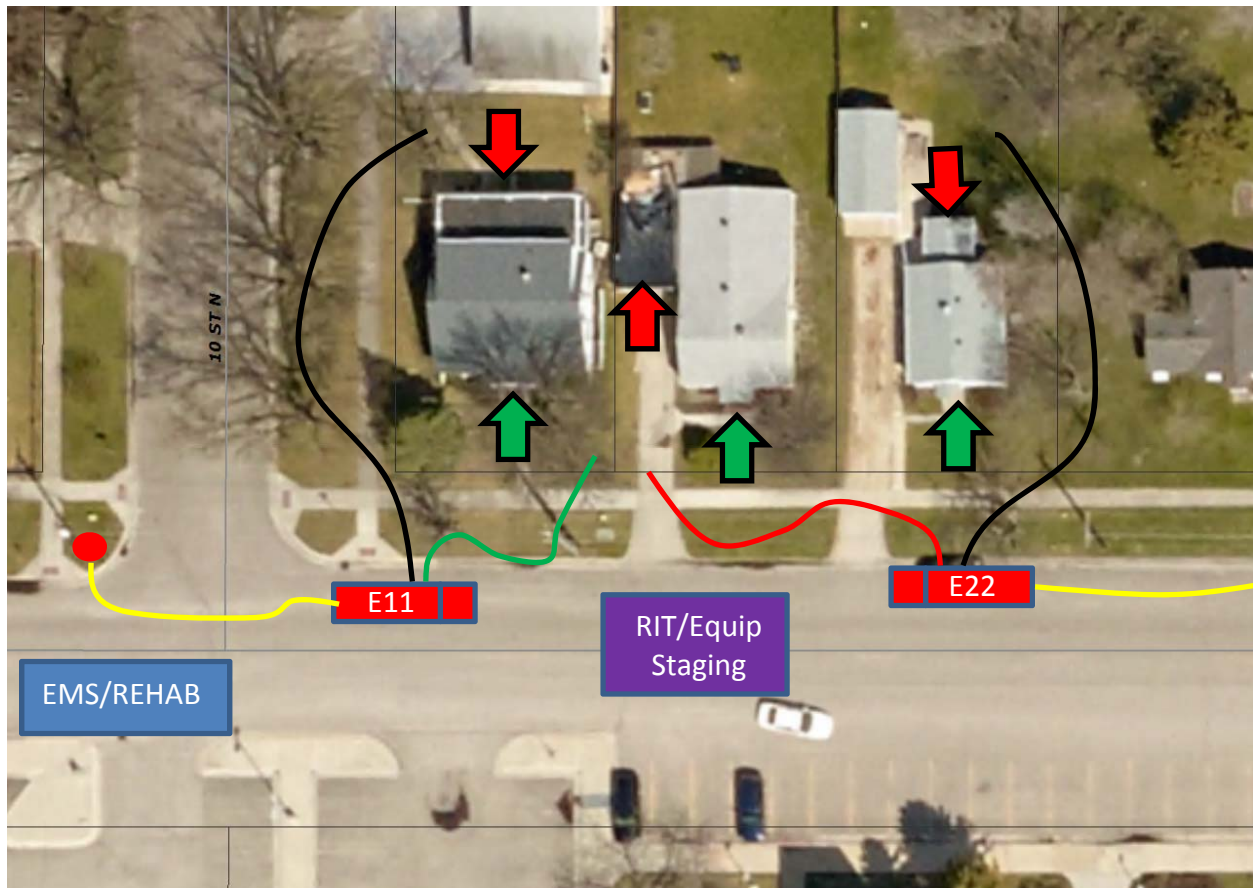


Figure 5 – Burn to Learn Training Plot Plan

Training evolutions will occur in stages. Several rooms will be equipped with furnishings and ignition sources, some incendiary, some accidental. Each individual area will then be systematically ignited and allowed to burn to a predetermined point, often just after flashover of the individual room contents before being extinguished. Burning in a new room or area will not occur until the previous area has been extinguished. Training will also occur in one building at a time.

NFPA 1403 standard recommendations will be followed regarding staffing and assignments. A RIC crew will be assigned during the duration of live fire events, staging with their equipment in the indicated area. A safety officer shall be appointed for all live fire training evolutions. A minimum of two (2) two-person fire control teams shall operate the primary line (indicated as a green line above) and the backup line (indicated as a red line above). One of these team members will be designated as the ignition officer. Additional two-person fire control teams may operate exposure lines (indicated as black lines above). Primary entrance/exit points are indicated by green arrows above. Secondary entrance/exit points are indicated by red arrows



above. Dedicated EMS staff will be posted in the indicated area and will also provide rehab services.

A combination of lecture, burn area setup, live fire exercises, and post-fire examinations will occur from the hours of 8am to 5pm on Monday, September 26<sup>th</sup>, and Tuesday, September 27<sup>th</sup>, 2016. Properties for one block north and west and half a block east of the burn buildings will have been vacated for area demolition which should provide an adequate distance for smoke to rise beyond a level to cause significant safety concerns. Properties to the south are owned by Clay County and should be protected by distance as well.

## PHASE 2 – CERTIFICATION PREPARATION

### Overview

Area fire investigation staff will be given the opportunity to complete the written and practical fire examination skills test to become certified Fire Investigators through the MFSCB. This phase of the training process will involve preparing several residential burns for post-fire examination by fire investigator candidates.



Figure 6 – Certification Preparation Site Control Plan

#### KEY

- |   |  |
|---|--|
|  Construction advisory signs         |  Fire training ahead sign |
|  Road closed signs and/or barricades |  Orange cones             |

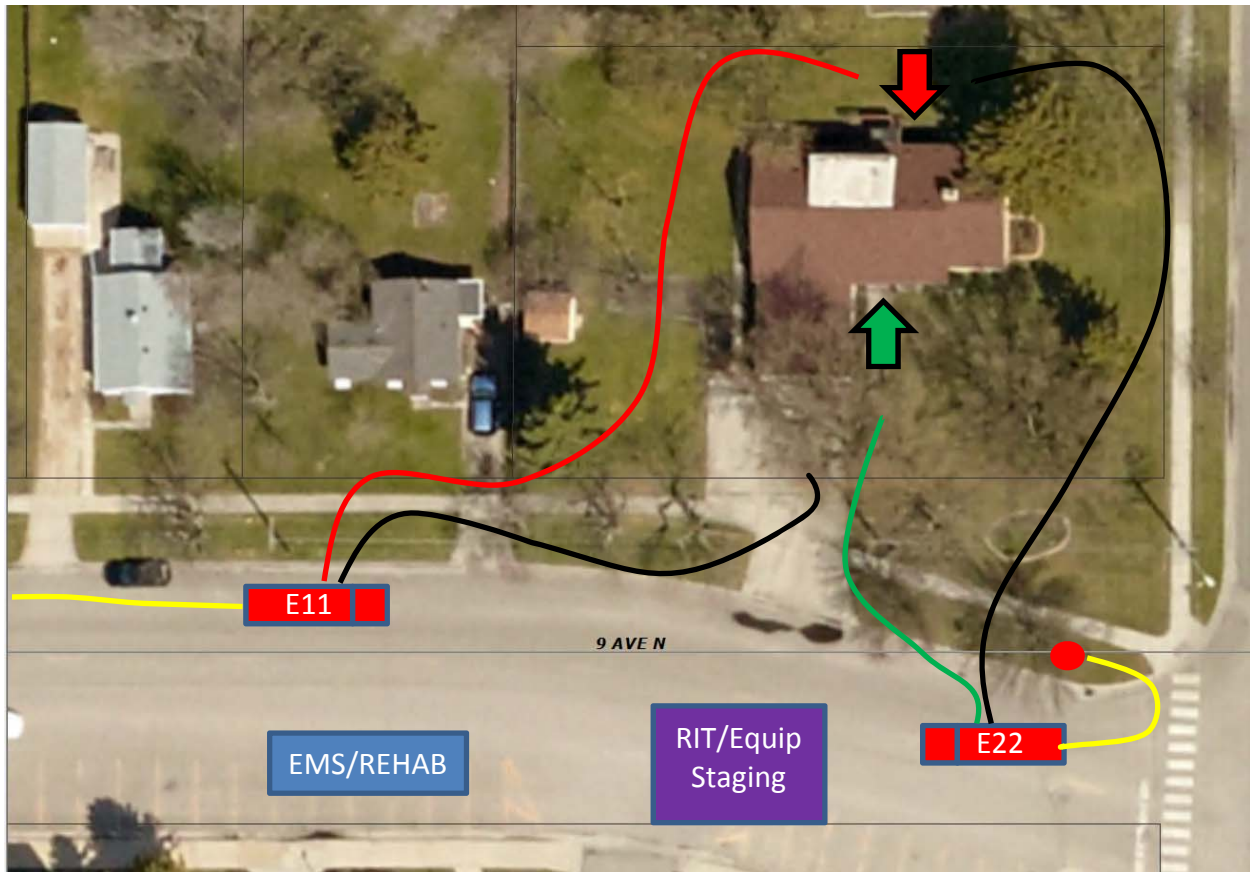


Figure 7 – Certification Preparation Plot Plan

Certification test areas will be developed in stages. Several rooms will be equipped with furnishings and ignition sources, some incendiary, some accidental. Each individual area will then be systematically ignited and allowed to burn to a predetermined point, often just after flashover of the individual room contents before being extinguished. Burning in a new room or area will not occur until the previous area has been extinguished.

NFPA 1403 standard recommendations will be followed regarding staffing and assignments. A RIC crew will be assigned during the duration of live fire events, staging with their equipment in the indicated area. A safety officer shall be appointed for all live fire training evolutions. A minimum of two (2) two-person fire control teams shall operate the primary line (indicated as a green line above) and the backup line (indicated as a red line above). One of these team members will be designated as the ignition officer. Additional two-person fire control teams may operate exposure lines (indicates as black lines above). Primary entrance/exit points are indicated by green arrows above. Secondary entrance/exit points are indicated by red arrows above. Dedicated EMS staff will be posted in the indicated area and will also provide rehab services.

Constructing burn rooms followed by burning and extinguishment will occur from the hours of 5pm to 10pm on Tuesday, September 27<sup>th</sup>, 2016. Properties for one block north and west and

will have been vacated for area demolition which should provide an adequate distance for smoke to rise beyond a level to cause significant safety concerns. Properties to the south are owned by Clay County and should be protected by distance as well. An elementary school and a collector road lie immediately adjacent to the burn structure. The timing of the burn is designed to minimize the impact to the school and to the area vehicle traffic. Burn sets that will be of a higher impact will be scheduled for as late a time as possible as traffic flows decrease. A traffic detour plan is in place for the burn down on Wednesday. Signage and barriers will be staged adjacent to the deployment points allowing for the detour to be established if weather conditions or distracted drivers warrant the detour deployment.

# PHASE 3 – CERTIFICATION TESTING

## Overview

Area fire investigation staff will be given the opportunity to complete the written and practical fire examination skills test to become International Fire Service Accreditation Council and National Board on Fire Service Professional Qualifications certified Fire Investigators through the MFSCB. Casey Stotts, the lead instructor for the Burn to Learn portion of this training will also be the lead examiner for the certification exam and may be assisted by other MFSCB staff. NO LIVE BURING will be conducted at this point in the training process. The exam is intended to be a post-fire analysis of an incident scene.

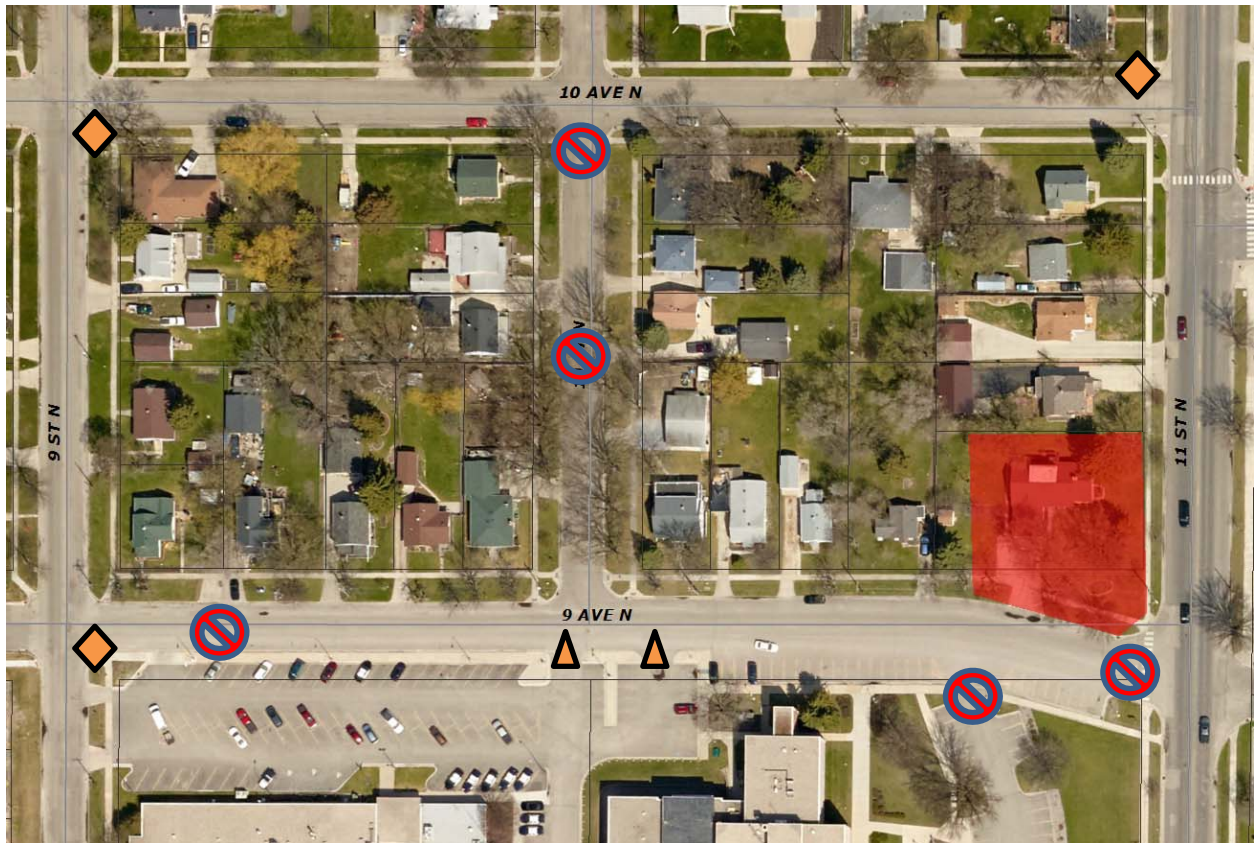






Figure 8 – Certification Testing Site Control Plan

### KEY

-  Construction advisory signs
-  Road closed signs and/or barricades
-  Fire training ahead sign
-  Orange cones

The questions and skills tested are designed to test the candidate on the knowledge and proficiencies outlined in NFPA 1033, 2014 Edition, for Fire Investigator. The candidate shall be at least 18 years of age and shall be one or more of the following: Firefighter II certified or P.O.S.T. certified or a local or state fire marshal whose job description includes fire investigation. Applicants must have had 24 hours of Fire Investigator training within the last three years and be certified to Haz-Mat Awareness level as described in NFPA 472 4.2.1 thru 4.2.3. The candidate shall have a minimum of three years of experience in some phase of fire or law enforcement service, be of good moral character and shall not have been convicted of or plead guilty to a felony. The Skills Test consists of the candidate demonstrating proficiency in eight or more of the 16 proficiencies required in the NFPA 1033 standard. Skill stations include: Fire Ground Security, Exterior Survey, Interior Survey, Interpret Burn Patterns, Interpret and Analyze Fire Patterns, Correlate Burn Patterns, Reconstruct Area of Origin, Building Systems, Effects of Explosions, Diagram Scene, Photographically Document Scene, and five different elements of Investigative Notes.

# PHASE 5 – TRAINING STRUCTURE BURN DOWN

## Overview

When the fire investigation training and certification testing has been completed, a controlled burn down of the structures will occur. This process is necessary to reduce the burned structural materials to the smallest amount possible before final disposal. Burned materials cannot be disposed of in demolition landfills, but must be discarded in lined sanitary landfills which is considerably more expensive. Without complete burn down at the end of the training, disposal would be cost prohibitive and the demolition contractor would elect traditional demolition and disposal versus allowing us to gain valuable fire investigator training.

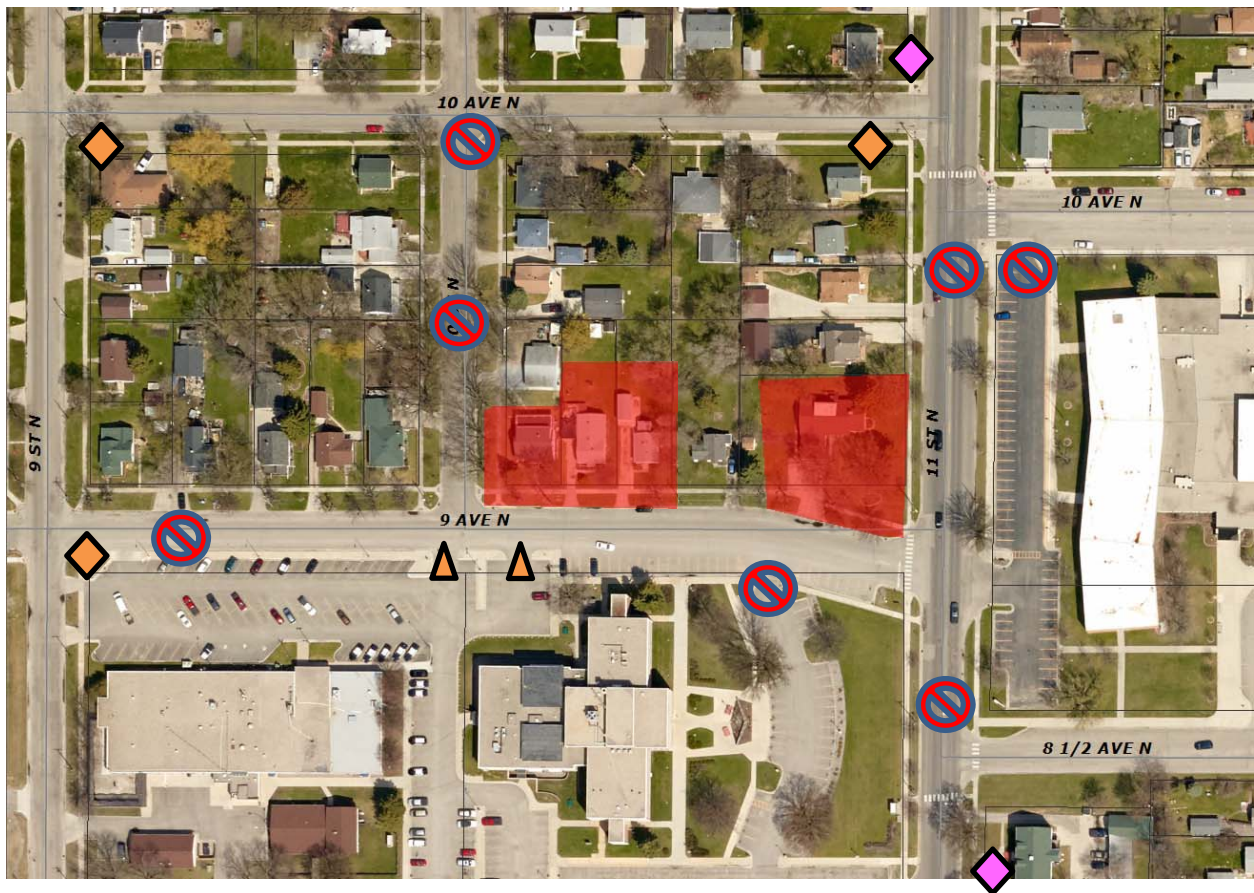


Figure 9 – Burn Down Site Control Plan

### KEY

- Construction advisory signs
- Fire training ahead sign
- Road closed signs and/or barricades
- Orange cones

Final burn down of the structures will occur on the evening of Wednesday, September 28th, 2016 after certification testing is complete. The order and timing of final burning will be dictated by weather conditions beginning, most likely with the westernmost structure, continuing eastward after each previous structure has reached a significant enough decay phase so the next structure can be safely ignited. It is anticipated that traffic on 11<sup>th</sup> St N will be rerouted as indicated in figure 10 below for the duration of the burn down, likely from 5pm to 10pm.

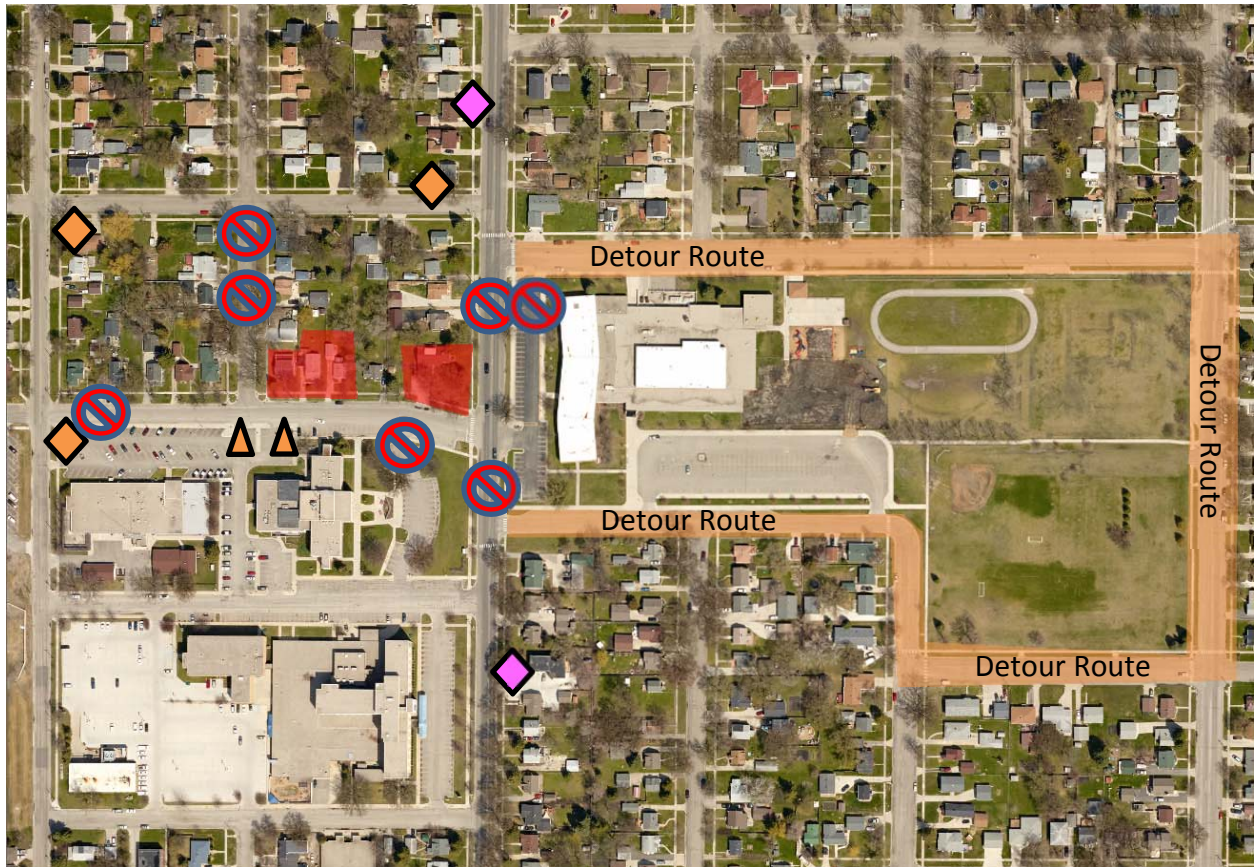


Figure 10 – Burn Down Traffic Control Plan

KEY

- |   |  |
|---|--|
|  Construction advisory signs         |  Fire training ahead sign |
|  Road closed signs and/or barricades |  Orange cones             |



The final burn down process will be a primarily defensive operation that is meant to control the rate of burning and fire brand and ember production if necessary. The exception will be during the initial ignition of the structures where similar safeguards will be provided to interior staff as during phase 1 of the training process. Where possible, final fire sets will be designed to allow ignition from outside the structure to increase safety. Fire crews will not be extinguishing and re-igniting any of the structures nor conducting any interior firefighting training during this phase of the overall training process.



Figure 11 – Burn Down Site Plan

Although no interior training will be conducted, and we intend to ignite the structures from the exterior where possible, it may be necessary to ignite one or more structures from the interior or restock a fire if it does not build to the point of involving the entire structure so NFPA 1403 standard recommendations will be followed regarding staffing and assignments. A RIC crew will be assigned during the duration of live fire events, staging with their equipment in the indicated area. A safety officer shall be appointed for all live fire training evolutions. A minimum of two (2) two-person fire control teams shall operate the primary line (indicated as a green line above) and the backup line (indicated as a red line above). One of these team members will be designated as the ignition officer. Additional two-person fire control teams may operate exposure lines (indicated as black lines above). Dedicated EMS staff will be posted in the indicated area and will also provide rehab services. 11<sup>th</sup> St N will be reopened and the demolition site will be turned back to Excavating Inc., when the structures have been reduced to a smoldering phase and smoke production is minimized.

**Pages 18-20 contain to-do lists and notes for inclusion in the final version of this plan.**