

Government of the District of Columbia



Chain Bridge Fire Preliminary Review *Friday, August 7, 2009*

Summary

At 8:15 p.m. on July 29, 2009, the District of Columbia Fire and Emergency Services Department (F&EMS) received a call for a fire at 3030 Chain Bridge Road, N.W. (“Chain Bridge Road fire”). It would ultimately grow to the equivalent of a four-alarm fire, requiring 19 Engine Companies, seven Ladder Company trucks, eight other specialized units and 125 fire fighters to fight the blaze. Within minutes of arriving on the scene, fire fighters reported having low water flow, or insufficient water to fight the fire. According to eye witnesses and the Department’s review of incident, the subsequent search for high water volume delayed the Department’s response to the fire. The fire was knocked down at 1 a.m. Tragically, the house was completely destroyed.

This is not the only fire in recent years that has raised questions about the District’s water system in relation to the city’s capacity to fight fires. On April 30, 2007, fire fighters who responded to a three alarm blaze at the Georgetown Public Library on Wisconsin Avenue, N.W. (“Georgetown Library fire”) reported delays in their response because of broken hydrants in the immediate vicinity of the fire. And on October 1, 2007, fire fighters reported low water flow during a three alarm blaze at the four-story condominium building at 2627 Adams Mill Road, N.W. (“Adams Mill fire”).

In addition to providing basic facts regarding the Chain Bridge fire, this preliminary report revisits progress made as a result of the Adams Mill and Georgetown Library fires. Additionally, it examines the factors that impacted the water flow available to fire fighters who arrived on the scene at this fire, and the extent to which these factors suggest an exploration of broader changes that could minimize the likelihood of the situation recurring again.

Timeline of Events

8:15:59 pm:	The first call is made to 911 about a house fire at Chain Bridge Road. In total, 15 calls were made to 911 about the fire. The callers describe visible flames.
8:17:01 pm:	F&EMS dispatched to the scene.
8:21 pm:	First set of F&EMS resources arrive at the scene. Over the next few minutes other resources arrive, including: Truck 2 & 12; Engines 20, 29 28, 5 and 21.

	Upon arrival fire fighters found 80% of first floor involved, 30% of second floor and 10% of the third floor involved in the fire. The engines connected to the two hydrants in front of 3101 Chain Bridge Rd NW, and across from 2950 Chain Bridge closest to the house on the same 8" water main (numbered H0900 and H03916). This configuration using 1 ½" and 2 ½" lines, delivered 450 gallons per minute of water.
8:30 pm:	Two Alarm fire sounded. Fire fighters retreat to the outside of the structure and continue fighting the fire from the grounds. 2 nd Alarm Company begins arriving and relaying lines further away. Fire fighters communicate that water supply is an issue. Two additional hydrants are connected hydrant H03496 off of the 8" main on Loughboro Road & Indian Lane and H03553 across from 2730 Chain Bridge Rd. At this point F&EMS is using 10 engines, 5 trucks, 3 rescue quads, 3 battalion chiefs, and 1 ambulances. WASA is notified based on protocol. Investigation crew was dispatched to the scene, and calls are made to the program engineer for hydrants as well as the engineer on call.
8:45 pm:	Water supply companies (units with large diameter hoses) established a relay for approximately one mile from the incident with considerable elevation to connect to additional hydrants. Connected to additional 4 hydrants: Macomb St & Nebraska Ave NW, Loughboro Road between Indian Lane & University Terrace, MacArthur Blvd & Chain Bridge Rd, Chain Bridge Road & Sherrier Place (hydrants: H04426, H07288, H09606, H0337).
9:00 pm:	WASA investigators arrive on the scene and are asked to assure all valves are adequately open.
9:15 pm:	WASA program manager arrives at scene, begins working with engineer on call over the phone to find larger water mains. By 9:30, on advice from WASA, hydrant on Rockwood Parkway (H03127) is connected. Addition of this hydrant provided the required water needed for this size fire.
1:00 am:	Fire fighters contained the fire knocked down the fire.

Total deployment equivalent to a 4 Alarm Fire: 19 Engines, 7 Paramedic Engines, 4 Water Supply Pumpers, 7 Trucks, 5BFC's, 2 Mutual Aide BFC's, 6 Special Units, 4 CSU's, 3 Tankers, 5 DFC's, 4 AFC's, 1FC, 1 Ambulance, 1 Medic Unit, 2 EMS Supervisors.

Contributing Factors

The Chain Bridge Road fire consisted of a unique set of circumstances that resulted in a particularly challenging fire ground for F&EMS. First, the house itself was a significant size at approximately 15,000sq ft., and even with a relative quick response time from F&EMS, the vast majority of the first floor was engulfed in flames at the time of their arrival. Second, the

hydrants along Chain Bridge Road are attached to a 75 year-old cast iron water main that is approximately 8" diameter cast iron water mains. While water mains of that age or diameter are not uncommon in the District, and according to F&EMS in nearly all cases provide adequate water flow, the two hydrants first used by fire fighters at the scene produced only 323 and 296 gallons per minute of water during subsequent flow testing, a quantity well short of the 1643 gallons per minute that the fire department's analysis determined they needed to fight a fire of that size.

Unique geography and road design were the most significant factors contributing to these sub-optimal water flows. Chain Bridge Road is a narrow road, approximately 24' wide in many parts and one of the longest stretches of roadway in the District that is uninterrupted by cross streets – approximately .9 miles. This made F&EMS's eventual decision to use hydrants on Loughboro Road and McArthur Boulevard, the closest cross streets, difficult and time-consuming to accomplish, as it required the use of multiple apparatus to stretch the hose between the hydrants and the house. Finally, Chain Bridge Road is a steep hill. By accessing a higher flow hydrant on McArthur Boulevard, F&EMS had to pump water from the hydrant uphill, which further reduced the water pressure available.

Progress Since the Adams Mill and Georgetown Library Fires

Addressing the issues that came out of the Georgetown Library Fire required close cooperation and coordination between F&EMS and WASA. A plan of action was agreed upon in the form of a Memorandum of Understanding signed by the Directors of both agencies on October 25, 2007. The MOU's major requirements are for F&EMS to inspect every fire hydrant in the District on a twice per year basis and for WASA to repair and replace broken or out of service hydrants within certain timeframes; and for WASA to conduct an analysis of the flow capability of the entire water distribution system and "flow test" public fire hydrants.

Many of the MOU's commitments and action items had been implemented at the time of the Chain Bridge Road fire. In 2007, F&EMS launched an inspection program that surveyed every hydrant in the city during the first year, and has a team of fire fighters who subsequently have inspected every hydrant on a twice per year basis. The teams, or Community Service Units, affix rings around hydrants that are out of service or in service but need maintenance. F&EMS has inspected over 12,000 hydrants since 2007. WASA funds half the personnel and all of the capital costs of this program, and has provided F&EMS with hand-held devices with a Google Earth hydrant Geographic Information System (GIS) mapping application installed on them for use by their inspectors. Since the signing of the MOU, WASA has replaced approximately 3231 hydrants, surpassing the original goal of 540 installations per year.¹ WASA provides updated hydrant status information to the OUC and F&EMS on an hourly basis, and provides information to the public on hydrant status on its website.

According to F&EMS Chief Dennis Rubin, this aspect of the MOU's implementation has worked well, and F&EMS has had little to no problems quickly identifying broken hydrants since the Georgetown Library fire. It should also be noted that during the Chain Bridge Road fire, both WASA and F&EMS agree that while there were out of service hydrants in the immediate area, *their presence did not impede the Department's response*. F&EMS was aware

¹ The MOU calls for replacing 3500 hydrants within five years.

of which hydrants were out of service and so did not spend time attempting to use those hydrants.

At the Adams Mill fire on October 1, 2007, fire fighters encountered a different and more complicated problem than knowing the status of nearby fire hydrants – low water flow. The Adams Mill incident report issued by F&EMS made several recommendations. The major recommendations included the need to perform a detailed analysis of the entire water system to identify all known or suspected problem areas, to be supplemented by flow testing, convert water system maps to a GIS system to be made available to F&EMS, establish a system to ensure that WASA technical expertise is readily available for emergency situations, and improve training on situations requiring high volume tactics, and other tactical improvements.

Both agencies have made progress implementing the Adams Mill recommendations. First, F&EMS has implemented many of the report's tactical recommendations. It has provided training to its first responders on high volume water supply tactics, created a Water Supply Unit and Water Supply Officers in each of the city's battalions, and developed an improved method of hooking up to hydrants when increased water flows are required.

WASA has made significant progress producing an application that overlays hydrants onto the District's water main system with a GIS application. Doing so will provide F&EMS with electronic information about what mains hydrants are on, as well as the size of the mains, information that is currently only available on paper counter maps. Prior to the Chain Bridge fire, this upgrade of the GIS system was scheduled to be completed in November 2007. WASA has now committed to completing the upgrade by August 31, 2009.

With respect to the need to have WASA expertise on the scene of emergencies, a system is already in place. WASA is automatically called by the District's Computer Aided Dispatch (CAD) system whenever there is a two alarm fire in the city. When WASA receives this call, it dispatches a crew of water investigators and its on-call engineer to the scene to assist with any water needs. WASA has also routinely made its senior managers available at the scene of large fires or fires with water flow issues, as occurred at the Chain Bridge Road fire.

Another major recommendation to come out of the Adams Mill fire and that was also included in the MOU was for WASA to conduct a flow analysis of the entire water distribution system. WASA responded to this recommendation with the issuance of its *Evaluation of Small Diameter Water Mains – Fire Flow Analysis* on November 15, 2007 (FFA). The FFA specified a minimum fire flow availability of 1000 gallons per minute (gpm) within a 1000 foot radius of structures in Low/Moderate Density Residential neighborhoods. Using this criteria, the FFA concluded that only three locations in the District did not have the specified minimum fire flow: the westerly portion of Mayfair Parkside in N.E., the westerly portion of Poplar Point in S.E., and the Ft. Stanton Reservoirs in S.E. (ES-2). Only the Mayfair Parkside neighborhood is a residential area of the city – the other two areas are industrial.

WASA moved to quickly install new high volume water mains in the Mayfield Parkside neighborhood, and the capital project was preceded by cooperative contingency planning on the part of WASA and F&EMS to ensure that sufficient fire protection and water supply plans were

in place in the case of fires before the capital project could be completed. The two agencies also continued to meet on a monthly basis and to formulate contingency and pre-fire planning for an additional 34 areas identified by F&EMS. Capital projects have been completed or planned for five of these areas (for example, plans for installing larger or more modern water mains), as well as operational contingency plans for F&EMS to follow in the event of a fire (for example, immediately deploying Water Supply Units to a fire in certain areas, rather than waiting for a second alarm or for water flow problems to be reported).

Systemic Review

Despite this progress, the Chain Bridge Road fire is a clear message to the government that an additional systemic review must take place to identify neighborhoods that may have low water flow and other water supply vulnerabilities. Over the next 180 days, WASA and F&EMS will take the following next steps:

- Make recommendations on whether to revise the 2007 Fire Flow Analysis minimum standards to be more specific to the needs and characteristics of each neighborhood's water system and that are based on actual flow test data and other relevant factors.
- Work together to determine what neighborhoods may have low water flow due to small mains and other factors, and come up with a plan to flow test and color band hydrants in those areas.
- Review and update the October 27, 2007 Memorandum of Understanding executed after the Georgetown Library and Adams Mill Road fires and make revisions as appropriate.
- Explore whether there are appropriate additional regulations to building codes, especially for large residential structures that can provide more reasonable protections.

Conclusion

It is particularly important to note, when examining this event with the illumination of hindsight, that when fire suppression resources first arrived on the scene, only 4 minutes after dispatch, that 80% of the first floor of the house – 4000 square feet – was already impacted by fire. While low water flow unquestionably impacted the time needed to put out the fire, it is debatable how much of the house's structure and contents could have been saved had water flow been more significant, especially given the time F&EMS needs to pull water from hydrants beyond two closest to the house. There is therefore no system or set of actions that will eliminate the risks that fires pose to communities. The goal is to minimize the occurrence of tragedies like the Chain Bridge Road fire by extending lessons out of the experience that can better protect the communities. Continued work and cooperation between WASA and F&EMS is needed to achieve this.