



## MEMORANDUM

TO: BRIAN JOHNSON, WATER SYSTEM  
SPECIALIST  
FROM: KERRI SIDEBOTTOM, P.E.  
DATE: JANUARY 8, 2025  
SUBJECT: WASHINGTON STATE FAIRGROUNDS  
INTERNATIONAL VILLAGE FIRE FLOW  
AVAILABILITY  
CITY OF PUYALLUP, PIERCE COUNTY,  
WASHINGTON  
G&O #21415.22

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Per your request, I have analyzed the available fire flow at the Washington State Fairgrounds International Village area, located in the central part of the City's water service area. The Washington State Fair (State Fair) has proposed modifications to the water system within the fairgrounds in the vicinity of the International Village building, which has been analyzed in this memo. The setup of the hydraulic model and the assumptions used to determine the static pressure and available fire flow are noted as follows.

- The available fire flows and pressures are measured at five nodes, corresponding to five existing hydrants within the International Village at the State Fair site, shown in the attached figure.
- Water system demands are based on projected 2038 demands and reservoirs are depleted of fire suppression and equalizing storage, as established in the *2019 Water System Plan (WSP)*, approved by the Washington State Department of Health (DOH). The City's water model was updated in 2021 to reflect additional system improvements since the WSP was developed.
- All pump stations are idle, and the Salmon Springs source is operating at 1,100 gallons per minute (gpm).

The development is located in Zone 1, which is supplied by Maplewood Springs and the 15<sup>th</sup> Avenue SE Reservoirs. The system was modeled with the proposed piping indicated on the attached figure. The domestic and fire lines within the State Fair site were input to the model based on a base map provided by the City. The City noted that all lines into the State Fair site run through either reduced pressure backflow assemblies (RPBAs) or double check valve assemblies (DCVAs), and as such, these pipes are modeled as check



valves. Water from the City’s system can enter the State Fair site but will not flow back out from the site into the City’s system.

The available pressure under 2038 peak hour demands at the hydrants is included in Table 1.

**TABLE 1**

**Peak Hour Pressure**

<b>Node</b>	<b>Hydrant</b>	<b>Elevation, feet</b>	<b>Peak Hour Pressure, psi</b>
J2406	SW266	40	55
J2390	SW349	40	55
J2402	SW374	40	55
J2350	SW420	40	55
J2430	SW421	40	55

Available fire flow was modeled at five existing hydrants around the International Village building. The existing hydrants are located on 10-inch, 8-inch, or 4-inch mains. The results of this modeling are included in Table 2. The modeled fire flow is available at either hydrant individually, but not simultaneously.

**TABLE 2**

**Modeled Fire Flow Availability**

<b>Node</b>	<b>Hydrant</b>	<b>Modeled Fire Flow, gpm</b>	<b>Residual Pressure at Modeled Fire Flow, psi</b>	<b>Minimum System Pressure at Modeled Fire Flow, psi</b>
J2406	SW266	1,560 <sup>(1)</sup>	40	30
J2390	SW349	3,440 <sup>(1)</sup>	36	30
J2402	SW374	1,560 <sup>(1)</sup>	41	30
J2350	SW420	600 <sup>(1)</sup>	36	30
J2430	SW421	710 <sup>(1)</sup>	33	30

(1) Limited by a maximum system-wide velocity of 10 feet per second (fps).

Fire flow to the hydrants is limited by the 10-fps maximum velocity through the existing pipes.



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It should be noted that Hydrants SW420 and SW421 are located on 4-inch water mains, and as such, will not provide much flow due to both the velocity limitation and high headloss through the small-diameter pipes. These hydrants should not be relied upon for firefighting purposes. However, there are private domestic lines supporting these hydrants which are fed by three 6-inch meters off of the City water system, each of which is protected by a premise RPBA.

The other three hydrants, SW266, SW349, and SW374, are located along the private fire lines on the State Fair site. The fire lines run through premise DCVAs at each connection point to the City's water system. Hydrants SW266 and SW374 are on dead-end 8-inch water mains and are therefore limited by the maximum velocity through the 8-inch pipes.

The DOH and City Standards for water distribution systems are to meet the peak hourly demand of the system, while providing a minimum pressure of 30 psi, system-wide. Under peak daily demand with a fire flow, the system is designed to maintain a minimum pressure of 20 psi, system-wide. Although the peak hourly demand pressure may currently be higher than these standards, the Developer must recognize that the City may not provide pressure higher than 30 psi in the future. The flows and pressures determined in this memo are based on the approximate hydrant elevation at ground level. The Developer may design their sprinkler system for whatever pressure they wish; however, they must recognize and be responsible for conditions when the pressure may be less than currently exists.

KS/sr

Note: all mains shown in this map are private domestic or fire supply lines for the State Fair site. These are supplied by 8-inch to 16-inch City water mains located along the perimeter of the Fair site, as well as a 16-inch main running east to west through the Fair site.

J2390  
Elevation: 40 ft  
PHD Pressure: 55 psi  
Fire Flow: 3,440 gpm

J2406  
Elevation: 40 ft  
PHD Pressure: 55 psi  
Fire Flow: 1,560 gpm

0 50 100 150 200 FEET



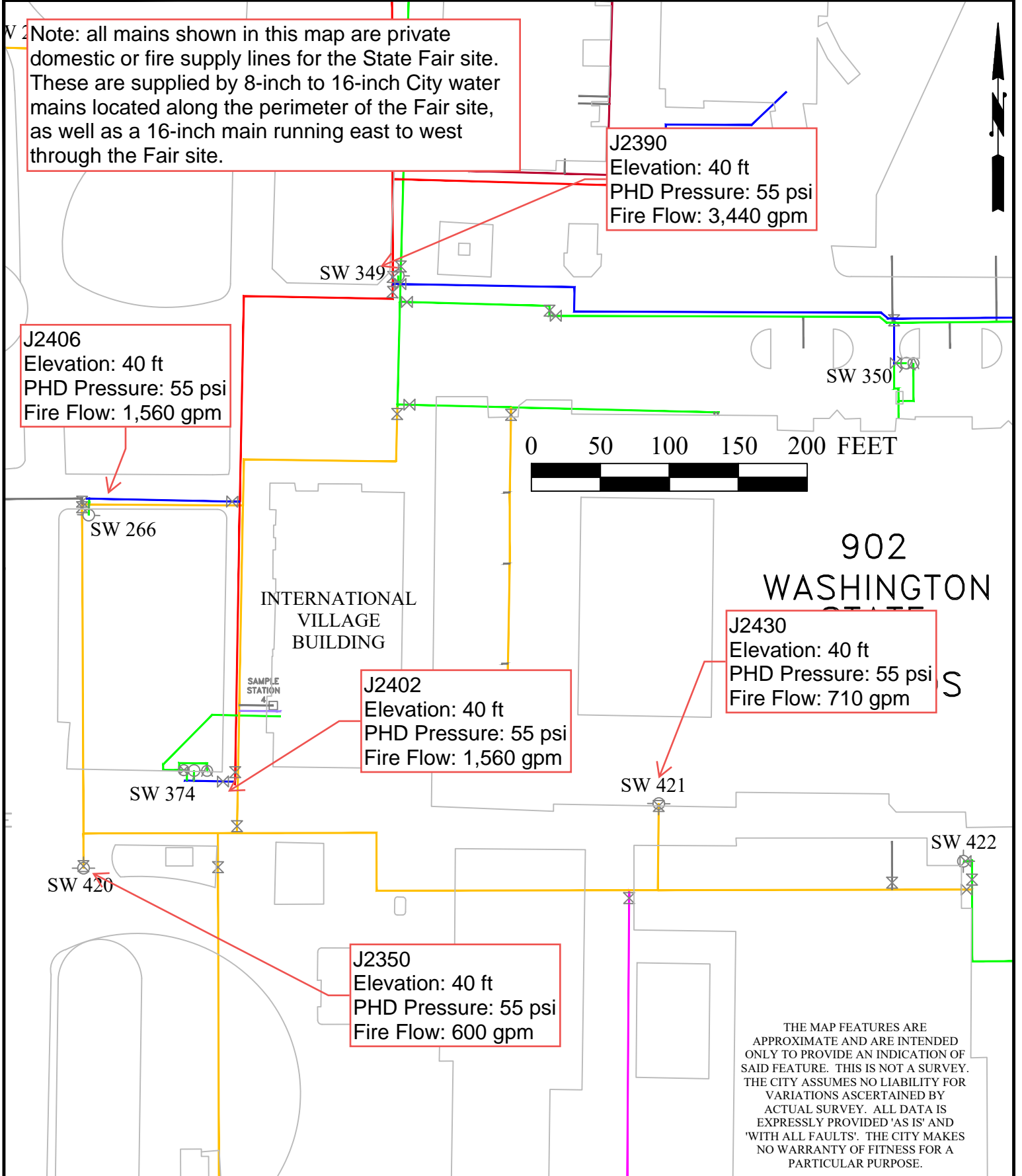
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J2430  
Elevation: 40 ft  
PHD Pressure: 55 psi  
Fire Flow: 710 gpm

J2402  
Elevation: 40 ft  
PHD Pressure: 55 psi  
Fire Flow: 1,560 gpm

J2350  
Elevation: 40 ft  
PHD Pressure: 55 psi  
Fire Flow: 600 gpm

THE MAP FEATURES ARE APPROXIMATE AND ARE INTENDED ONLY TO PROVIDE AN INDICATION OF SAID FEATURE. THIS IS NOT A SURVEY. THE CITY ASSUMES NO LIABILITY FOR VARIATIONS ASCERTAINED BY ACTUAL SURVEY. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. THE CITY MAKES NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.



CITY OF PUYALLUP  
PUBLIC WORKS  
WATER DIVISION

# HYDRAULIC MODEL INSIDE WA STATE FAIRGROUNDS

SCALE AS SHOWN

12/19/2024

COP/PW/WATER/S\_MAINT/PDF/QSEC/  
PG129/MODEL\_INSIDE\_WS\_FAIR\_12-2024