



TECHNICAL MEMORANDUM

PREPARED FOR: Tradeport Hanover Land, LLC

PREPARED BY: Dewberry Engineers Inc.

DATE: July 27, 2026

SUBJECT: East Ashland Ironhorse Development Water Service Hydraulic Evaluation

1. Introduction

Tradeport Hanover Land, LLC (Tradeport) is currently engaged in the planning and design of a new 180-acre development (Ironhorse Development) located in the eastern area of the Town of Ashland in Hanover County, Virginia. Tradeport has contracted Dewberry Engineers Inc. (Dewberry) to utilize the current Hanover Suburban Water System (HSWS) hydraulic model to evaluate the existing water distribution system. The evaluation aims to ensure adequate service for the proposed Ironhorse Development and to identify any necessary infrastructure improvements. The hydraulic modeling was conducted based on project phasing and water demands projections provided by Tradeport, as summarized below:

- Average daily demand = 1.0 million gallon per day (MGD)
- Maximum day demand (MDD) = 1.2 MGD
- Peak instantaneous flow = 1,000 gallons per minute (gpm) over an 18-hour period

2. Proposed Development Water Service Overview

Tradeport's proposed 180-acre Ironhorse Development will be located on a parcel at the intersection of Mount Hermon Road and East Patrick Henry Road. The Ironhorse Development is within the Ashland Pressure Zone, where water is typically supplied by the Hill Carter, Airport East, and Airpark Booster Pump Stations. The Ironhorse Development includes the following proposed waterlines:

- A new 12-inch waterline extending from the existing 12-inch waterline located west of I-95, crossing I-95, and proceeding to the development site.
- A new 16-inch waterline along the property frontage on East Patrick Henry Road.
- A new 20-inch waterline routed through the proposed development to connect the proposed 12 inch waterline on the western side of the site to the proposed 16-inch waterline on the northern side of the site.
- A 12-inch water line will extend to the site where it will be connected to the onsite water treatment plant.

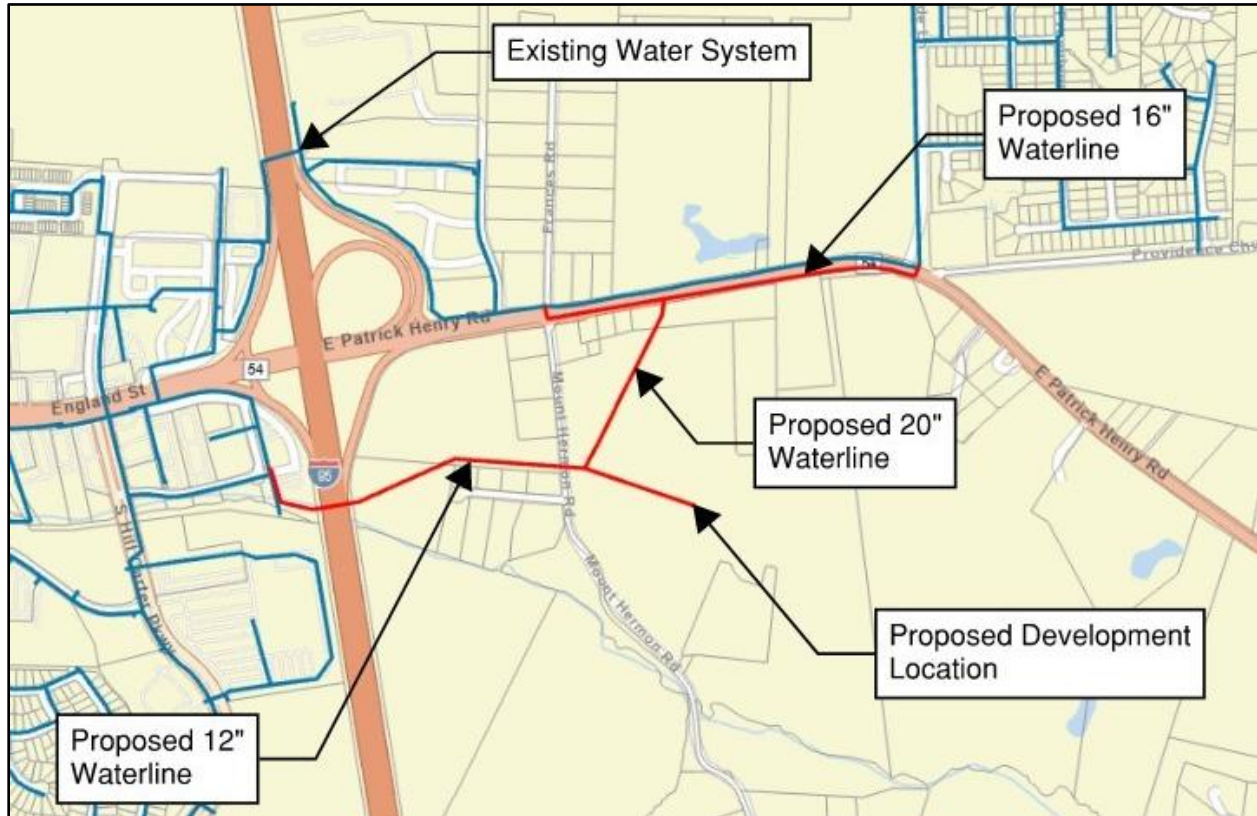


Figure 1 Existing System and Proposed Development

3. Hydraulic Evaluation

3.1 Modeling Scenarios

To evaluate the existing HSWS's ability to serve the Ironhorse Development, MDD extended period simulations (EPS) and fire flow EPS scenarios were developed. Each scenario was run using the existing infrastructure, and improvements were identified when necessary.

Table 1 Model Scenarios Summary

MODEL SCENARIOS SUMMARY			
NAME	DEMAND CONDITION	IRONHORSE DEMAND	WATER SYSTEM STATUS
S1	MDD	1,000 gpm over 18 hours	Existing
S1a	MDD	1,000 gpm over 18 hours	Existing with Operational Changes
S1b	MDD	1,000 gpm over 18 hours	Improved
S2	MDD + Fire Flow	1,000 gpm over 18 hours + 2,000 gpm fire over 2 hours	Existing

Each MDD scenario was conducted as a 24-hour extended period simulation (EPS), with the appropriate American Water Works Association (AWWA) diurnal curves applied to all existing demands. The

proposed 1,000 gpm demand for the Ironhorse Development was set to occur over an 18-hour period. The fire flow scenarios were simulated during an MDD scenario with a 2-hour fire event starting 8 hours into the 24-hour simulation. The fire event requires 2,000 gpm of fire flow availability over the 2-hour duration.

3.2 Level of Service Criteria

Level of service (LOS) criteria were developed for purposes of evaluating improvements necessary for each model scenario. The LOS criteria were based on the VDH Waterworks Regulations, the AWWA Manual of Water Supply Practices M68 Water Quality in Distribution Systems (AWWA M68), Hanover County standards, and industry standards/best practices. The LOS criteria are used for the evaluation of each modeling scenario and the sizing of proposed infrastructure. Refer to Table 2 for a summary of the LOS criteria.

Table 2 Level of Service Criteria

LEVEL OF SERVICE CRITERIA		
LEVEL OF SERVICE	CRITERIA	SOURCE
Minimum System Pressure (MDD)	40 psi	Industry Standard
Minimum System Pressure (Fire Flow)	20 psi	VDH Requirement
Maximum Head Loss Gradient for New Water Mains	2 ft/1,000 ft	AWWA M68
Fire Flow Requirement (Commercial)	2,000 gpm for 2 hours	Hanover County Standards

3.3 Scenario S1

Scenario S1 evaluates the existing HSWS's ability to serve the Ironhorse Development during MDD conditions. Demand is assumed to be the maximum specified demand of the development of 1,000 gpm for 18 hours. All proposed waterlines described above are assumed to be constructed and online.

Based on the results of this analysis, the existing HSWS has sufficient capacity to supply the water required by the Ironhorse Development during MDD conditions, however the additional demand in the HSWS causes pressure concerns elsewhere. Pressure at the development ranges from 50 pounds per square inch (psi) to 82 psi. Pressures throughout the Ashland Pressure Zone remain above 40 psi at all points of the day except for a small region in the southwestern edge of the Pressure Zone near the Elmont Booster Pump Station, where pressures dip to 35 psi during part of the simulation due to the increased demand in the Pressure Zone.

Operational adjustments at the Airport East facility are required to maintain a minimum system-wide pressure of 40 psi. Specifically, the Airport East discharge pressure must be increased from 84 psi to 94 psi to prevent depletion of the Air Park storage tank. If the tank drains, associated pumps shut down, resulting in system pressure drops and reduced reliability.

Increasing the discharge pressure, however, will cause over pressurization in several areas of Ashland. A beneficial long-term improvement to support this initiative would be the construction of the proposed 20-inch parallel water main along Ashcake Road, consistent with the recommendations identified in the 2020 Water Master Plan.

The County is currently updating the Water Master Plan using revised growth projections and demand forecasts. As a result, the recommended infrastructure improvements may be refined based on the updated hydraulic modeling and projected system needs.

3.4 Scenario S2

Scenario S2 evaluates the existing HSWS's ability to serve the County fire flow requirement for commercial or industrial areas of 2,000 gpm for 2 hours during MDD conditions. All proposed waterlines described above are assumed to be constructed and online.

Based on the results of this analysis, HSWS has sufficient capacity to meet the fire flow requirement at the Ironhorse Development. The minimum pressure at the development during the fire event is 30 psi. Pressures throughout the remainder of the Ashland Pressure Zone remain above 20 psi for the duration of the fire event.

4. Summary and Conclusions

Based on the results of the hydraulic model of the HCWS, there is sufficient capacity for the anticipated demands of the Ironhorse Development. Pressure above 40 psi during MDD conditions was observed at the development location, however, due to the increased demands in the Ashland Pressure Zone, a small area near the Elmont Booster Pump Station was observed to briefly drop below 40 psi. Pressure throughout the Ashland Pressure Zone remained above 20 psi during the 2,000-gpm fire event located at the Ironhorse Development.

To maintain a minimum system-wide pressure of 40 psi during MDD conditions, either operational adjustments at the Airport East facility or transmission infrastructure improvements are required. Increasing the Airport East discharge pressure from 84 psi to 94 psi will resolve the low-pressure concerns, however, it will cause over pressurization in several areas of Ashland. A beneficial long-term improvement to support this initiative would be the construction of the proposed 20-inch parallel water main along Ashcake Road, consistent with the recommendations identified in the 2020 Water Master Plan.

The County is updating the Water Master Plan with revised growth projections and demand forecasts, which may lead to refinements in recommended infrastructure improvements based on updated hydraulic models and system needs.