

ENGINEER'S REPORT FOR WATER MAIN

for

PROPOSED WAREHOUSES

Prepared for:

HCI DP Land Acquisition LLC

Block 14, Lot 1
4000 Bordentown Avenue
Borough of Sayreville
Middlesex County, New Jersey

Prepared by

BOHLER //

NJ Certification of Authorization No. 24GA28161700

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New Jersey Professional Engineer License No. 47863

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June 2026

BENJ #: NJA240049.00

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Project Definition:

The proposed project consists of constructing approximately 1,259 LF of 6-inch pipe water mains and 6,111 LF of 10-inch pipe fire loops. The purpose of the main construction is to provide domestic water and fire services for the two warehouse buildings, totaling 714,500 SF gross floor area.

Water service will be provided to the development via proposed 6-inch and 10-inch services from an existing water main located in Jernee Mill Road. The water service will also serve the nine (9) fire hydrants, as depicted on the accompanying site plans. The buildings will be provided with one domestic and one fire service connection each.

The proposed utility layout is depicted on the enclosed Utilities Plan as prepared by Tung-To Lam, Bohler, LLC, dated May 9, 2025, last revised August 14, 2026.

System Design:

All proposed water mains will have a minimum ground cover of 4.0 feet and will be installed with sand bedding from 6-inches below the invert of the pipe to 12-inches above the top of the pipe. Prior to completion of backfilling the water line, a tracing wire system shall be installed (Copperhead Industries tracer wire or equivalent) and be placed along the entire length of the pipe, hydrant branches and services. Trenches will be backfilled with select fill, excavated material, compacted in lifts to 95% compaction.

Valves will be installed at branch connections in conformance with NJAC 7:10-11.10 (e) 6 and along the various pipeline routes to minimize disruption of service during maintenance or repair of mains and related appurtenances.

Refer to the attached hydrant flow test and preliminary fire flow calculations. Based on the calculations, no improvements to the Borough's water system are anticipated. An additional hydrant flow test will be requested prior to construction to ensure this is still the case.

The system will be constructed as shown on the Site Utility Plan documents. Wherever possible, water mains are to be installed to provide the required separation from sanitary sewer mains and appurtenances as specified in NJAC 7:10-11:10 (e) 5 (10' horizontal and 18" vertical separation, where the water main is over the sewer main). Where appropriate separation from a water and fire main is not possible, the sewer must be constructed of ductile iron pipe using mechanical or slip-on joints for a distance of at least 10 feet on either side of the crossing.

Disinfection of Water Mains:

All new water mains will be disinfected and tested prior to being placed into service. Crystal chlorine will be utilized for disinfection in accordance with the latest revision of NJAC 7:10-4.1, Disinfection.

Estimated Demand in accordance with NJAC 7:10-12.6(b)2 Table 1

Use	Unit	Calculation	GPD
Warehouse	306 Employees	306 Employees x 25 GPD/Employee x 3 shifts	22,950
Office	12,434 SF	12,434 SF x 0.125 GPD/SF	1,555

Average Demand Flow: 24,505 GPD

Peak Hour Demand Flow (3 x Average): 73,515 GPD

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Automatic Sprinkler Contractor & Fire Protection Consultants
Design Installation Inspection Service

NJDFS #P00136

P.O. Box 3922
Trenton, N.J. 08629-0922
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Fax: (609) 396-2485
E-Mail: capitolfirecp@gmail.com

April 29, 2025

Ms. Veronica (Moditz) O'Callaghan, Project Engineer
Bohler Engineering
30 Independence Blvd., Suite 200
Warren, NJ 07059

Re: 4000 Bordentown Road
Sayreville, New Jersey

Dear Veronica,

The results of the flow test we conducted with The Borough of Sayreville Fire Inspector at the above location on Tuesday April 29, 2025, are as follows:

Test #1: 9:25 AM

Static Pressure Hydrant #39:

Location:	776 Jernee Mill Road Sayreville, New Jersey
Static Pressure:	125 PSI
Residual Pressure:	117 PSI
Main Size:	16" Main

Flow Hydrant #40:

Location:	650 Jernee Mill Road Sayreville, New Jersey
Pitot:	83 PSI
Outlet Size:	2½"
Flow:	1,529 GPM
Flow @ 20 PSI:	6,141 GPM
Main Size:	10" Main

If you have any questions, please feel free to give me a call.

Very truly yours,

A blue ink signature of Charles S. Parkerson.

Charles S. Parkerson
NJDFS #: 153245
Capitol Fire Protection Co., Inc.

Enclosure



Flow Test Summary

Project Name: Bohler Engineering Inc.
Project Address: 4000 Bordentown Ave., Sayreville, NJ 08872
Date of Flow Test: 2025-04-29
Time of Flow Test: 9:25 AM
Data Reliable Until: 2025-10-29
Conducted By: Capitol Fire Protection Co., Inc.
Witnessed By: Jonathan D. Magaw, Fire Inspector
City Forces Contacted: Borough of Sayreville

Note Static Hydrant #39 on 16" Main. Flow Hydrant #40 on 10" Main

Raw Flow Test Data

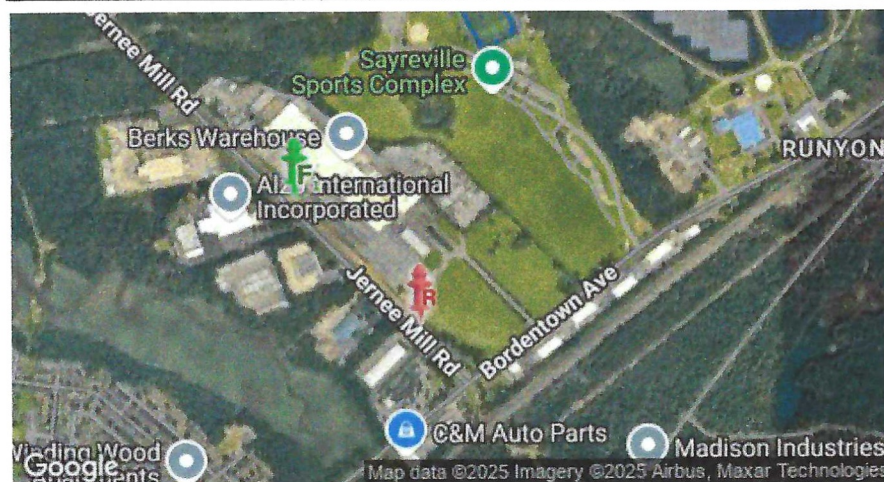
Static Pressure: 125.0 PSI
Residual Pressure: 117.0 PSI
Flowing GPM: 1,529
GPM @ 20 PSI: 6,141

Data with a 10 % Safety Factor

Static Pressure: 112.5 PSI
Residual Pressure: 104.5 PSI
Flowing GPM: 1,529
GPM @ 20 PSI: 5,735

Hydrant F₁

Pitot Pressure (1): 83 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 2.5 inches



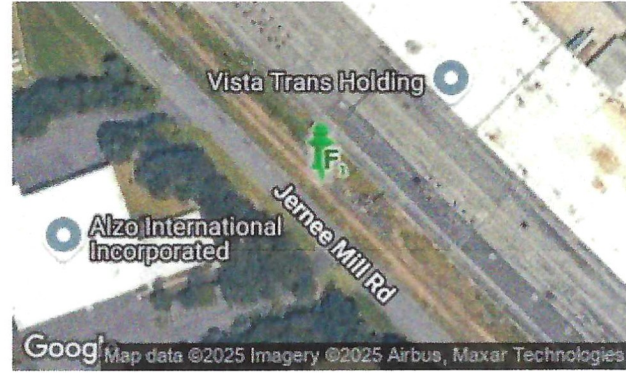
Static-Residual Hydrant
Flow Hydrant
Main Size
10 inches
Distance Between F₁ and R
1202 ft (measured linearly)
Static-Residual Elevation
15 ft (above sea level)
Flow Hydrant (F₁) Elevation
16 ft (above sea level)
Elevation & distance values are approximate

Flow Test Summary

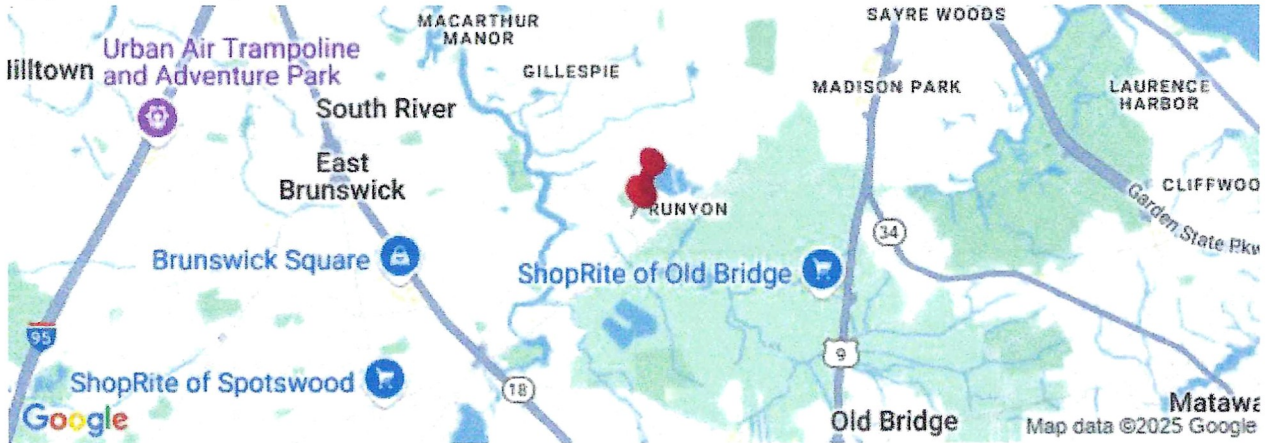
Static-Residual Hydrant



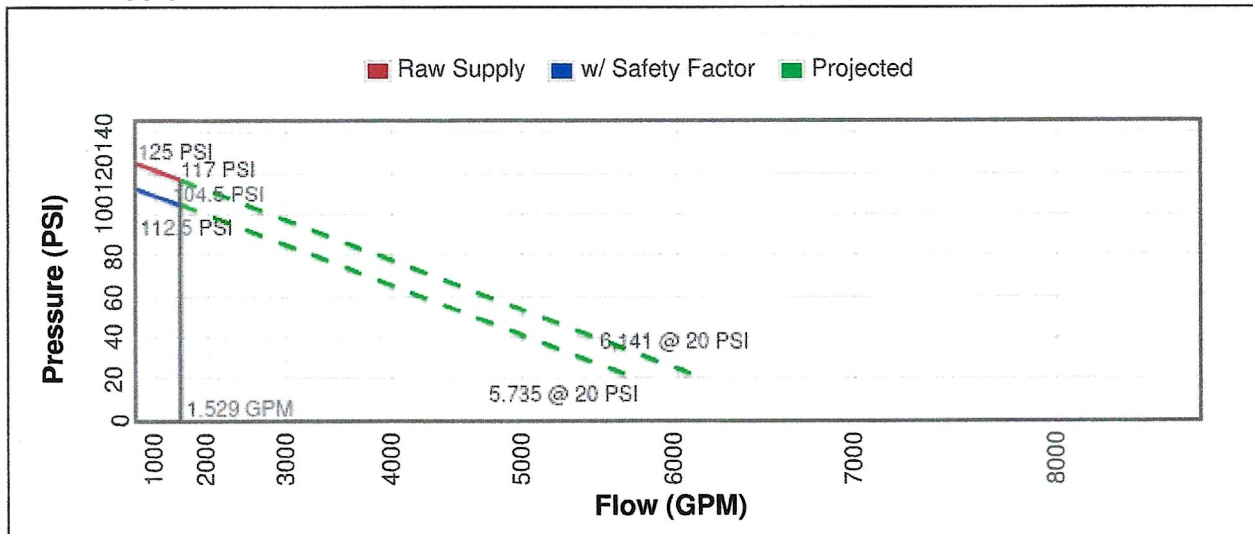
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve $N^{1.85}$ Graph



August 17, 2026

Mr. Pedro Peralta
Project Manager
Ware Malcomb

Re: Fire Protection Water Supply
Proposed Warehouses, 4000 Bordentown Avenue
Borough of Sayreville, Middlesex County, New Jersey
Ware Malcomb Project No. NJY24-0022-00

Dear Pedro:

We have completed our preliminary review of the fire protection water supply for the two proposed warehouses, and I wanted to get our findings over to you in a form you can pass along to ownership.

The short answer is that based upon the information we currently know, and have available, the Borough's existing water main looks capable of supporting the project, and we do not initially expect offsite water system improvements to be required.

CURRENT CIRCUMSTANCES

- The Borough main appears able to deliver the fire flow this project requires, with roughly 270 gallons per minute to spare.
- We do not anticipate improvements to the Borough's water system being required as part of this application.
- Each building will need a fire pump. We are holding off on sizing it until the items below are settled.
- The margin is modest, not comfortable, so all of this needs to be re-confirmed once a current flow test is in hand.

	Required	Available
Fire flow	3,500 GPM	3,774 GPM

Both buildings come out at the same required fire flow. Each is large enough that the calculation reaches its ceiling, so the difference in floor area between them does not change the answer. The available figure is drawn from the April 2025 flow test and is subject to the retest noted below.

BASIS OF EVALUATION

- Required fire flow follows the ISO method the Borough's comment calls for, applied to each building's floor area and construction, with the customary reduction for a fully sprinklered building.
- Sprinkler demand is based on ESFR ceiling protection with twelve heads flowing at once, plus an allowance for fire department hose streams. That is the NFPA 13 basis for this type of system.
- Available supply comes from the witnessed hydrant flow test on Jernee Mill Road, carried with a safety factor applied to the residual pressure.
- Building areas are taken from Bohler's site plan, roughly 308,200 and 406,300 square feet.

BUILDING DATA AND DESIGN CRITERIA

Parameter	Warehouse No. 1	Warehouse No. 2
Gross area (warehouse / office)	308,200 SF (301,632 / 6,568)	406,300 SF (400,434 / 5,866)
Footprint	845 ft by 360 ft	1,115 ft by 360 ft
Clear height / top of roof	40 ft 0 in. / 46 ft 10 in.	40 ft 0 in. / 46 ft 10 in.
Construction (assumed)	Type II-B, concrete tilt-up	Type II-B, concrete tilt-up
Sprinkler protection	ESFR, wet pipe, ceiling only	ESFR, wet pipe, ceiling only
Storage / commodity (assumed)	35 ft rack, Class I-IV and Group A plastics	35 ft rack, Class I-IV and Group A plastics

DESIGN APPROACH

- Both buildings are planned for ESFR ceiling sprinkler protection, wet pipe.
- A looped underground fire main around each building, sized to the final demand.
- A fire pump in each building, selected from our standard units once the open items below are resolved.

NEEDED FIRE FLOW

	Warehouse No. 1	Warehouse No. 2
Effective area, A	308,200 SF	406,300 SF
NFF before sprinkler credit	7,000 GPM	7,000 GPM
Credit for complete sprinkler protection	50%	50%
Governing needed fire flow	3,500 GPM	3,500 GPM

As a check by a second method, IFC Appendix B yields 8,000 GPM for Type II-B construction at these areas, which the 75 percent sprinkler reduction of Section B105.2 brings to 2,000 GPM. The ISO figure of 3,500 GPM is the more conservative and is carried forward.

SPRINKLER SYSTEM DEMAND

	Basis	Result
Sprinkler and pressure at most remote head	K-25.2 pendent ESFR at 35.0 psi	149.1 GPM
Number of sprinklers	NFPA 13 ESFR design	12
Theoretical minimum flow	12 x 149.1	1,789 GPM
Hydraulic balance across the design area	near heads flow above minimum	1,968 GPM
Hose stream allowance	NFPA 13, ESFR	250 GPM
Total system demand		2,218 GPM

The hydraulic balance figure is not a safety factor. It accounts for sprinklers nearer the riser discharging above the minimum 35.0 psi, and the contractor's remote-area calculation will set the final value. Pressure required at the base of the riser is 35.0 psi at the remote sprinkler, 19.5 psi of elevation over the 45 ft rise to the deck, 20.0 psi for friction in the overhead piping, 10.0 psi across a 10-inch double check detector assembly and 2.0 psi through the riser check and alarm valve, or 86.5 psi at 1,968 GPM.

UNDERGROUND FIRE SERVICE LOOP

A looped private fire main is carried around each building, C900 DR18 PVC with a Hazen-Williams coefficient of 150. The governing condition is the most remote riser on Warehouse No. 2, opposite the point of connection, with each leg carrying approximately half the demand.

Segment	Size	Flow / Equivalent Length	Loss
Lead-in from Borough main	12 in.	2,218 GPM / 520 ft	2.1 psi
Loop leg to remote riser	12 in.	1,109 GPM / 1,854 ft	2.1 psi
Elevation, finished floor above hydrant		5 ft assumed	2.2 psi
Total underground loss			6.4 psi

A 12-inch loop is required. Unit friction loss at 2,218 GPM is 0.41 psi per 100 ft assumes a 400 ft run to the point of connection.

SUPPLY COMPARED TO DEMAND

Comparison	Flow	Required	Available	Result
Sprinkler system and hose stream	2,218 GPM	92.9 psi	85.7 psi	7.2 psi short
Needed fire flow	3,500 GPM	20.0 psi	33.7 psi	13.7 psi margin

The two comparisons answer different questions. The first asks whether the Borough main can drive the sprinkler system unaided, and it cannot; a fire pump is required. The second asks whether the main can deliver the firefighting flow the Borough requires, and it can. The main delivers 3,774 GPM at 20 psi against a needed fire flow of 3,500 GPM, a surplus of 274 GPM, or roughly 8 percent. That headroom is modest and must be re-confirmed against a current flow test.

FIRE PUMP

A fire pump is required in each building. The sprinkler demand falls 7.2 psi short of the available supply, and suction pressure at the pump is 81.4 psi against 88.6 psi required at the discharge. Pump selection confirmation is deferred. The firm's standard selections carry a minimum boost of 60 psi at 2,000 GPM and 70 psi at 2,500 GPM, and against a 125 psi static suction either would carry total system pressure above the 175 psi rating of standard components. Selection must therefore be made together with the roof height and standpipe determinations noted above, and the pressure rating of the system components settled at the same time.

CONCLUSIONS

- The governing needed fire flow is 3,500 GPM for each warehouse, after 50 percent credit for complete automatic sprinkler protection.
- The existing Borough main delivers 3,774 GPM at 20 psi and meets that requirement, with a surplus of 274 GPM. No upgrades to the Borough's water system are required, though the margin is modest.
- A fire pump is required in each building. Sizing is deferred pending recent hydrant flow test and determination of standpipe requirements, and the component pressure rating must be settled with it.
- The private fire service loop shall be 12-inch C900 DR18 PVC around each building.
- These findings are provisional, subject to the two items under Basis and Limitations.

ASSUMPTIONS AND OTHER ITEMS TO CONFIRM

- Code citations, against the editions currently adopted by the New Jersey UCC. This report is preliminary, is issued for Borough review, and is not a sealed construction document.
- A current flow test - The test we currently have was taken in April 2025 and was only reliable through that October. The Borough has specifically asked for a current test, and everything above needs to be re-verified against it.
- Standpipes - Buildings of this length may require them, and that is the Fire Department's call. If Sayreville wants them, it affects both the pump and the underground loop, so it is worth raising with them early.
- Storage and commodity - Confirm the maximum storage height and what is intended to be stored. What we have assumed covers a wide range of tenants, but it is worth checking against anything already known about the end user.

EMTEC Engineers, DPC

Fire Protection Division