Appendix G – Water Computations

HYDRANT FLOW TEST DATA SHEET

ENVIRONMENTAL DESIGN
PARTNERSHIP, LLP
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Clifton Park, New York 12065
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September 26, 2005

1. Reason for Test:
   - ☐ Bid Information
   - ☐ Design Base
   - ☐ Municipal Engineer Requirement
   - ☒ Other: Environmental Impact Statement

2. Project: Highland Creek P.U.D.

3. Test Location: McChesney Avenue Ext. at Country Way
   Town of Brunswick

4. Date and Time of Test: Date: 9/22/05
   Time; 9:15 a.m.

5. Test Conducted by: Jeff Ferguson (EDP)
   Mark Kestner
   Myron Van Dyck, Supt.
   Wayne Savage, Foreman

6. Source of Water Supply: ☒ Gravity ☐ Pump ☐ Other: _____

7. Name of Water System: Brunswick Water District No. 10

8. Flow Test Data:

Gage Hydrant		Pump House		Delta P* (psi)	Flow Hydrant			Adjusted Flow; Flow @ 20 psi
Static Pressure (psi)	Residual Pressure (psi)	Static Pressure (psi)	Residual Pressure (psi)		Pitot-Tube Pressure (psi)	Outlet Coef.	Discharge Rate** (gpm)	
109	55	n/a	n/a	n/a	33.5	0.90	972.5	1,273.7 gpm

*Delta P = Gage Static + Change in Pump House Pressure
(+ increase - decrease) - gage residual
**From Table or calculated using: $Q = 27\ D^2\sqrt{P}$

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9. **Outlet Coefficient:**
   - ☐ **Outlet Square & Projecting into Barrel, coef. = 0.77**
   - ☐ **Outlet Square & Sharp, coefficient = 0.88**
   - ☒ **Outlet Smooth & Rounded, coefficient = 0.90**

10. **Fire Flow Calculation (Theoretical Flow @ 20 psi):**

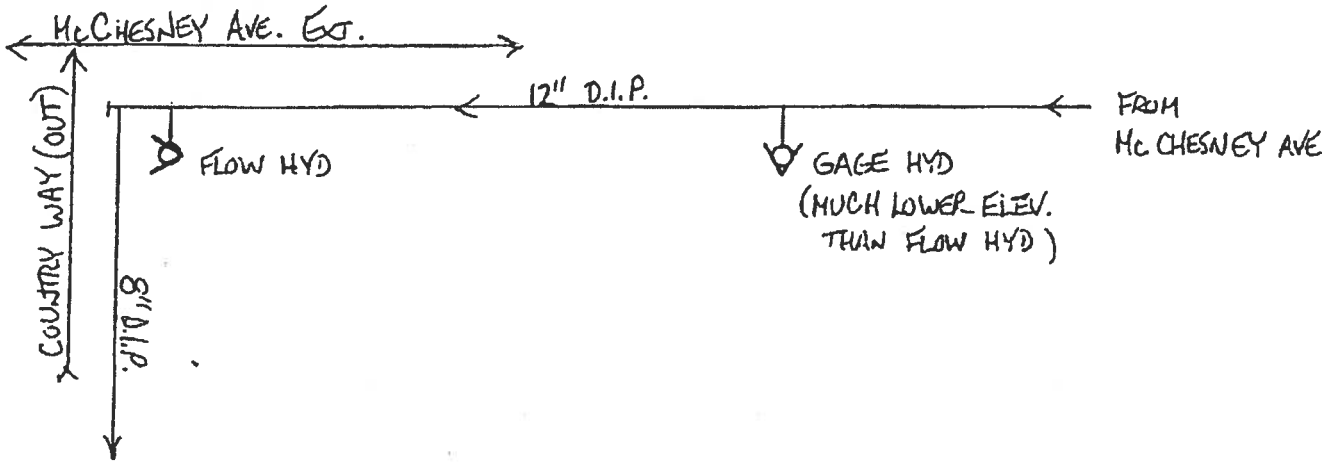
$$Q_A = Q_T \times \frac{h_A^{0.54}}{h_T^{0.54}}$$

Where Q_A is the flow available with a residual of 20 psi, Q_T is the test flow, h_A is the pressure drop available, and h_T is the pressure drop during the test.

$$Q_A = 972.5 \times \frac{(109-20)^{0.54}}{(109-55)^{0.54}}$$

Q_A =1,273.7 gpm at 20 psi

11. **Sketch of Test Location:**



12. **Remarks:** _____

13. **Signed:** _____
Jeffrey A. Ferguson
Quality Control Engineer

ITEM 1-2

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JOB NAME: Duncan Meadows
SHEET: 1 OF 2
CALCULATED BY: SDP DATE: 12-16-08
CHECKED BY: DATE:
SCALE: N.T.S.

Fire Flow Calculations

Fire Demand:

For Sprinklered Bldgs:

- Must be designed in accordance with NFPA 13R (Residential Buildings up to 4 stories in Height)
- Assume 4 design sprinklers

  13 gpm/sprinkler → (4)(13) = 52 gpm
- Per AWWA M-31 Table 5-1 (for Hose Flows)

  Per AWWA M-31 Table 1-1 (1-21-09)

  Light Hazard Class. → Hose-Stream Allowance = 100 gpm, Duration = 30 min

  Ordinary Group I Class → " " " = 250 gpm, " = 60-90 min. } → 120 min
- Projected fire flows = Q sprinklers + Q Hose

  = 52 gpm + 250 gpm

  = 302 gpm.
- Req'd Fire Flow = Projected fire flows or 500 gpm (whichever is greater)

  (per AWWA) = 302 gpm or 500 gpm

For Non-Sprinklered Bldgs:

According to ISO's "Guide for Determination of Needed Fire Flow", Chapt. 7:

1- /2- Family structures ≤ 2 stories in ht would need:

750 gpm if Bldgs are 31-100' apart

1,000 gpm if Bldgs are 11-30' apart

The current layout has > 31' of separation to the neighboring Bldgs.

↳ NFF = 750 gpm.

Total Design Demand:

Per AWWA:

Design Demand = Peak Hourly Domestic Demand OR the Fire Demand + Max. Daily Domestic Demand

= 224.4 OR 750 + 140.25

= 224.4 OR 890.25

Therefore, Design Demand = 890.25 gpm.

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JOB NAME: Duncan Meadows
SHEET: 2 OF 2
CALCULATED BY: SDP DATE: 12-16-08
CHECKED BY: DATE:
SCALE: N.T.S.

Per the attached Hydrant Flow Test dated Sept. 26, 2005:

The fire flow in the ex. main = 1,273.7 gpm @ 20 psi

* Since 1,273.7 > 890.25, the existing system will provide sufficient fire fighting flows for the proposed development

Storage Capacity:

Storage Quantity = Rate × Duration
= (890.25 gpm)(90 min)
= 80,122.5 gallons.

= (890.25)(120 min) (1-21-09)
= 106,830 gallons

Storage Capacity of the existing system = 2,000,000 gallons
- Avg. Daily Demand, existing = 625,000 gallons
- Proposed Avg. Daily Demand for other devel. = 150,000 gallons
- Proposed Avg. Daily Demand for this devel. = 55,080 gallons
- Proposed Fire Flows for this development for 90 min = 80,122.5 gallons = 106,830 gal's

Excess storage volume = 1,089,797.5 gallons. = 1,063,090 gallons