

**TRC Engineers, Inc.**

**Water Demand and Sewage Flow  
Calculations**

## **Existing Water Use / Sewage Flow**

Project # 167697  
 United Hospital Site  
 Water Usage Record from Aquarion Water Company  
 7/21/2009

United Hospital			
Date Mo/Yr	Consumption (ccf)	Consumption (gallons)	Monthly Average (gallons)
12/5/2005	225	168,278	
12/5/2005	195	145,841	
12/5/2005	109	81,521	395,639
11/8/2005	190	142,101	
11/8/2005	162	121,160	
11/8/2005	91	68,059	331,320
10/6/2005	46	34,403	
10/6/2005	35	26,177	
10/6/2005	22	16,454	77,034
9/6/2005	95	71,051	
9/6/2005	56	41,882	
9/6/2005	33	24,681	137,614
8/3/2005	35	26,177	
8/3/2005	0	0	
8/3/2005	21	15,706	
8/3/2005	14	10,471	52,353
7/7/2005	69	51,605	
7/7/2005	26	19,445	
7/7/2005	26	19,445	
7/7/2005	17	12,714	103,210
6/7/2005	116	86,756	
6/7/2005	58	43,378	
6/7/2005	37	27,672	
6/7/2005	21	15,706	173,513
5/5/2005	305	228,110	
5/5/2005	139	103,958	
5/5/2005	101	75,538	
5/5/2005	65	48,614	456,219
4/5/2005	165	123,404	
4/5/2005	83	62,076	
4/5/2005	437	326,832	
4/5/2005	189	141,353	653,665
3/7/2005	375	280,463	
3/7/2005	859	642,446	
3/7/2005	319	238,580	
3/7/2005	165	123,404	1,284,892
2/7/2005	534	399,379	
2/7/2005	1224	915,430	
2/7/2005	455	340,295	
2/7/2005	235	175,757	1,830,859
1/4/2005	777	581,118	
1/4/2005	1795	1,342,481	
1/4/2005	671	501,841	
1/4/2005	347	259,521	2,684,961
12/1/2004	757	566,160	
12/1/2004	1772	1,325,279	
12/1/2004	658	492,118	
12/1/2004	357	267,000	2,650,558
11/3/2004	926	692,555	
11/3/2004	2180	1,630,422	
11/3/2004	807	603,555	
11/3/2004	447	334,311	3,260,844
10/5/2004	1468	1,097,917	
10/5/2004	3465	2,591,474	
10/5/2004	1291	965,539	
10/5/2004	706	528,017	5,182,947
8/31/2004	1310	979,749	
8/31/2004	3088	2,309,515	

681,773 Year 2005

United Hospital			
Date Mo/Yr	Consumption (ccf)	Consumption (gallons)	Monthly Average (gallons)
8/31/2004	1156	864,572	
8/31/2004	622	465,194	4,619,030
8/3/2004	1797	1,343,976	
8/3/2004	4229	3,162,869	
8/3/2004	1583	1,183,926	
8/3/2004	849	634,967	6,325,738
7/1/2004	1335	998,447	
7/1/2004	3134	2,343,919	
7/1/2004	1173	877,287	
7/1/2004	626	468,185	4,687,837
6/2/2004	983	735,186	
6/2/2004	2234	1,670,809	
6/2/2004	860	643,194	
6/2/2004	391	292,429	3,341,617
5/5/2004	854	638,707	
5/5/2004	1808	1,352,203	
5/5/2004	752	562,421	
5/5/2004	202	151,076	2,704,406
4/5/2004	611	456,967	
4/5/2004	1297	970,026	
4/5/2004	541	404,614	
4/5/2004	145	108,446	1,940,053
3/11/2004	676	505,580	
3/11/2004	1428	1,068,001	
3/11/2004	594	444,253	
3/11/2004	158	118,168	2,136,002
2/12/2004	809	605,051	
2/12/2004	1714	1,281,901	
2/12/2004	715	534,749	
2/12/2004	190	142,101	2,563,801
1/9/2004	704	526,522	
1/9/2004	1488	1,112,875	
1/9/2004	621	464,446	
1/9/2004	163	121,908	2,225,750
12/11/2003	-2598	-1,943,044	3,469,882 year 2004
12/10/2003	2013	1,505,523	
12/10/2003	3295	2,464,331	
12/10/2003	807	603,555	
12/10/2003	475	355,253	2,985,617
11/7/2003	982	734,438	
11/7/2003	2598	1,943,044	
11/7/2003	1385	1,035,842	
11/7/2003	231	172,765	3,886,088
10/21/2003	-8990	-6,723,621	
10/8/2003	5122	3,830,744	
10/8/2003	11850	8,862,615	
10/8/2003	5542	4,144,862	
10/8/2003	1186	887,009	11,001,609
9/10/2003	4784	3,577,954	
9/10/2003	4495	3,361,811	
9/10/2003	3138	2,346,910	
9/10/2003	1068	798,757	10,085,432
8/7/2003	2367	1,770,279	
8/7/2003	0	0	
8/7/2003	2392	1,788,977	
8/7/2003	1569	1,173,455	
8/7/2003	534	399,379	5,132,090
7/11/2003	2128	1,591,531	
7/11/2003	1148	858,589	
7/11/2003	719	537,740	
7/11/2003	246	183,983	3,171,844
6/12/2003	2204	1,648,372	
6/12/2003	1044	780,808	
6/12/2003	919	687,320	

United Hospital			
Date Mo/Yr	Consumption (ccf)	Consumption (gallons)	Monthly Average (gallons)
6/12/2003	241	180,244	3,296,743
5/8/2003	167	124,899	
5/8/2003	1521	1,137,556	
5/8/2003	719	537,740	
5/8/2003	635	474,917	2,275,112

5,229,317 year 2003

May 2003  
to April

2004

**Hospital**

4,225,012 average monthly use in gallons

138,904 average daily use (gpd) over 12-months

Project # 167697  
 United Hospital Site / 999 High Street  
 Water Usage Record from Aquarion Water Company  
 file: Projects/167697/excel/site/Aquarion water useage  
 7/21/2009

<b>999 High Street Water Use</b>			
Date	Consumption	Consumption	Monthly
Mo/Yr	(ccf)	(gallons)	Average
			days
12/7/2006	4011	2,999,827	31
12/7/2006	-2166	-1,619,951	-30
11/6/2006	2166	1,619,951	30
10/6/2006	1559	1,165,976	31
9/7/2006	1279	956,564	30
8/9/2006	1343	1,004,430	31
7/10/2006	1545	1,155,506	31
6/6/2006	1370	1,024,623	30
Total		8,306,925	184
<b>gallons per day (gpd)</b>		<b>45,146</b>	

Project # 167697  
United Hospital Site  
Water Usage Record from Aquarion Water Company  
file: Projects/167697/excel/site/Aquarion water useage  
7/21/2009

<b>Average Daily Water Use (gpd)</b>		
<b>United Hospital Use</b>	<b>999 High Street Use</b>	<b>Combined Site Use</b>
May 2003 to April 2004	June 2006 to Dec 2006	
138,904	45,146	184,051

### Existing Sewage Flow Calculation

<b>Existing Water Use (gpd)</b>	<b>Sewage / Water %</b>	<b>Existing Sewage Flow (gpd)</b>
184,051	90%	165,646

# **Proposed Water Demand / Sewage Flow**

**Table D-4a  
Proposed  
Estimated Sewage Flow**

Use	Quantity (1)	Unit (1)	Flow Rate Per Unit (gal / day) (2)	Estimated Average Daily Flow Rate (gal / day)
Residential Apartments	362	1 BR	120	43,440
Residential Apartments	400	2 BR	240	96,000
Commercial	254,203	S.F.	0.08	20,336
<b>Total</b>	N/A	-	N/A	<b>159,776</b>

**Proposed Estimated Water Demand**

Estimated Water Usage (3)	<b>177,500</b>
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Notes:

- (1) Quantity based on values provided by SOM Concept Master Plan.
- (2) Sewage Flows taken from Table 3 of the NYS DEC Design Standards for Wastewater Treatment. Allowance of 20% reduction for water saving plumbing fixtures has been applied.
- (3) Sewage Flows are assumed to be 90% of the total water usage. Total Water Usage is calculated by Total Sewage Flow / 90%

# **Comparative Water / Sewage Summary**

**Table D-2  
Comparison of Water Use**

<b>Existing (gpd) (1)</b>	<b>Proposed (gpd) (2)</b>	<b>% Reduction</b>
184,000	177,500	4%
Notes:		
<p>(1) Derived from available water use records from Aquarion Water Co. Represents water use for the year May 2003 to May 2004. It is assumed that water use prior to this date would have been greater.</p> <p>(2) Estimated at 10% less than the DEC sewage flows (see Table D-4)</p>		

**Table D-5  
Comparison of Sewage Flow**

<b>Existing (gpd) (1)</b>	<b>Proposed (gpd) (2)</b>	<b>% Reduction</b>
166,000	159,776	4%
Notes:		
<p>(1) Derived from available water use records from Aquarion Water Co. for the year May 2003 to May 2004. Represents sewage flow accounting for a 10% reduction from the water use. (See Table D-2) It is assumed that sewage flow prior to this date would have been greater.</p> <p>(2) See Table D-4a.</p>		

# **Water System Calculations**

**Project: Gateway Port Chester  
 High Street & Boston Post Road  
 Port Chester, NY**

**Project No.: 167697**

**Date: 5/10/10**

**Type of Hydrant Flow Test  
 Calculation:**

**Computed By: TDH**

**Checked By:**

**Flow test data provided by United Water Westchester.**

Flow Test: 4/29/10, 10:00 A.M.

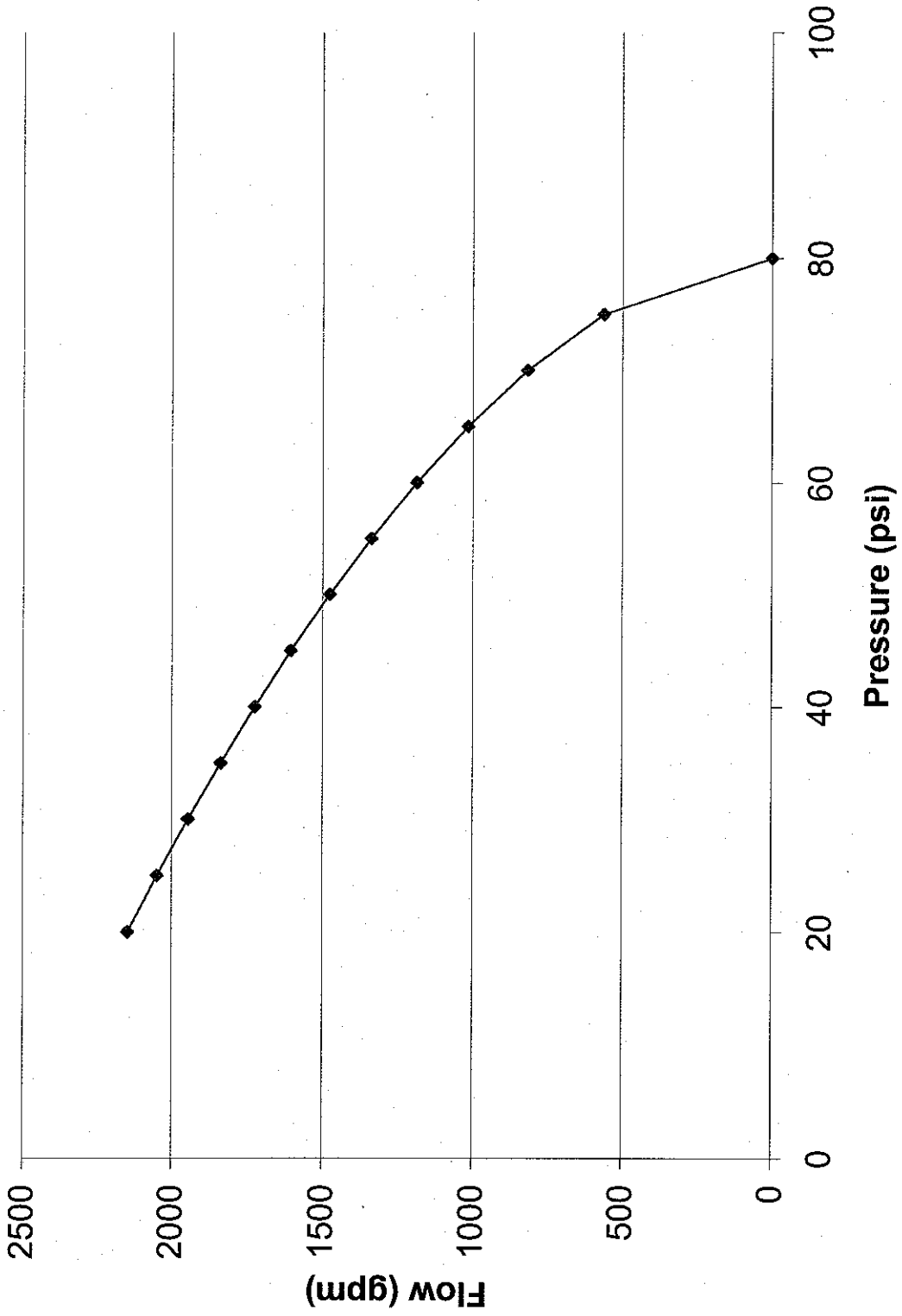
Flow Test Hydrant #44 (Boston Post Rd. Shop. Ctr.) Residual Hydrant #137 (1000 High Street)

Gauge Static Pressure, P <sub>s</sub>	80	lbs. / sq. in.
Gauge Flow (Residual) Pressure, P <sub>r</sub>	60	lbs. / sq. in.
Pitot Tube Flow Pressure		lbs. / sq. in.
Inside Diameter of Nozzle	2 1/2	inches
Flow at Residual Pressure, Q <sub>r</sub>	1186	gallons per minute (gpm)

Flow at 20 lbs/sq. in. = 
$$Q_f \times \frac{(P_s - 20)^{0.54}}{(P_s - P_r)^{0.54}} \quad (AWWA M17)$$

Flow at	20	lbs/sq. in	2146	gpm
Flow at	25	lbs/sq. in	2048	gpm
Flow at	30	lbs/sq. in	1945	gpm
Flow at	35	lbs/sq. in	1838	gpm
Flow at	40	lbs/sq. in	1724	gpm
Flow at	45	lbs/sq. in	1604	gpm
Flow at	50	lbs/sq. in	1476	gpm
Flow at	55	lbs/sq. in	1338	gpm
Flow at	60	lbs/sq. in	1186	gpm
Flow at	65	lbs/sq. in	1015	gpm
Flow at	70	lbs/sq. in	816	gpm
Flow at	75	lbs/sq. in	561	gpm
Flow at	80	lbs/sq. in	0	gpm

# Hydrant Flow Chart



Series1

**TRC Engineers**

**Project:** Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

**Project No.:** 167697  
Sheet I  
**Date:** 5/10/10

**Type of Calculation:** Pipe Head Loss Calculation  
From Flow Hydrant #137 (High St.) to Northerly Site entrance

**Computed By:** TDH  
**Checked By:**

(feet from resid. hyd.#137 to site + 15% for equiv.

Pipe Length (ft.) = 506 440 length for fittings)  
Pipe Size (in.) = 8  
Pipe Class = CL 52 DIP  
Coef., "C" = 100  
Elevation at Resid. Hydrant #137 80 (High St)  
Peak Elevation of Pipe 94 (Northerly site entrance)

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	15.3	7.7	14.00	21.7	9.4
800	19.6	9.9	14.00	23.9	10.4
900	24.4	12.3	14.00	26.3	11.4
1000	29.6	15.0	14.00	29.0	12.6
1100	35.4	17.9	14.00	31.9	13.8
1200	41.5	21.0	14.00	35.0	15.2
1300	48.2	24.4	14.00	38.4	16.6
1400	55.3	28.0	14.00	42.0	18.2
1500	62.8	31.8	14.00	45.8	19.8
1600	70.8	35.8	14.00	49.8	21.6
1700	79.2	40.1	14.00	54.1	23.4
1800	88.0	44.5	14.00	58.5	25.4
1900	97.3	49.2	14.00	63.2	27.4

Calculate Pressure at Site Entrance			
Residual Pressure at Test Hydrant 137 (psi) (1)	Total Head Loss (hydrant 137 to design point) (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
72	9.4	62.6	700
70	10.4	59.6	800
68	11.4	56.6	900
65	12.6	52.4	1000
63	13.8	49.2	1100
59	15.2	43.8	1200
56	16.6	39.4	1300
52	18.2	33.8	1400
49	19.8	29.2	1500
45	21.6	23.4	1600
41	23.4	17.6	1700
37	25.4	11.6	1800
32	27.4	4.6	1900

(1) from hyd flow test

**TRC Engineers**

**Project:** Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

**Project No.:** 167697

Sheet 2

**Date:** 5/10/10

**Type of Calculation:** Pipe Head Loss Calculation  
From High St. Entrance to Onsite Design Point

**Computed By:** TDH

**Checked By:**

(feet from High St / site entrance to onsite hyd 15%  
720 for equiv. length for fittings)

Pipe Length (ft.) = 828  
 Pipe Size (in.) = 12  
 Pipe Class = CL 52 DIP  
 Coef., "C" = 120  
 Elevation at High Street entrance = 94 (High St / site entrance)  
 Peak Elevation of Pipe = 106 (onsite hydrant Design Point )

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	1.5	1.3	12.00	13.3	5.7
800	1.9	1.6	12.00	13.6	5.9
900	2.4	2.0	12.00	14.0	6.1
1000	2.9	2.4	12.00	14.4	6.3
1100	3.5	2.9	12.00	14.9	6.5
1200	4.1	3.4	12.00	15.4	6.7
1300	4.8	3.9	12.00	15.9	6.9
1400	5.5	4.5	12.00	16.5	7.2
1500	6.2	5.1	12.00	17.1	7.4
1600	7.0	5.8	12.00	17.8	7.7
1700	7.8	6.5	12.00	18.5	8.0
1800	8.7	7.2	12.00	19.2	8.3
1900	9.6	8.0	12.00	20.0	8.7

Calculate Pressure at Design Point at Required Flow:			
Residual Pressure at High Street (psi) (1)	Total Head Loss High St. to design point (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
62.6	5.7	56.8	700
59.6	5.9	53.7	800
56.6	6.1	50.5	900
52.4	6.3	46.2	1000
49.2	6.5	42.7	1100
43.8	6.7	37.1	1200
39.4	6.9	32.4	1300
33.8	7.2	26.6	1400
29.2	7.4	21.7	1500
23.4	7.7	15.7	1600
17.6	8.0	9.5	1700
11.6	8.3	3.3	1800
4.6	8.7	-4.1	1900

(1) from Sheet 1

TRC Engineers

Project: Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

Project No.: 167697  
Sheet 3  
Date: 5/10/10

Type of Calculation: Pipe Head Loss Calculation  
From 20" Main (north) to site

Computed By: TDH

Checked By:

(feet from resid. hyd.#137 to site + 15% for equiv.  
125 length for fittings)

Pipe Length (ft.) = 143.75  
 Pipe Size (in.) = 8  
 Pipe Class = CL 52 DIP  
 Coef., "C" = 100  
 Elevation at 20" Main = 100 Village Property  
 Peak Elevation of Pipe = 98

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	15.3	2.2	-2.00	0.2	0.1
800	19.6	2.8	-2.00	0.8	0.4
900	24.4	3.5	-2.00	1.5	0.7
1000	29.6	4.3	-2.00	2.3	1.0
1100	35.4	5.1	-2.00	3.1	1.3
1200	41.5	6.0	-2.00	4.0	1.7
1300	48.2	6.9	-2.00	4.9	2.1
1400	55.3	7.9	-2.00	5.9	2.6
1500	62.8	9.0	-2.00	7.0	3.0
1600	70.8	10.2	-2.00	8.2	3.5
1700	79.2	11.4	-2.00	9.4	4.1
1800	88.0	12.7	-2.00	10.7	4.6
1900	97.3	14.0	-2.00	12.0	5.2

Calculate Pressure at North Site PL				
Residual Pressure at Hyd #137 (psi) (1)	Residual Pressure at 20" Main (psi) (1)	Total Head Loss (20" main to site) (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
72	63.3	0.1	63.3	700
70	61.3	0.4	61.0	800
68	59.3	0.7	58.7	900
65	56.3	1.0	55.4	1000
63	54.3	1.3	53.0	1100
59	50.3	1.7	48.6	1200
56	47.3	2.1	45.2	1300
52	43.3	2.6	40.8	1400
49	40.3	3.0	37.3	1500
45	36.3	3.5	32.8	1600
41	32.3	4.1	28.3	1700
37	28.3	4.6	23.7	1800
32	23.3	5.2	18.1	1900

(1) fAssume residual pressure same as #137 - 8.66 for elev change  
(100-20)/2.31 = 8.66 psi

**TRC Engineers**

**Project:** Gateway Port Chester  
 High Street & Boston Post Road, Port Chester NY

**Type of Calculation:** Pipe Head Loss Calculation  
 Northeast Leg from 8" at north PL to onsite design point

**Project No.:** 167697  
 Sheet 4

**Date:** 5/10/10

**Computed By:** TDH

**Checked By:**

(north PL to design point + 15% for equiv. length  
 800 for fittings)

Pipe Length (ft.) = 920  
 Pipe Size (in.) = 12  
 Pipe Class = CL 52 DIP  
 Coef. "C" = 120  
 Elevation at North PL = 98  
 Peak Elevation of Pipe = 106 (onsite hydrant Design Point)

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	1.5	1.4	8.00	9.4	4.1
800	1.9	1.8	8.00	9.8	4.2
900	2.4	2.2	8.00	10.2	4.4
1000	2.9	2.7	8.00	10.7	4.6
1100	3.5	3.2	8.00	11.2	4.9
1200	4.1	3.8	8.00	11.8	5.1
1300	4.8	4.4	8.00	12.4	5.4
1400	5.5	5.0	8.00	13.0	5.7
1500	6.2	5.7	8.00	13.7	5.9
1600	7.0	6.4	8.00	14.4	6.3
1700	7.8	7.2	8.00	15.2	6.6
1800	8.7	8.0	8.00	16.0	6.9
1900	9.6	8.9	8.00	16.9	7.3

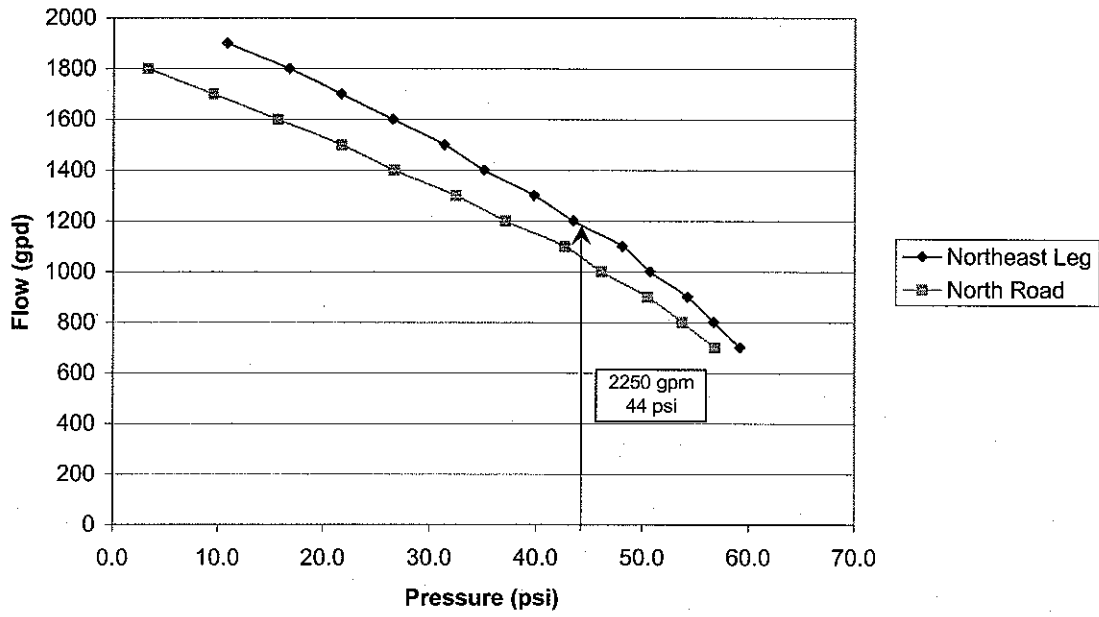
Calculate Pressure at Design Point at Required Flow:			
Residual Pressure at North PL (psi) (1)	Total Head Loss High St. to design point (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
63.3	4.1	59.2	700
61.0	4.2	56.7	800
58.7	4.4	54.3	900
55.4	4.6	50.7	1000
53.0	4.9	48.1	1100
48.6	5.1	43.5	1200
45.2	5.4	39.8	1300
40.8	5.7	35.1	1400
37.3	5.9	31.3	1500
32.8	6.3	26.5	1600
28.3	6.6	21.7	1700
23.7	6.9	16.8	1800
18.1	7.3	10.8	1900

Total Head Loss from #137 to site road

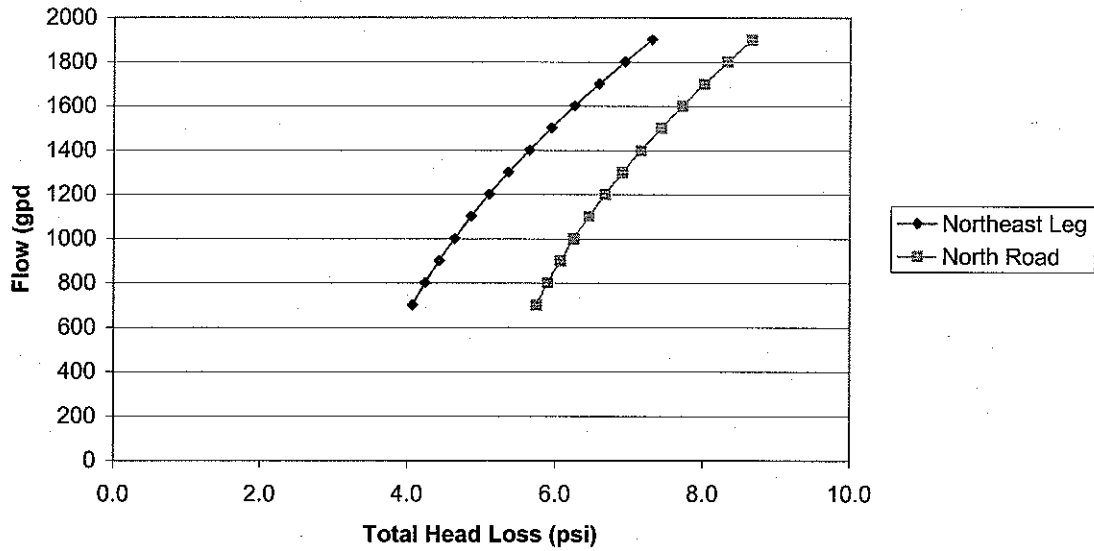
5.7  
5.9  
6.1  
6.3  
6.5  
6.7  
6.9  
7.2  
7.4  
7.7  
8.0  
8.3  
8.7

(1) from sheet 3

### Comparison Pressure



### Comparison



**TRC Engineers**

**Project:** Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

**Project No.:** 167697  
**Sheet 5**  
**Date:** 5/10/10

**Type of Calculation:** Pipe Head Loss Calculation  
From Flow Hydrant #137 (High St.) to Post Rd

**Computed By:** TDH

**Checked By:**

Pipe Length (ft.) = 391 (feet from resid. hyd.#137 to Post Rd + 15% for 340 equiv. length for fittings)  
 Pipe Size (in.) = 8  
 Pipe Class = CL 52 DIP  
 Coef., "C" = 100  
 Elevation at Resid. Hydrant #137 = 80 (High St)  
 Peak Elevation of Pipe = 77 (12" Post Rd)

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	15.3	6.0	-3.00	3.0	1.3
800	19.6	7.7	-3.00	4.7	2.0
900	24.4	9.5	-3.00	6.5	2.8
1000	29.6	11.6	-3.00	8.6	3.7
1100	35.4	13.8	-3.00	10.8	4.7
1200	41.5	16.2	-3.00	13.2	5.7
1300	48.2	18.8	-3.00	15.8	6.9
1400	55.3	21.6	-3.00	18.6	8.1
1500	62.8	24.6	-3.00	21.6	9.3
1600	70.8	27.7	-3.00	24.7	10.7
1700	79.2	31.0	-3.00	28.0	12.1
1800	88.0	34.4	-3.00	31.4	13.6
1900	97.3	38.0	-3.00	35.0	15.2

Calculate Pressure at Post Rd			
Residual Pressure at Test Hydrant 137 (psi) (1)	Total Head Loss (hydrant 137 to design point) (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
72	1.3	70.7	700
70	2.0	68.0	800
68	2.8	65.2	900
65	3.7	61.3	1000
63	4.7	58.3	1100
59	5.7	53.3	1200
56	6.9	49.1	1300
52	8.1	43.9	1400
49	9.3	39.7	1500
45	10.7	34.3	1600
41	12.1	28.9	1700
37	13.6	23.4	1800
32	15.2	16.8	1900

(1) from hyd flow test

TRC Engineers

Project: Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

Project No.: 167697  
Sheet 6  
Date: 5/10/10

Type of Calculation: Pipe Head Loss Calculation  
From High St @ BP Rd to Kohl's D'way

Computed By: TDH

Checked By:

Pipe Length (ft.) = 517.5 (feet from High St @ BP Rd to Kohl's + 15% for 450 equiv. length for fittings)  
 Pipe Size (in.) = 12  
 Pipe Class = CL 52 DIP  
 Coef., "C" = 100  
 Elevation at Resid. Hydrant #137 77 (High & Post Rd)  
 Peak Elevation of Pipe 74 (12" Kohl's)

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	2.1	1.1	-3.00	-1.9	-0.8
800	2.7	1.4	-3.00	-1.6	-0.7
900	3.4	1.8	-3.00	-1.2	-0.5
1000	4.1	2.1	-3.00	-0.9	-0.4
1100	4.9	2.5	-3.00	-0.5	-0.2
1200	5.8	3.0	-3.00	0.0	0.0
1300	6.7	3.5	-3.00	0.5	0.2
1400	7.7	4.0	-3.00	1.0	0.4
1500	8.7	4.5	-3.00	1.5	0.7
1600	9.8	5.1	-3.00	2.1	0.9
1700	11.0	5.7	-3.00	2.7	1.2
1800	12.2	6.3	-3.00	3.3	1.4
1900	13.5	7.0	-3.00	4.0	1.7

Calculate Pressure at Post Rd			
Residual Pressure at High & Post Rd (psi) (1)	Total Head Loss (High St to Kohl's) (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
70.7	-0.8	71.5	700
68.0	-0.7	68.7	800
65.2	-0.5	65.7	900
61.3	-0.4	61.7	1000
58.3	-0.2	58.5	1100
53.3	0.0	53.3	1200
49.1	0.2	48.9	1300
43.9	0.4	43.5	1400
39.7	0.7	39.0	1500
34.3	0.9	33.4	1600
28.9	1.2	27.7	1700
23.4	1.4	21.9	1800
16.8	1.7	15.1	1900

(1) from sheet 5

**TRC Engineers**

**Project:** Gateway Port Chester  
High Street & Boston Post Road, Port Chester NY

**Project No.:** 167697  
sheet 7

**Date:** 5/10/10

**Type of Calculation:** Pipe Head Loss Calculation  
From 12" in Post Rd./Kohl's to Onsite Design Point

**Computed By:** TDH

**Checked By:**

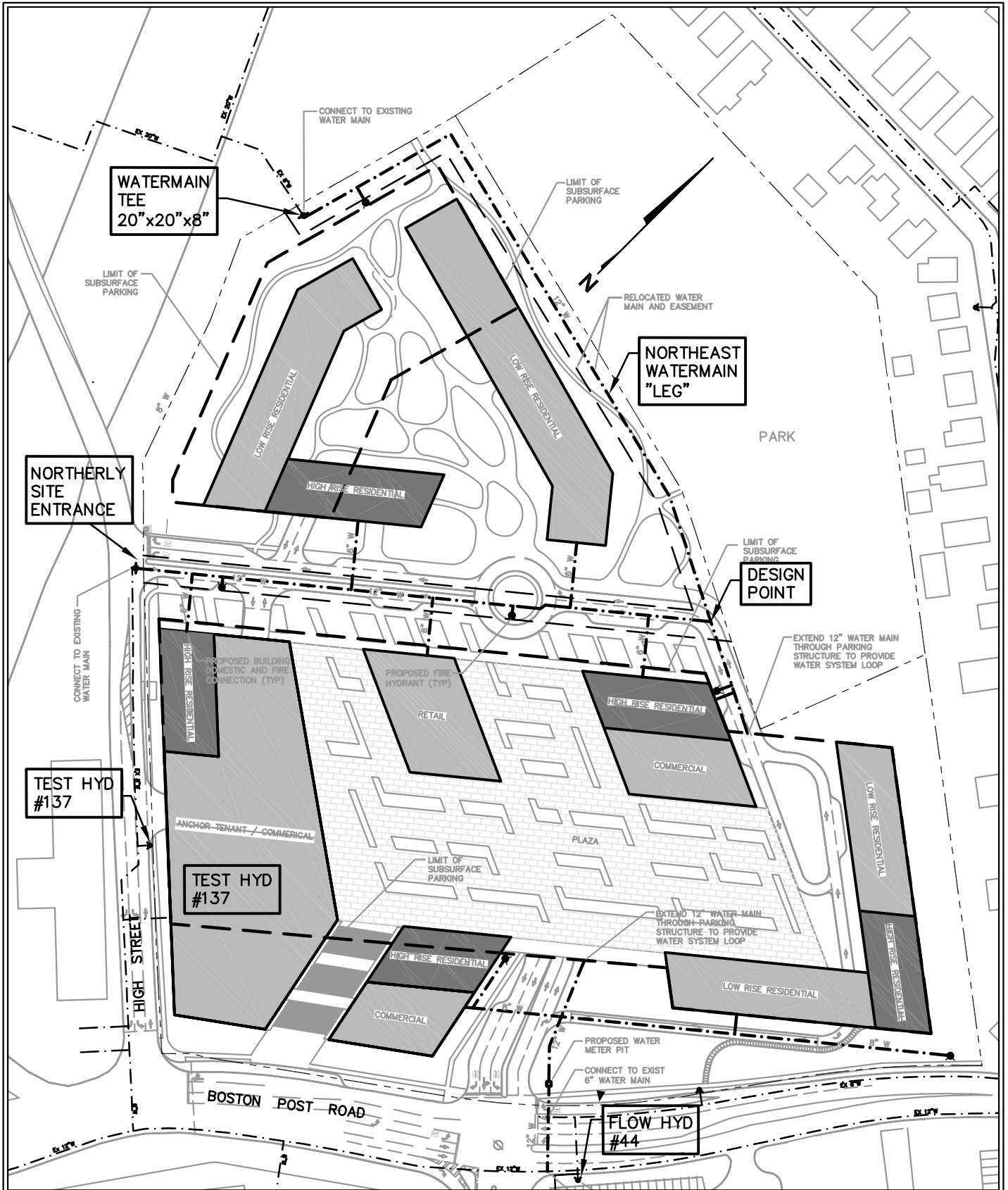
(feet from BP Rdt / site entrance to oniste design  
600 point + 15% for equiv. length for fittings)

Pipe Length (ft.) = 700  
 Pipe Size (in.) = 12  
 Pipe Class = CL 52 DIP  
 Coef., "C" = 120  
 Elevation Post Rd & Kohl's entrance = 74 (Post Rd & Kohl's entrance)  
 Peak Elevation of Pipe = 106 (onsite hydrant Design Point )

Flow Rate (gpm)	Friction Loss per 1000 ft.	Friction Head (ft.)	Elevation Head (ft.)	Total Head Loss (ft.)	Total Head Loss (psi)
700	1.5	1.1	32.00	33.1	14.3
800	1.9	1.4	32.00	33.4	14.5
900	2.4	1.7	32.00	33.7	14.6
1000	2.9	2.1	32.00	34.1	14.8
1100	3.5	2.5	32.00	34.5	14.9
1200	4.1	2.9	32.00	34.9	15.1
1300	4.8	3.3	32.00	35.3	15.3
1400	5.5	3.8	32.00	35.8	15.5
1500	6.2	4.4	32.00	36.4	15.8
1600	7.0	4.9	32.00	36.9	16.0
1700	7.8	5.5	32.00	37.5	16.3
1800	8.7	6.1	32.00	38.1	16.5
1900	9.6	6.7	32.00	38.7	16.8

Calculate Pressure at Design Point at Required Flow:			
Residual Pressure at High Street (psi) (1)	Total Head Loss High St. to design point) (psi)	Pressure at Design Point (psi)	Flow at Design Point (gpm)
71.5	14.3	57.2	700
68.7	14.5	54.2	800
65.7	14.6	51.1	900
61.7	14.8	46.9	1000
58.5	14.9	43.6	1100
53.3	15.1	38.1	1200
48.9	15.3	33.6	1300
43.5	15.5	28.0	1400
39.0	15.8	23.2	1500
33.4	16.0	17.4	1600
27.7	16.3	11.5	1700
21.9	16.5	5.4	1800
15.1	16.8	-1.7	1900

(1) from sheet 6



TRC Engineers, Inc.  
 7 Skyline Drive  
 Hawthorne, New York 10532  
 Tel: (914) 592-4040  
 Fax: (914) 592-5046  
 www.trcsolutions.com

Project No. 167697  
 Scale 1"=150'

Water Analysis Schematic  
 Gateway Port Chester  
 Mixed Use Development  
 Village of Port Chester, New York