DWELL AT MAITLAND

FIRE FLOW HYDRAULIC CALCULATIONS

PREPARED FOR:

THE KLEIN COMPANY
1735 MARKET STREET, STE 4010
PHILADELPHIA, PA 19103

PREPARED BY:

KCG KELLY, COLLINS & GENTRY, INC.
ENGINEERING / PLANNING
1700 NORTH ORANGE AVENUE, SUITE 400
ORLANDO, FLORIDA 32804
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DATE:

November 24th, 2015

CIVIL DISCIPLINE ONLY
CERTIFICATION OF AUTHORIZATION
NUMBER 00007360

GARTH R. RITTER
No. 79364
STATE OF FLORIDA
PROFESSIONAL ENGINEER

11/24/15

GARTH R. RITTER, P.E.
FLORIDA REGISTRATION 79364

NEEDED FIRE FLOW CALCULATIONS

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SAVAGE FIRE PROTECTION, INC.
P. 352-728-2877 - FAX 352-787-1202

FIRE HYDRANT FLOW TEST RESULTS

Subdivision / Project : Dwell Luxury Apartments **Total # Hydrants** 1

Address / S-T-R 1938 Summit Park Drive, Orlando, FL 32810

Date: October 28, 2015

Test Requested by: Garth R. Ritter, P.E. - KCG Corp.

Send Test Result to: To whom it may concern

Address:

Phone: **Fax:**

Test Conducted By: Savage Fire Protectic **Date:** October 28, 2015

Witnesses: Darcy Savage Orange County

Hydrant Location: 1938 Summit Park Drive, Orlando, FL 32810 (hydrant # 0328)

Static: 68 **Residual:** 57 **Pitot:** 47.5 **Test Flowing:** 1157

The above values, when applied in the calculations required by NFPA 291, indicate an available fire flow of:

2564 **GPM at 20 PSI** for the flowing hydrant

Please Note: The results of these water flow tests are an indicator of available water for fire protection on this date, time, and location, as specified above. No expressed or implied guarantees are made of future water flows, for this or any other location

- ☐ Final Approval Date
- ☐ Paint Hydrant Barrels RED
- ☐ Paint Bonnet & Nozzle Caps
- ☐ Blue Fire Hydrant Marker permanently installed on the road surface.
- ☐ Steamer facing Road
- ☐ Hydrant Heights & Setbacks
- ☐ Other

Classification of Hydrants	Marking of Hydrants
Class AA — Rated capacity of 1500 gpm (5680 L/min) or greater	**Light Blue**
Class A — Rated capacity of 1000–1499 gpm (3785–5675 L/min)	**Green**
Class B — Rated capacity of 500–999 gpm (1900–3780 L/min)	**Orange**
Class C — Rated capacity of less than 500 gpm (1900 L/min)	**Red**

The formula used to compute the discharge, Q, in gpm from these measurements is as follows:

$$Q=29.84cd^2\sqrt{P}$$

Q= Gallons Per Minute

c = coefficient of discharge

d = diameter of the outlet in inches

p = pitot pressure (velocity head) in psi

C= 0.9

D= 2.5

P= 47.5

Q= 1156.826292 **gallons per minute @ hydrant discharge outlet**

PROJECT: Dwell at Maitland

LOCATION: 200' N of Intersection of Summit Park & Maitland Summit

WATER SOURCE: Orange County Utilities

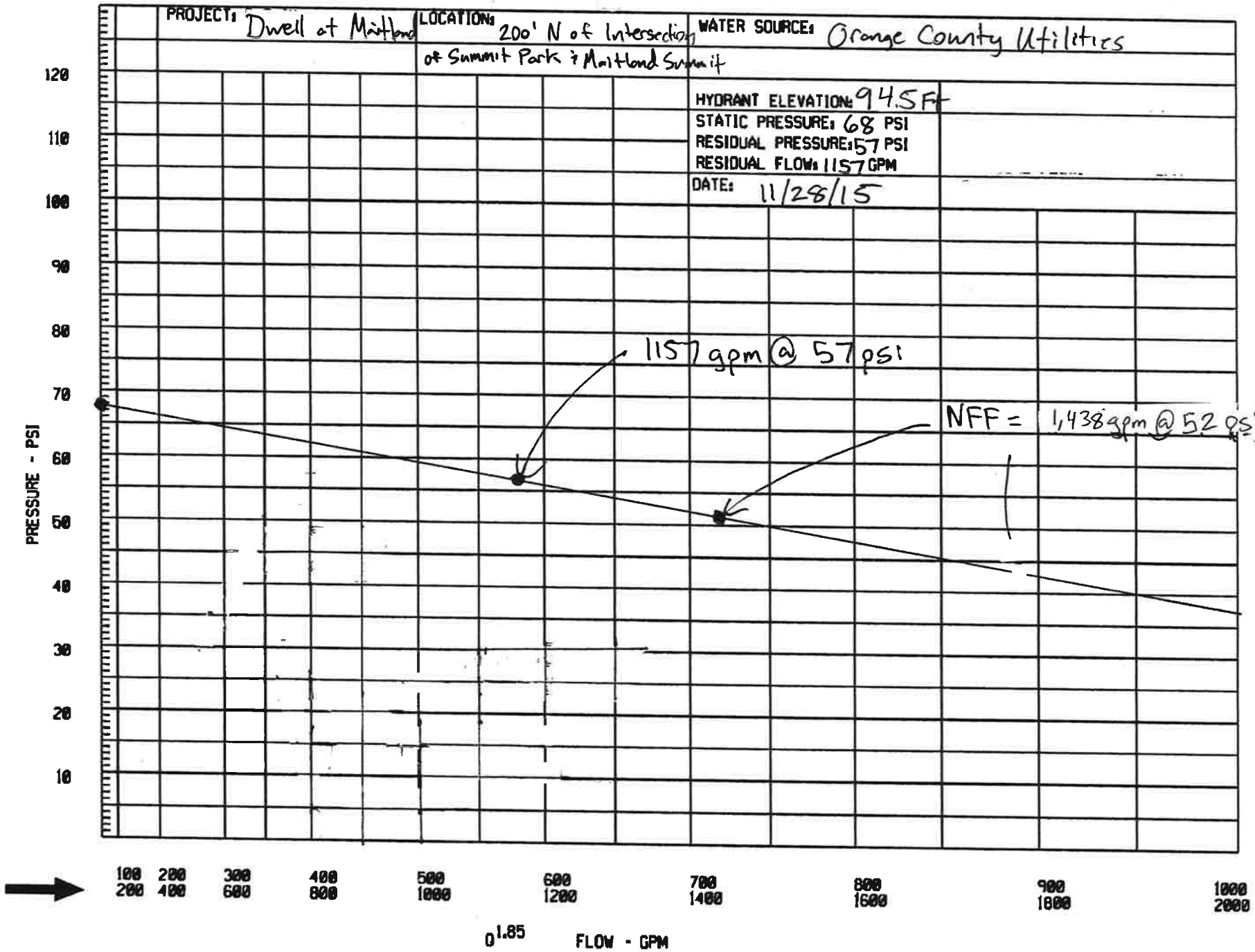
HYDRANT ELEVATION: 94.5 Ft

STATIC PRESSURE: 68 PSI

RESIDUAL PRESSURE: 57 PSI

RESIDUAL FLOW: 1157 GPM

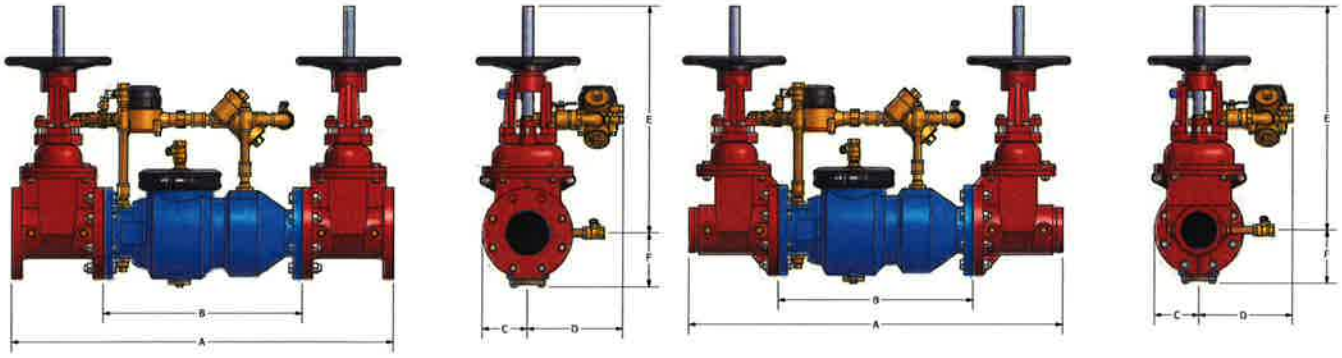
DATE: 11/28/15



WATER SUPPLY GRAPH

Specifications – 350DA Double Check Detector Assembly

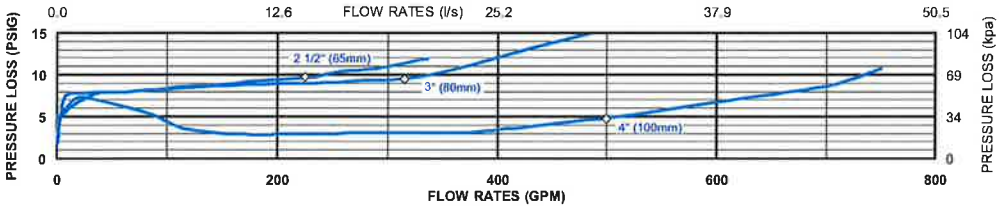
Weights and Dimensions

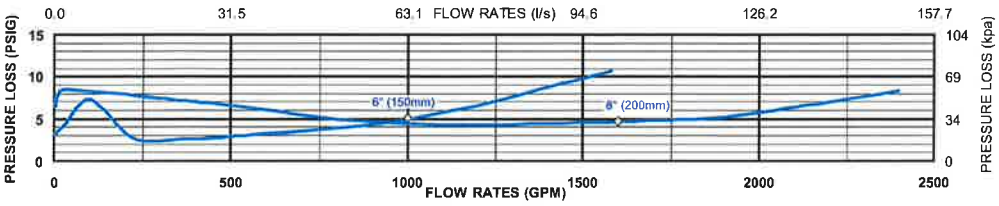


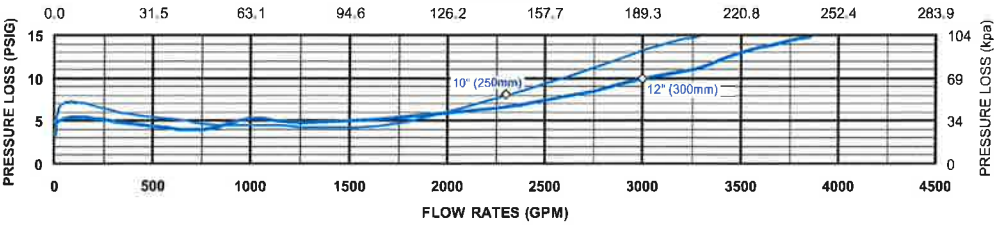
MODEL 350DA SIZE		DIMENSIONS (approximate)														WEIGHT	
		A		B WITHOUT GATE		C		D		E OS&Y GATE (OPEN)		E OS&Y GATE (CLOSED)		F		WITH OS&Y GATE VALVES	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg
2"	50	33 1/2	851	15 7/8	403	3 3/4	95	9	229	16 3/8	416	13 7/8	352	3 1/2	89	194	88.1

MODEL 350DA SIZE		DIMENSION (approximate)														WEIGHT			
		A		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		F		WITHOUT GATES VALVES		WITH OS&Y GATE VALVES	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg	lbs.	kg
2 1/2	65	31	787	15 7/8	403	3 3/4	95	9	229	16 3/8	416	13 7/8	352	3 1/2	89	68	30.9	178	80.8
3	80	32	813	15 7/8	403	3 3/4	95	9	229	18 7/8	479	15 5/8	397	3 1/2	89	68	30.9	198	90
4	100	37 5/8	956	19 1/2	495	4 1/2	114	9	229	22 3/4	578	18 1/4	464	6	152	106	48	296	134.4
6	150	44 3/4	1137	23 1/2	597	5 1/2	140	10 1/2	267	30 1/8	765	23 3/4	603	7	178	180	81.7	480	217.9
8	200	60 3/4	1543	37 3/4	959	10	254	12	305	37 3/4	959	29 1/4	743	8 1/2	216	374	170	850	385.9
10	250	63 3/4	1619	37 3/4	959	10	254	12	305	45 3/4	1162	35 3/8	899	8 1/2	216	404	183	1222	554.8
12	300	66 1/4	1683	38	965	10	254	12	305	53 1/8	1349	40 5/8	1032	8 7/8	226	463	210	1623	736.2

Flow Curves







Dwell at Maitland

Domestic Flow Demand

Tenant	Lot	Unit	Unit Type	GPD/Unit	GPD	GPM
Building 100		81	DU	350	28,350	19.69
					Total =	19.69

	Flow GPM	Peaking Factor
Avg. Daily Flow (ADF)	19.69	1.0
Max Daily Flow (MDF)	39.38	2.0
Peak Hour Flow (PHF)	78.75	4.0
Adjusted Needed Fire Flow (FF)	1,438	
MDF + FF	**1,477**	

Fire Flow Determination

Dwell at Maitland

November 24, 2015

Needed Fire Flow Calculations (Table 18.4.5.1.2 of the Florida Fire Prevention Code)

Building 100

Construction Type:	**V(111)**
Fire Area:	**97,292 sf**
Needed Fire Flow	**5,750 gpm**
Allowed Reduction Factor (per 18.4.5.2.1)	**75%**
Adjusted Needed Fire Flow	**1437.5 gpm**

Dwell at Maitland

Fire Main Pressure Calculations

Fire Flow + MDF

PIPE DATA

	Water Main Segment 1	Fire Main Segment 2	Fire Main Segment 3	Water Main Segment 4
Pipe Length(ft)	25	170	360	
Location	POC to DDCVA	DDCVA to Hyd 1	DDCVA to Hyd 2	
Inside Diam. (in)	8	8	8	
Roughness C	130	130	130	

Fittings:	K value	No.	Sub-K	No.	Sub-K	No.	Sub-K	No.	Sub-K
BFP*	10	0	0	0	0	0	0	0	0
90 deg.	0.9	0	0	3	2.7	4	3.6	0	0
45 deg.	0.42	4	1.68	0	0	0	0	0	0
22 1/2 deg.	0.25	0	0	0	0	0	0	0	0
Tee	1.8	3	5.4	1	1.8	2	3.6	0	0
Reducer	0.2	0	0	0	0	0	0	0	0
Contraction	0.5	0	0	0	0	0	0	0	0
Gate Valve	0.19	2	0.38	2	0.38	2	0.38	0	0
Check Valve	2.5	0	0	0	0	0	0	0	0
			7.46		**4.88**		**7.58**		**0**

*Pressure loss through 8" DDCV @ 2,000 gpm = 6 psi

PRESSURE LOSS CALCULATION

Elevation at connection = 94.5 ft

Residual Pressure at connection = 52 psi

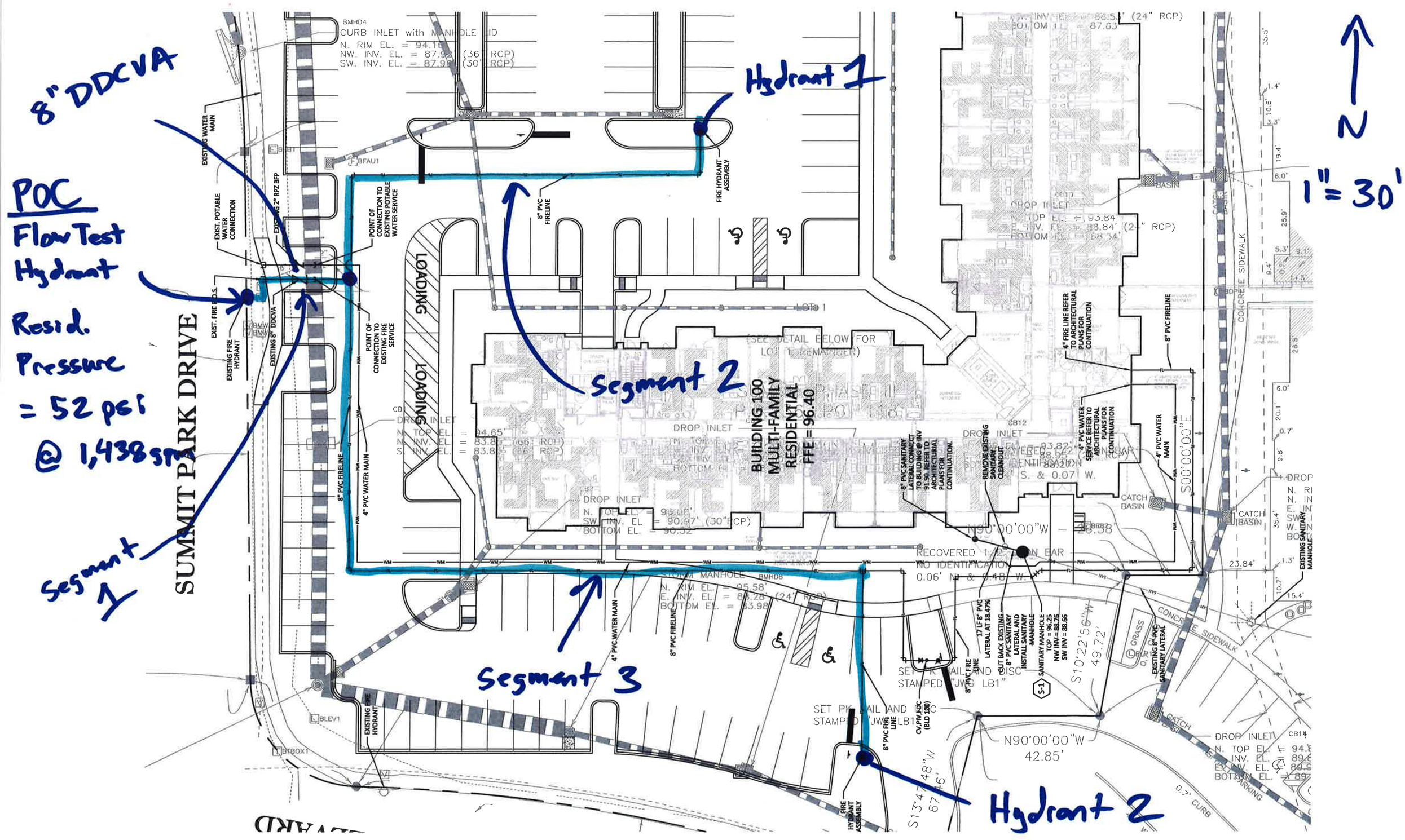
Segment	Flow (gpm)	Elev. Down (ft)	Static Pres. (psi) Up	Static Pres. (psi) Down	Head Loss (psi) Friction	Head Loss (psi) Minor	Elev Diff. (psi)	Resid. Pres.(psi) Up	Resid. Pres.(psi) Down	
1	1,477	94.7			0.41	4.46	(0.09)	52.00	41.04	
2	1,438	95.3			2.65	2.77	(0.24)	41.04	35.39	Hydrant 1
3	1,438	95.8			5.61	4.30	(0.45)	41.04	30.68	Hydrant 2

Friction Headloss(ft) = $\frac{10.44\ (L)*(Flow)^{1.85}}{(C)^{1.85}(dInches)^{4.8655}}$

psi * 2.31 = ft

ft * 0.433 = psi

Minor Headloss(ft) = k*V^2/2g g=32.2f/s^2



8" DDCVA
POC
Flow Test Hydrant
Resid. Pressure = 52 psi @ 1,438 gpm
Segment 1
Segment 2
Segment 3
Hydrant 1
Hydrant 2
N
1" = 30'
SUMMIT PARK DRIVE
LOADING
LOADING
BUILDING 100 MULTI-FAMILY RESIDENTIAL FFE = 96.40
CURB INLET with MANHOLE LID
N. RIM EL. = 94.16'
NW. INV. EL. = 87.92' (36" RCP)
SW. INV. EL. = 87.98' (30" RCP)
EXISTING WATER MAIN
EXIST. POTABLE WATER CONNECTION
EXISTING 2" RPZ BFP
POINT OF CONNECTION TO EXISTING POTABLE WATER SERVICE
EXIST. FIRE P.O.S.
EXISTING FIRE HYDRANT
EXISTING 8" DDCVA
POINT OF CONNECTION TO EXISTING FIRE SERVICE
8" PVC FIRELINE
FIRE HYDRANT ASSEMBLY
4" PVC WATER MAIN
DROP INLET
N. TOP EL. = 94.65'
N. INV. EL. = 83.81' (66" RCP)
S. INV. EL. = 83.85' (66" RCP)
DROP INLET
N. TOP EL. = 96.06'
SW. INV. EL. = 90.97' (30" RCP)
BOTTOM EL. = 90.52'
STORM MANHOLE
N. RIM EL. = 95.58'
E. INV. EL. = 88.28' (24" RCP)
BOTTOM EL. = 83.98'
DROP INLET
N. TOP EL. = 93.84'
E. INV. EL. = 88.84' (24" RCP)
BOTTOM EL. = 88.34'
4" FIRE LINE REFER TO ARCHITECTURAL PLANS FOR CONTINUATION
8" PVC FIRELINE
4" PVC WATER MAIN
CONCRETE SIDEWALK
CATCH BASIN
S00°00'00"E
N90°00'00"W
RECOVERED 1/2" IRON BAR
NO IDENTIFICATION
0.06' N & 0.18' W.
SET PK NAIL AND DISC STAMPED "JWG LB1"
N90°00'00"W
42.85'
S10°22'56"W
49.72'
S13°47'48"W
67.46'
EXISTING FIRE HYDRANT
EXISTING SANITARY MANHOLE