



Hydraulic Overview

Job Number: 5265
Report Description: Light Hazard (1)

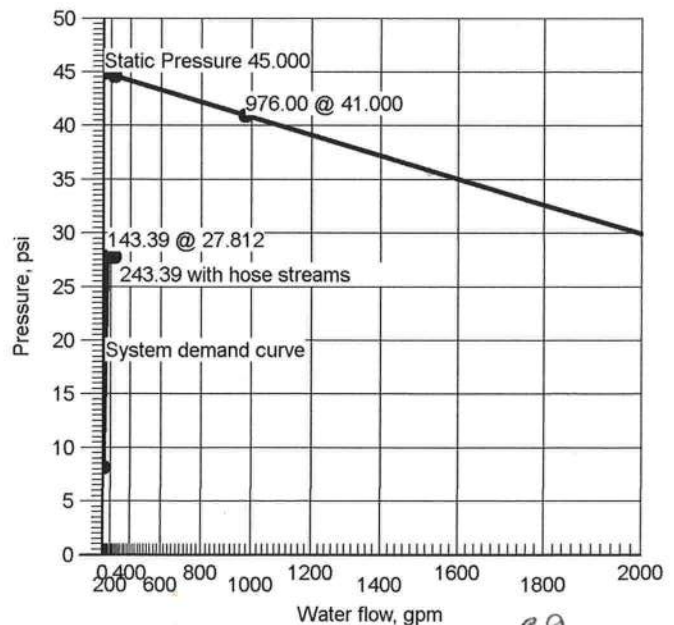
Job		
Job Number 5265	Design Engineer OMAR FONSECA	
Job Name: GRAND CYPRESS ALP	Phone 954-581-9393	FAX 954-581-2896
Address 1 LAKE CITY, FL	State Certification/License Number	
Address 2	AHJ	
Address 3	Job Site/Building	

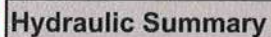
System		
Density 0.100gpm/ft²	Area of Application 1000.00ft² (Actual 1104.74ft²)	
Most Demanding Sprinkler Data 5.6 K-Factor 14.82 at 7.000	Hose Streams 100.00	
Coverage Per Sprinkler 120.00ft²	Number Of Sprinklers Calculated 9	Number Of Sprinklers Calculated 0
System Pressure Demand 27.812	System Flow Demand 143.39	
Total Demand 243.39 @ 27.812	Pressure Result +16.882 (37.8%)	

Supplies						Check Point Gauges			
<u>Node</u>	<u>Name</u>	<u>Flow(gpm)</u>	<u>Hose Flow(gpm)</u>	<u>Static(psi)</u>	<u>Residual(psi)</u>	<u>Identifier</u>	<u>Pressure(psi)</u>	<u>K-Factor(K)</u>	<u>Flow(gpm)</u>
9	Water Supply	976.00	100.00	45.000	41.000				



ALF	Water Supply at Node 9 (976.00, 0.00, 45.000, 41.000)
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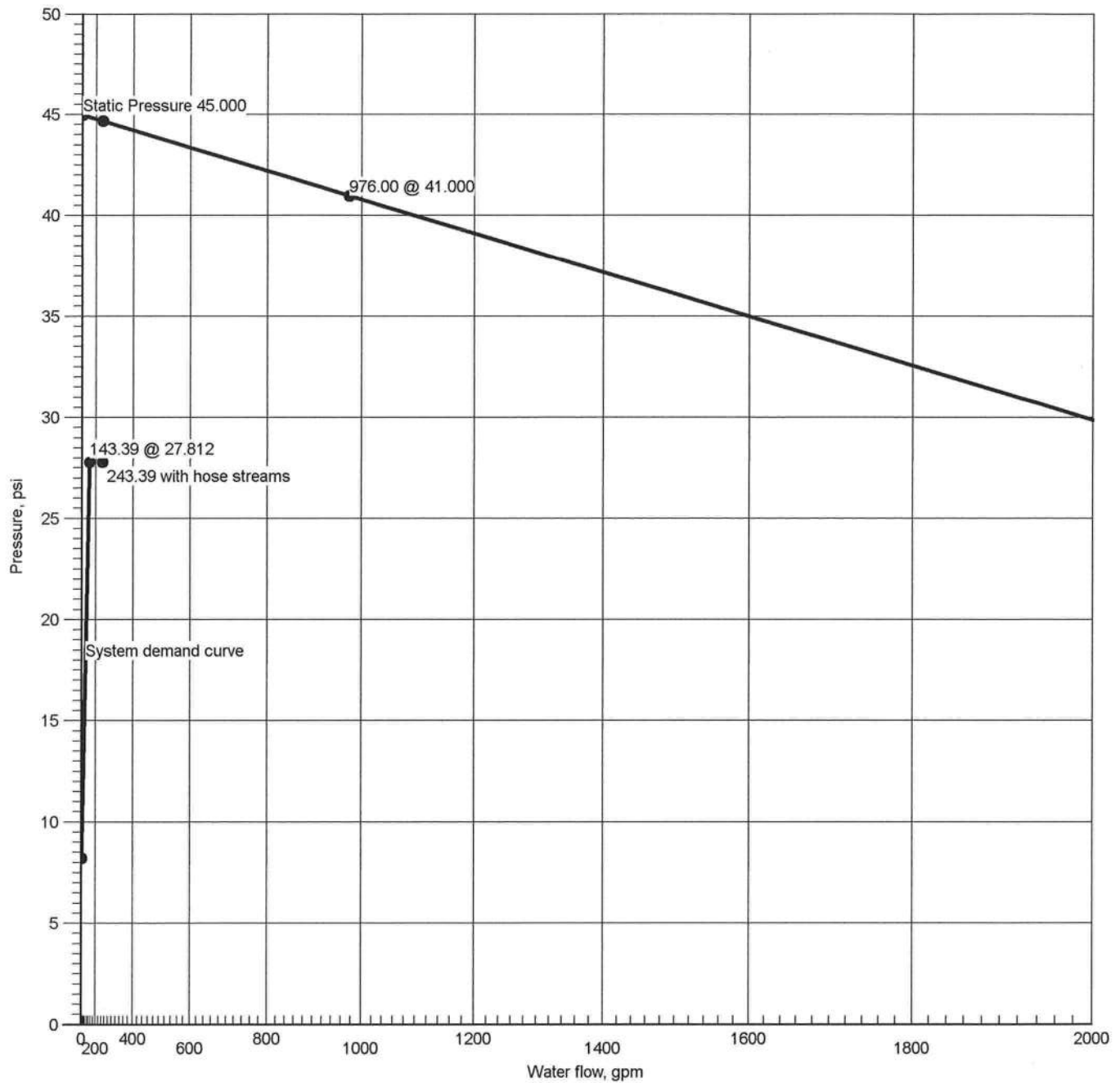
Job Number 5265	Design Engineer OMAR FONSECA
Job Name: GRAND CYPRESS ALP	State Certification/License Number
Address 1 LAKE CITY, FL	AHU
Address 2	Job Site/Building
Address 3	Drawing Name ALF

Most Demanding Sprinkler Data 5.6 K-Factor 14.82 at 7.000	Occupancy Light Hazard	Job Suffix
Hose Allowance At Source 100.00	Density 0.100gpm/ft²	Area of Application 1000.00ft² (Actual 1104.74ft²)
Additional Hose Supplies <u>Node</u> <u>Flow(gpm)</u>	Number Of Sprinklers Calculated 9	Number Of Nozzles Calculated 0
	Coverage Per Sprinkler 120.00ft²	
AutoPeak Results: Pressure For Remote Area(s) Adjacent To Most Remote Area		

Total Hose Streams		100.00
System Flow Demand	Total Water Required (Including Hose Allowance)	243.39
Maximum Pressure Unbalance In Loops		0.000
Maximum Velocity Above Ground		6.91 between nodes 6 and 13
Maximum Velocity Under Ground	3.23 between nodes 21 and 8	
Volume capacity of Wet Pipes	Volume capacity of Dry Pipes	
307.03gal		

Node	Name	Hose Flow (gpm)	Static (psi)	Residual (psi)	@ Flow (gpm)	Available (psi)	@ Total Demand (gpm)	Required (psi)	Safety Margin (psi)
9	Water Supply	100.00	45.000	41.000	976.00	44.694	243.39	27.812	16.882

	Contractor Number	Contact Name	Contact Title
Name of Contractor: Caribbean Fire		Phone	Extension
Address 1 1700 NW 65th ave Plantation FL 33313		FAX	
Address 2		E-mail	
Address 3		Web-Site	

**Water Supply at Node 9**

Hydraulic Graph

Water Supply at Node 9Static Pressure
45.000Residual Pressure
41.000 @ 976.00Available Pressure at Time of Test:
44.694 @ 243.39System Demand
27.812 @ 143.39System Demand (Including Hose Allowance at Source)
27.812 @ 243.39



Summary Of Outflowing Devices

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Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
⇒ Sprinkler	101	14.82	12.00	5.6	7.000		
Sprinkler	102	14.83	12.00	5.6	7.013		
Sprinkler	103	14.95	12.00	5.6	7.130		
Sprinkler	104	15.26	12.00	5.6	7.425		
Sprinkler	105	15.27	12.00	5.6	7.438		
Sprinkler	106	15.39	12.00	5.6	7.551		
Sprinkler	107	17.42	12.00	5.6	9.675		
Sprinkler	108	17.72	12.00	5.6	10.014		
Sprinkler	109	17.73	12.00	5.6	10.027		

⇒ Most Demanding Sprinkler Data



Node Analysis

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Node	Elevation(Foot)	Fittings	Pressure(psi)	Discharge(gpm)
9	-3'-0	S, Z	27.812	143.39
101	16'-0¼	Spr(-7.000)	7.000	14.82
102	16'-0¼	Spr(-7.013)	7.013	14.83
103	16'-0¼	Spr(-7.130)	7.130	14.95
104	16'-0¼	Spr(-7.425)	7.425	15.26
105	16'-0¼	Spr(-7.438)	7.438	15.27
106	16'-0¼	Spr(-7.551)	7.551	15.39
107	8'-0¼	Spr(-9.675)	9.675	17.42
108	8'-0¼	Spr(-10.014)	10.014	17.72
109	8'-0¼	Spr(-10.027)	10.027	17.73
1	16'-11	PO(5'-0)	7.052	
2	16'-11	PO(5'-0)	7.502	
4	8'-11	LtE(2'-5¾)	12.580	
5	8'-11	PO(9'-10¾)	19.709	
6	8'-11	PO(9'-10¾)	19.737	
7	8'-11	PO(9'-10¾)	19.830	
8	8'-11	LtE(6'-8¾)	22.094	
10	16'-11	PO(5'-0)	7.066	
11	16'-11	PO(5'-0)	7.516	
13	8'-11	LtE(2'-5¾)	12.597	
14	16'-11	PO(5'-0)	7.189	
15	16'-11	PO(5'-0)	7.635	
17	8'-11	LtE(2'-5¾)	12.711	
18	8'-11	T(5'-0), C(5'-0)	10.385	
19	8'-11	PO(5'-0)	10.239	
20	8'-11	T(5'-0)	10.252	
21	-3'-0	E(13'-2)	27.386	



Hydraulic Analysis

Job Number: 5265
Report Description: Light Hazard (1)

Pipe Type	Diameter	Flow	Velocity	HWC	Pn	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt		Fittings	Eq. Length	Summary
Upstream							Total Length	
Route 1								
DR	1.0490	14.82	5.50	120		0.074703	0'-10%	Pf 0.440
101	16'-0 1/4"	14.82	5.6	7.000		Sprinkler,	5'-0	Pe -0.388
1	16'-11"			7.052		PO(5'-0)	5'-10%	Pv
BL	1.6820	32.54	4.70	120		0.032121	14'-0	Pf 0.450
1	16'-11"	17.72		7.052		Flow (q) from Route 8		Pe
2	16'-11"			7.502			14'-0	Pv
BL	1.6820	47.80	6.90	120		0.065428	19'-7 1/4"	Pf 1.610
2	16'-11"	15.26		7.502		Flow (q) from Route 4	4'-11 1/2"	Pe 3.469
4	8'-11"			12.580		2LiE(2'-5 1/4")	24'-7 1/4"	Pv
BL	1.6820	47.80	6.90	120		0.065428	99'-0%	Pf 7.129
4	8'-11"			12.580			9'-10%	Pe
5	8'-11"			19.709		PO(9'-10%)	108'-11 1/2"	Pv
FM	3.2600	47.80	1.84	120		0.002607	10'-5	Pf 0.027
5	8'-11"			19.709				Pe
6	8'-11"			19.737			10'-5	Pv
FM	3.2600	95.63	3.68	120		0.009406	9'-11"	Pf 0.093
6	8'-11"	47.84		19.737		Flow (q) from Route 2		Pe
7	8'-11"			19.830			9'-11"	Pv
FM	3.2600	143.39	5.51	120		0.019900	86'-11"	Pf 2.265
7	8'-11"	47.76		19.830		Flow (q) from Route 3	26'-10 1/2"	Pe
8	8'-11"			22.094		3LiE(6'-8 1/4"), fE(6'-8 1/4")	113'-9 3/4"	Pv
FM	4.2600	143.39	3.23	120		0.005407	10'-0	Pf 0.125
8	8'-11"			22.094			13'-2	Pe 5.166
21	-3'-0			27.386		BFP, E(13'-2)	23'-2	Pv
BL	4.2300	143.39	3.27	150		0.003704	95'-9 3/4"	Pf 0.426
21	-3'-0			27.386			19'-2 1/2"	Pe
9	-3'-0			27.812		E(19'-2 1/2"), S, Z	115'-0%	Pv
		100.00				Hose Allowance At Source		
9		243.39						
Route 2								
DR	1.0490	14.83	5.51	120		0.074830	0'-10%	Pf 0.441
102	16'-0 1/4"	14.83	5.6	7.013		Sprinkler,	5'-0	Pe -0.388
10	16'-11"			7.066		PO(5'-0)	5'-10%	Pv
BL	1.6820	32.56	4.70	120		0.032166	14'-0	Pf 0.450
10	16'-11"	17.73		7.066		Flow (q) from Route 9		Pe
11	16'-11"			7.516			14'-0	Pv
BL	1.6820	47.84	6.91	120		0.065526	19'-7 1/4"	Pf 1.612
11	16'-11"	15.27		7.516		Flow (q) from Route 5	4'-11 1/2"	Pe 3.469
13	8'-11"			12.597		2LiE(2'-5 1/4")	24'-7 1/4"	Pv
BL	1.6820	47.84	6.91	120		0.065526	99'-0%	Pf 7.140
13	8'-11"			12.597			9'-10%	Pe
6	8'-11"			19.737		PO(9'-10%)	108'-11 1/2"	Pv
Route 3								
DR	1.0490	14.95	5.55	120		0.075982	0'-10%	Pf 0.448
103	16'-0 1/4"	14.95	5.6	7.130		Sprinkler,	5'-0	Pe -0.388
14	16'-11"			7.189		PO(5'-0)	5'-10%	Pv
BL	1.6820	32.37	4.67	120		0.031819	14'-0	Pf 0.445
14	16'-11"	17.42		7.189		Flow (q) from Route 7		Pe
15	16'-11"			7.635			14'-0	Pv
BL	1.6820	47.76	6.90	120		0.065335	19'-7 1/4"	Pf 1.607
15	16'-11"	15.39		7.635		Flow (q) from Route 6	4'-11 1/2"	Pe 3.469
17	8'-11"			12.711		2LiE(2'-5 1/4")	24'-7 1/4"	Pv
BL	1.6820	47.76	6.90	120		0.065335	99'-0%	Pf 7.119
17	8'-11"			12.711			9'-10%	Pe
7	8'-11"			19.830		PO(9'-10%)	108'-11 1/2"	Pv
Route 4								
DR	1.0490	15.26	5.66	120		0.078889	0'-10%	Pf 0.465
104	16'-0 1/4"	15.26	5.6	7.425		Sprinkler,	5'-0	Pe -0.388
2	16'-11"			7.502		PO(5'-0)	5'-10%	Pv
Route 5								
DR	1.0490	15.27	5.67	120		0.079021	0'-10%	Pf 0.466
105	16'-0 1/4"	15.27	5.6	7.438		Sprinkler,	5'-0	Pe -0.388
11	16'-11"			7.516		PO(5'-0)	5'-10%	Pv
Route 6								



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Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss	Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Eq. Length	Summary
Upstream						Total Length	
DR	1.0490	15.39	5.71	120	0.080124	0'-10%	Pf 0.472
106	16'-0 1/4	15.39	5.6	7.551	Sprinkler,	5'-0	Pe -0.388
15	16'-11			7.635	PO(5'-0)	5'-10%	Pv
***** Route 7 *****							
DR	1.0490	17.42	6.47	120	0.100778	0'-10%	Pf 1.098
107	8'-0 1/4	17.42	5.6	9.675	Sprinkler,	10'-0	Pe -0.388
18	8'-11			10.385	T(5'-0), C(5'-0)	10'-10%	Pv
BL	1.6820	17.42	2.52	120	0.010110	22'-0	Pf 0.272
18	8'-11			10.385		4'-11 1/2	Pe -3.468
14	16'-11			7.189	2LiE(2'-5 3/4)	26'-11 1/2	Pv
***** Route 8 *****							
DR	1.0490	17.72	6.58	120	0.104036	0'-10%	Pf 0.613
108	8'-0 1/4	17.72	5.6	10.014	Sprinkler,	5'-0	Pe -0.388
19	8'-11			10.239	PO(5'-0)	5'-10%	Pv
BL	1.6820	17.72	2.56	120	0.010437	22'-0	Pf 0.281
19	8'-11			10.239		4'-11 1/2	Pe -3.468
1	16'-11			7.052	2LiE(2'-5 3/4)	26'-11 1/2	Pv
***** Route 9 *****							
DR	1.0490	17.73	6.58	120	0.104157	0'-10%	Pf 0.614
109	8'-0 1/4	17.73	5.6	10.027	Sprinkler,	5'-0	Pe -0.388
20	8'-11			10.252	T(5'-0)	5'-10%	Pv
BL	1.6820	17.73	2.56	120	0.010449	22'-0	Pf 0.282
20	8'-11			10.252		4'-11 1/2	Pe -3.468
10	16'-11			7.066	2LiE(2'-5 3/4)	26'-11 1/2	Pv

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51



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Pipe Type	Diameter	Flow	Velocity	HWC	Friction Loss		Length	Pressure
Downstream	Elevation	Discharge	K-Factor	Pt	Pn	Fittings	Eq. Length	Summary
Upstream							Total Length	

Pipe Type Legend		Units Legend		Fittings Legend	
AO	Arm-Over	Diameter	Inch	ALV	Alarm Valve
BL	Branch Line	Elevation	Foot	AngV	Angle Valve
CM	Cross Main	Flow	gpm	b	Bushing
DN	Drain	Discharge	gpm	BaIV	Ball Valve
DR	Drop	Velocity	fps	BFP	Backflow Preventer
DY	Dynamic	Pressure	psi	BV	Butterfly Valve
FM	Feed Main	Length	Foot	C	Cross Flow Turn 90°
FR	Feed Riser	Friction Loss	psi/Foot	cplg	Coupling
MS	Miscellaneous	HWC	Hazen-Williams Constant	Cr	Cross Run
OR	Outrigger	Pt	Total pressure at a point in a pipe	CV	Check Valve
RN	Riser Nipple	Pn	Normal pressure at a point in a pipe	DelV	Deluge Valve
SP	Sprig	Pf	Pressure loss due to friction between points	DPV	Dry Pipe Valve
ST	Stand Pipe	Pe	Pressure due to elevation difference between indicated points	E	90° Elbow
UG	Underground	Pv	Velocity pressure at a point in a pipe	EE	45° Elbow
				Ee1	11¼° Elbow
				Ee2	22½° Elbow
				f	Flow Device
				fd	Flex Drop
				FDC	Fire Department Connection
				fE	90° FireLock(TM) Elbow
				fEE	45° FireLock(TM) Elbow
				flg	Flange
				FN	Floating Node
				fT	FireLock(TM) Tee
				g	Gauge
				GloV	Globe Valve
				GV	Gate Valve
				Ho	Hose
				Hose	Hose
				HV	Hose Valve
				Hyd	Hydrant
				LiE	Long Turn Elbow
				mecT	Mechanical Tee
				Noz	Nozzle
				P1	Pump In
				P2	Pump Out
				PIV	Post Indicating Valve
				PO	Pipe Outlet
				PrV	Pressure Relief Valve
				PRV	Pressure Reducing Valve
				red	Reducer/Adapter
				S	Supply
				sCV	Swing Check Valve
				SFx	Seismic Flex
				Spr	Sprinkler
				St	Strainer
				T	Tee Flow Turn 90°
				Tr	Tee Run
				U	Union
				WirF	Wirsbo
				WMV	Water Meter Valve
				Z	Cap