

# DETENTION POND CALCULATIONS

## GENERAL SUMMARY:

### I. TOTAL PREDEVELOPED RUNOFF WITHIN SQUABBLE CREEK BASIN:

PROPOSED DETENTION AREA NO. 1 = 7.82 AC.  
 PROPOSED DETENTION AREA NO. 2 = 49 AC. (DETAINED) &  
 20 AC. (FREE DISCHARGE) = 69 AC.

FUTURE DETENTION AREA NO. 3 = 28.3 AC.  
 FUTURE DETENTION AREA NO. 4 = 53.3 AC.

### II. DETENTION AREA NO. 1:

PREDEVELOPED TIME OF CONCENTRATION = 20 MIN.  
 C = .35  
 A = 7.82  
 I<sub>100</sub> = 8.3 in/hr  
 I<sub>25</sub> = 6.7 in/hr  
 I<sub>10</sub> = 5.9 in/hr

ALLOWABLE RELEASE RATE = PREDEVELOPED Q

Q allow 100 = (.35) (8.3) (7.82) = 22.7  
 Q allow 25 = (.35) (6.7) (7.82) = 18.3  
 Q allow 10 = (.35) (5.9) (7.82) = 16.1

REQUIRED STORAGE FOR POND NO. 1:

Q = (.5) (7.82) i = 3.91 i

100 YR.	TIME	I <sub>100</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	9.8	38.3	22.7	15.6	9,360
	15	9.0	35.2	22.7	12.5	11,250*
	20	8.3	32.4	22.7	9.7	11,640*
	25	7.5	29.3	22.7	6.6	9,900

25 YR.	TIME	I <sub>25</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	8.3	32.3	18.3	14.0	8,400
	15	8.0	31.3	18.3	13.0	11,700*
	20	6.7	26.2	18.3	7.9	9,480
	25	6.0	23.5	18.53	5.2	7,800

10 YR.	TIME	I <sub>10</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	7.2	28.1	16.1	12.0	7,200
	15	6.5	25.4	16.1	9.3	8,370*
	20	5.8	22.7	16.1	6.6	7,920
	25	5.4	21.1	16.1	5.0	7,500

REQUIRED STORAGE FOR POND NO. 1:

100 YR = 11,640 cf  
 25 YR = 11,700 cf  
 10 YR = 8,370 cf

CAPACITY OF POND NO. 1:

CONTOUR	AREA	AVG. AREA	CUM. STRG.
466	2,108		0
		2312	
467	2,516		2,312
		2750	
468	2,985		5,062
		3234	
469	3,484		8,296
		3750	
470	4,015		12,046
		4297	
471	4,579		16,343
		4876	
472	5,173		21,219

WITH 2' OF FREEBOARD, POND NO. 1 CAN DETAIN  
 12,046 ft<sup>3</sup>. REQUIRED VOLUME = 11,700 ft<sup>3</sup>

### III. DETENTION AREA NO. 2:

PREDEVELOPED TIME OF CONCENTRATION = 20 MIN.  
 C = .35  
 A = 49 AC. DETAINED & 20 AC. (FREE DISCHARGE) = 69 AC.  
 I<sub>100</sub> = 8.3 in/hr  
 I<sub>25</sub> = 6.7 in/hr  
 I<sub>10</sub> = 5.9 in/hr

ALLOWABLE RELEASE RATE = PREDEVELOPED Q

Q allow 100 = (.35) (8.3) (69) = 200 cfs  
 Q allow 25 = (.35) (6.7) (69) = 162 cfs  
 Q allow 10 = (.35) (5.9) (69) = 143 cfs

REQUIRED STORAGE FOR POND NO. 2:

Q = (.5) (69) i = 34.5 i

100 YR.	TIME	I <sub>100</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	9.8	338	200	138	82,800
	15	9.0	311	200	111	99,900
	20	8.3	286	200	86	103,200*
	25	7.5	259	200	59	88,500

25 YR.	TIME	I <sub>25</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	8.3	286	162	124	74,400
	15	8.0	276	162	114	102,600*
	20	6.7	231	162	69	82,800
	25	6.0	207	162	45	67,500

10 YR.	TIME	I <sub>10</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	7.2	248	143	105	63,000
	15	6.5	224	143	81	72,900*
	20	5.8	200	143	57	68,400
	25	5.4	186	143	43	64,500

REQUIRED STORAGE FOR POND NO. 2:

100 YR = 103,200 cf  
 25 YR = 102,600 cf  
 10 YR = 72,900 cf

CONTOUR	AREA	AVG. AREA	CUM. STRG.
492	332		0
		855	
493	1,379		855
		2,901	
494	4,423		3,756
		6,126	
495	7,829		9,882
		9,383	
496	10,937		19,265
		12,820	
497	14,703		32,085
		16,895	
498	19,086		48,980
		20,769	
499	22,451		69,748
		24,131	
500	25,811		93,879
		27,913	
501	30,014		121,792
		31,799	
502	33,583		153,591
		36,456	
503	39,328		190,047
		42,384	
504	45,440		232,431

### ALLOWABLE RELEASE RATE FOR DETENTION POND NO. 2:

Q<sub>100</sub> RELEASE RATE =

200 cfs TOTAL RELEASE ALLOWED  
 - 69 cfs LINE "M"  
 - 15 cfs LINE "J"  
 - 17 cfs LINE "E"

NET 99 cfs ALLOWABLE RELEASE RATE FROM POND NO. 2

WEIR STRUCTURE FOR POND NO. 2

Q<sub>100</sub> ELEVATION = 500.2

Q = CLH<sup>3/2</sup>

L = Q/CH<sup>3/2</sup>

H = 8.2' C = 3.367

L = 99/(3.367) (8.2')<sup>1.5</sup>

L = 1.50'

### IV. FUTURE DETENTION AREA NO. 3:

PREDEVELOPED TIME OF CONCENTRATION = 20 MIN.

C = .35  
 A = 28.3  
 I<sub>100</sub> = 8.3 in/hr

ALLOWABLE RELEASE RATE = PREDEVELOPED Q

Q allow 100 = (.35) (8.3) (28.3) = 82 cfs  
 Q allow 25 = (.35) (6.7) (28.3) = 66 cfs  
 Q allow 10 = (.35) (5.9) (28.3) = 58 cfs

REQUIRED STORAGE FOR FUTURE POND NO. 3:

Q = (.5) (28.3) i = 14.2 i

100 YR.	TIME	I <sub>100</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	9.8	139	82	57	34,200
	15	9.0	128	82	46	41,400
	20	8.3	118	82	36	43,200*
	25	7.5	107	82	25	37,500

TOTAL STORAGE REQUIRED = 43,200 cf

### V. FUTURE DETENTION AREA NO. 4:

PREDEVELOPED TIME OF CONCENTRATION = 20 MIN.

C = .35  
 A = 53.3

ALLOWABLE RELEASE RATE = PREDEVELOPED Q

Q allow 100 = (.35) (8.3) (53.3) = 155 cfs  
 Q allow 25 = (.35) (6.7) (53.3) = 125 cfs  
 Q allow 10 = (.35) (5.9) (53.3) = 110 cfs

REQUIRED STORAGE FOR FUTURE POND NO. 4:

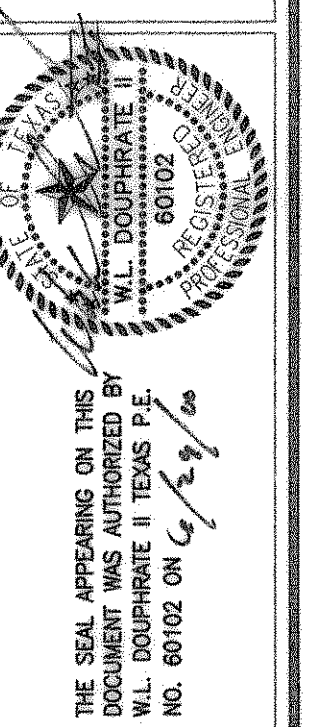
Q = (.5) (53.3) i = 26.7 i

100 YR.	TIME	I <sub>100</sub>	Q in	Q out	Q acc	CUM. STRG.
	10	9.8	261	155	106	63,600
	15	9.0	240	155	85	76,500
	20	8.3	222	155	67	80,400*
	25	7.5	200	155	45	67,500

TOTAL STORAGE REQUIRED = 80,400 cf

### RECORD DRAWINGS:

THE INTENT OF THE OWNER AND ENGINEER WAS TO CONSTRUCT THESE FACILITIES ACCORDING TO THESE PLANS AS APPROVED BY THE CITY OF Rockwall. THE LINES AND GRADES WERE SET ON THE GROUND FOR CONSTRUCTION ACCORDING TO SAID PLANS. THE CITY OF Rockwall INSPECTED THE CONSTRUCTION. THE OWNER NOR ENGINEER DID NOT VERIFY LINES OR GRADES AFTER CONSTRUCTION. WE ARE NOT AWARE OF ANY CHANGES OR REVISIONS TO THESE PLANS DURING CONSTRUCTION EXCEPT AS NOTED



DOUPHRATE & ASSOCIATES, INC.  
 ENGINEERING - PROJECT MANAGEMENT - SURVEYING  
 2235 RIDGE RD., # 200 ROCKWALL, TEXAS 75087  
 PHONE: (972) 771-9004 FAX: (972) 771-9005

DETENTION POND CALCULATIONS  
 LAKEVIEW SUMMIT, PHASE ONE  
 CITY OF ROCKWALL  
 COUNTY OF ROCKWALL

REVISION  
 W.L.D.  
 CHECKED  
 K.E.B.  
 DRAWN  
 4/14/00  
 DATE  
 9919CHARTS  
 PROJECT

40 B  
 OF  
 42