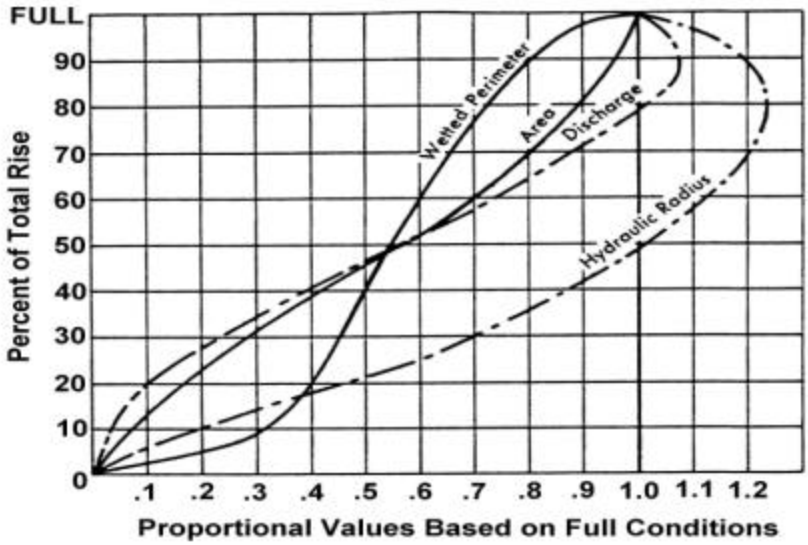
APPENDIX F-1
HYDRAULIC PROPERTIES OF CULVERT SECTIONS
Corrugated Steel Pipe-Arches



Hydraulic properties of corrugated steel and structural plate pipe-arches.

Full-Flow data for Corrugated Steel Pipe-Arches

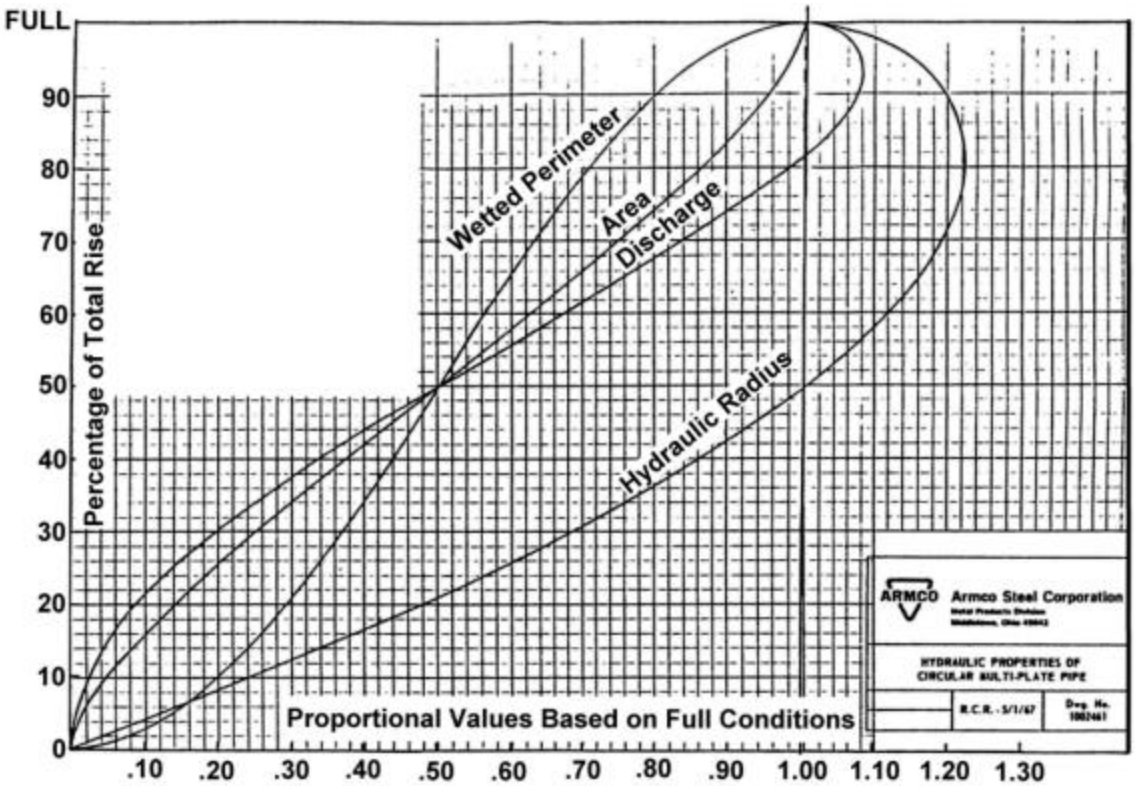
Corrugations 2 2/3 x ½ in.

Dimensions in inches			Waterway Area in Sq. Ft.	Hydraulic Radius A/(Pi)D in Feet
Pipe Diam.	Pipe-Arch Span	Pipe-Arch Rise		
15	18	11	1.1	0.280
18	22	13	1.6	0.340
21	25	16	2.2	0.400
24	29	18	2.8	0.446
30	36	22	4.4	0.560
36	43	27	6.4	0.679
*42	50	31	837	0.791
*48	58	36	11.4	0.907
*54	65	40	14.3	1.012
*60	72	44	17.6	1.120
*66	79	49	21.3	1.233
*72	85	54	25.3	1.342
Corrugations 3 x 1 in.				
66	73	55	22	1.273
72	81	59	26	1.379
78	87	63	31	1.518
84	95	67	35	1.592
90	103	71	40	1.698

*These sizes apply to both types of corrugations: 2-2/3 x ½ and 3 x 1 in.

(Source: Reference 2)

APPENDIX F-2
HYDRAULIC PROPERTIES OF CULVERT SECTIONS
Circular Pipe



Peri-phery	Area (ft.^{2})	Hydraulic Radius	Peri-phery	Area (ft.^{2})	Hydraulic Radius	Peri-phery	Area (ft.^{2})	Hydraulic Radius	Peri-phery	Area (ft.^{2})	Hydraulic Radius
60°	19	1.23	138°	105	2.89	216°	259	4.54	294°	483	6.20
66°	23	1.36	144°	114	3.01	222°	271	4.67	300°	503	6.32
72°	28	1.49	150°	124	3.14	228°	289	4.80	306°	523	6.45
78°	33	1.61	156°	134	3.27	234°	305	4.92	312°	544	6.58
84°	38	1.74	162°	145	3.40	240°	321	5.05	318°	565	6.71
90°	44	1.87	168°	156	3.52	246°	337	5.18	324°	587	6.83
96°	50	2.00	174°	168	3.65	252°	354	5.31	330°	609	6.96
102°	57	2.12	180°	179	3.78	258°	371	5.43	336°	631	7.09
108°	64	2.25	186°	192	3.91	264°	389	5.66	342°	654	7.22
114°	71	2.38	192°	204	4.03	270°	407	5.69	348°	678	7.34
120°	79	2.50	198°	218	4.14	276°	425	5.82	354°	701	7.47
126°	87	2.63	204°	231	4.29	282°	441	5.94	360°	725	7.60
132°	96	2.76	210°	245	4.41.	288°	469	6.07			

(Source: Reference 2)