

APPENDIX G

MATHEMATICAL MODEL ANALYSIS

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APPENDIX G-1

Non-uniform Calculation Table

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Case; Estimation based on $Q=422.5\text{m}^3/\text{s}$

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	405.6	625.04	0.0250	3.60	0.65	4.77	41.12	45.89	0.02	0.00				45.91	45.91	
No2	50	50	405.6	417.85	0.0250	4.40	0.97	5.64	40.23	45.87	0.05	0.00	0.00			45.91	45.92	45.91
No3	50	100	405.6	436.85	0.0250	5.03	0.93	6.08	39.79	45.87	0.04	0.00	0.00			45.92	45.92	45.92
No4	50	150	405.6	427.75	0.0250	5.13	0.95	6.62	39.26	45.88	0.05	0.00	0.00			45.92	45.92	45.92
B21	18	168	405.6	401.55	0.0250	4.54	1.01	5.88	39.59	45.87	0.05		0.00	Bridge	0.02			45.92
				403.34	0.0250	4.56	1.01	5.90		45.89	0.05	0.00				45.94	45.94	
No5	32	200	405.6	417.95	0.0250	5.08	0.97	6.88	39.02	45.90	0.05	0.00	0.00			45.95	45.95	45.94
No6	50	250	405.6	391.60	0.0250	5.46	1.04	7.28	38.61	45.89	0.05	0.00	0.00			45.95	45.95	45.95
No7	50	300	405.6	442.41	0.0250	5.51	0.92	7.31	38.60	45.91	0.04	0.00	0.00			45.95	45.95	45.95
No8	50	350	405.6	412.76	0.0250	5.40	0.98	7.71	38.20	45.91	0.05	0.00	0.00			45.96	45.96	45.95
No9	50	400	405.6	411.79	0.0250	4.55	0.98	5.79	40.12	45.91	0.05	0.00	0.00			45.96	45.96	45.96
No10	50	450	405.6	417.93	0.0250	4.40	0.97	5.56	40.35	45.91	0.05	0.00	0.00			45.96	45.96	45.96
No11	50	500	405.6	416.27	0.0250	4.34	0.97	5.40	40.52	45.92	0.05	0.00	0.00			45.97	45.97	45.96
No12	50	550	405.6	412.59	0.0250	4.25	0.98	5.44	40.48	45.92	0.05	0.00	0.00			45.97	45.97	45.97
No13	50	600	405.6	411.11	0.0250	4.16	0.99	5.19	40.74	45.93	0.05	0.00	0.00			45.98	45.98	45.97
No14	50	650	405.6	436.37	0.0250	4.34	0.93	5.34	40.60	45.94	0.04	0.00	0.00			45.98	45.98	45.98
No15	50	700	405.6	408.52	0.0250	4.27	0.99	5.23	40.70	45.93	0.05	0.00	0.00			45.98	45.99	45.98
No16	50	750	405.6	432.02	0.0250	4.21	0.94	4.94	41.00	45.94	0.04	0.00	0.00			45.99	45.99	45.99
No17	50	800	406.7	410.03	0.0250	4.00	0.99	4.57	41.37	45.94	0.05	0.00	0.00			45.99	45.99	45.99
No18	50	850	406.7	425.42	0.0250	4.12	0.96	4.84	41.11	45.95	0.05	0.00	0.00			46.00	45.00	45.99
No19	50	900	406.7	428.25	0.0250	4.16	0.95	4.95	41.00	45.95	0.05	0.00	0.00			46.00	45.00	46.00
No20	50	950	406.7	427.97	0.0250	4.01	0.95	4.73	41.23	45.96	0.05	0.00	0.00			46.01	45.01	46.00
B20	40	990	406.7	431.17	0.0250	3.92	0.94	4.98	40.58	45.96	0.05		0.00	Bridge	0.02			46.01
				433.43	0.0250	3.94	0.94	5.00		45.98	0.04	0.00				46.03	45.03	
No21	10	1000	406.7	427.80	0.0250	3.89	0.95	4.61	41.37	45.98	0.05	0.00	0.00			46.03	45.03	46.03
No22	50	1050	406.7	455.83	0.0250	4.02	0.89	4.76	41.23	45.99	0.04	0.00	0.00			46.03	45.04	46.03
No23	50	1100	406.7	450.37	0.0250	4.10	0.90	4.89	41.11	46.00	0.04	0.00	0.00			46.04	45.04	46.04
No24	50	1150	406.7	462.88	0.0250	4.21	0.88	5.07	40.93	46.00	0.04	0.00	0.00			46.04	45.04	46.04
No25	50	1200	406.7	466.37	0.0250	4.00	0.87	5.01	41.00	46.01	0.04	0.00	0.00			46.05	45.05	46.04
No26	50	1250	406.7	560.04	0.0250	3.81	0.73	4.96	41.06	46.02	0.03	0.00	0.00			46.05	45.05	46.05
No27	50	1300	406.7	433.04	0.0250	4.33	0.94	5.24	40.77	46.01	0.05	0.00	0.00			46.05	45.05	46.05
No28	50	1350	406.7	455.87	0.0250	4.55	0.89	5.66	40.35	46.01	0.04	0.00	0.00			46.06	45.06	46.05

G-3

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss (c) (d) (m)		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												Type	Head or WL difference (m)	UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)			
No29	50	1400	406.7	404.48	0.0250	4.39	1.01	5.70	40.31	46.01	0.05	0.00	0.00			46.06	45.06	46.06
No30	50	1450	406.7	394.95	0.0250	4.57	1.03	5.52	40.49	46.01	0.05	0.02	0.00			46.06	45.09	46.06
No31	540	1990	406.7	413.91	0.0250	4.71	0.98	5.75	40.31	46.06	0.05	0.02	0.02			46.11	45.13	46.09
No32	500	2490	406.7	405.84	0.0250	4.59	1.00	6.02	40.08	46.10	0.05	0.02	0.02			46.15	45.17	46.13
No33	500	2990	406.7	421.93	0.0250	4.71	0.96	5.91	40.23	46.14	0.05	0.02	0.02			46.19	45.20	46.17
No34	500	3490	407.2	420.80	0.0250	4.43	0.97	5.62	40.56	46.18	0.05	0.02	0.02			46.22	45.24	46.20
No35	500	3990	407.2	421.45	0.0250	4.41	0.97	5.58	40.64	46.22	0.05	0.02	0.02			46.26	45.28	46.24
No36	500	4490	407.4	417.17	0.0250	4.37	0.98	5.21	41.05	46.26	0.05	0.02	0.02			46.31	45.33	46.28
No37	500	4990	407.4	427.98	0.0250	4.89	0.95	6.03	40.27	46.30	0.05	0.02	0.02			46.34	45.36	46.33
No38	500	5490	407.8	445.83	0.0250	5.08	0.91	6.36	39.57	46.33	0.04	0.01	0.01			46.38	45.39	46.36
No39	500	5990	407.8	453.81	0.0250	4.77	0.90	5.67	40.69	46.36	0.04	0.02	0.02			46.41	45.42	46.39
No40	500	6490	407.8	514.72	0.0250	5.58	0.79	7.18	39.22	46.40	0.03	0.00	0.01			46.43	45.43	46.42
B19	55	6545	407.8	424.18	0.0250	5.07	0.95	6.19	40.20	46.39	0.05		0.00	Bridge	0.02			46.43
				425.76	0.0250	5.08	0.95	6.21		46.41	0.05	0.01				46.45	45.47	
No41	445	6990	407.8	433.93	0.0250	4.85	0.94	6.03	40.41	46.44	0.05	0.02	0.01			46.48	45.50	46.47
No42	500	7490	407.8	457.22	0.0250	4.99	0.87	6.23	40.24	46.47	0.04	0.01	0.01			46.52	45.53	46.50
No43	500	7990	408.2	441.86	0.0250	4.86	0.92	6.30	40.20	46.50	0.04	0.02	0.02			46.55	45.56	46.53
No44	500	8490	408.2	448.40	0.0250	4.86	0.91	6.16	40.38	46.54	0.04	0.02	0.02			46.58	45.59	46.56
No45	500	8990	408.3	439.58	0.0250	4.84	0.93	6.26	40.31	46.57	0.04	0.02	0.02			46.61	45.63	46.59
No46	500	9490	408.3	439.52	0.0250	4.65	0.93	5.52	41.08	46.60	0.04	0.02	0.02			46.64	45.66	46.63
No47	500	9990	408.3	452.87	0.0250	4.56	0.90	5.50	41.14	46.64	0.04	0.01	0.02			46.68	45.69	46.66
B18	280	10270	408.4	433.50	0.0250	4.58	0.94	5.61	41.04	46.65	0.05		0.01	Bridge	0.02			46.69
				435.35	0.0250	4.59	0.94	5.63		46.67	0.04	0.01				46.72	45.73	
No48	220	10490	408.4	441.07	0.0250	4.84	0.93	6.01	40.68	46.69	0.04	0.02	0.01			46.73	45.75	46.73
No49	500	10990	408.4	438.46	0.0250	4.63	0.93	5.58	41.14	46.72	0.04	0.02	0.02			46.77	45.78	46.75
No50	500	11490	408.4	424.58	0.0250	4.52	0.95	5.53	41.23	46.76	0.05	0.02	0.02			46.80	45.82	46.78
No51	500	11990	408.4	434.12	0.0250	4.66	0.94	5.89	40.90	46.79	0.05	0.02	0.02			46.84	45.86	46.82
No52	500	12490	408.4	424.79	0.0250	4.75	0.95	5.65	41.18	46.83	0.05	0.02	0.02			46.88	45.89	46.86
No53	500	12990	413.6	439.61	0.0250	4.90	0.94	5.99	40.88	46.87	0.05	0.02	0.02			46.91	45.93	46.89
B17	470	13460	413.6	471.35	0.0250	4.93	0.88	6.72	40.18	46.90	0.04		0.01	Bridge	0.01			46.93
				472.70	0.0250	4.94	0.87	6.73		46.91	0.04	0.00				46.95	45.95	
No54	30	13490	413.6	478.32	0.0250	5.26	0.85	7.09	39.83	46.92	0.04	0.00	0.00			46.96	45.96	46.95

G-4

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B16	94	13584	413.6	420.37	0.0250	4.87	0.98	6.11	40.80	46.91	0.05	0.00	Bridge	0.01			46.96	
				421.33	0.0250	4.88	0.98	6.12		46.92	0.05	0.01				46.97	45.99	
No55	406	13990	413.6	458.07	0.0250	4.77	0.90	6.07	40.89	46.96	0.04	0.02	0.01			47.00	47.02	46.99
No56	500	14490	413.6	472.22	0.0250	4.88	0.88	6.13	40.86	46.99	0.04	0.01	0.01			47.03	47.04	47.02
No57	500	14990	413.6	458.03	0.0250	4.77	0.90	5.44	41.58	47.02	0.04	0.02	0.02			47.06	47.08	47.04
No58	500	15490	415.6	444.14	0.0250	4.62	0.94	5.69	41.36	47.05	0.04	0.02	0.02			47.09	47.11	47.08
No59	500	15990	415.6	446.52	0.0250	4.53	0.93	6.08	41.01	47.09	0.04	0.02	0.02			47.13	47.15	47.11
No60	500	16490	417.0	440.33	0.0250	4.85	0.95	5.78	41.34	47.12	0.05	0.02	0.02			47.17	47.18	47.15
No61	500	16990	417.0	465.34	0.0250	4.83	0.90	5.70	41.46	47.16	0.04	0.02	0.02			47.20	47.21	47.18
No62	500	17490	417.0	439.69	0.0250	5.04	0.95	6.14	41.04	47.18	0.05	0.02	0.02			47.23	47.25	47.21
No63	500	17990	418.2	445.24	0.0250	4.80	0.94	6.07	41.15	47.22	0.05	0.01	0.02			47.26	47.28	47.25
B15	432	18422	418.2	396.89	0.0250	4.57	1.05	5.73	41.51	47.24	0.06	0.00	0.02	Bridge	0.03			47.28
				399.22	0.0250	4.57	1.05	5.76		47.27	0.06	0.00				47.32	47.33	
No64	68	18490	418.3	429.57	0.0250	4.90	0.97	6.07	41.21	47.28	0.05	0.02	0.00			47.33	47.35	47.33
No65	500	18990	418.3	480.23	0.0250	4.97	0.87	6.31	41.01	47.32	0.04	0.01	0.01			47.36	47.37	47.35
No66	500	19490	418.3	448.54	0.0250	4.83	0.93	6.25	41.10	47.35	0.04	0.02	0.02			47.39	47.41	47.37
No67	500	19990	418.3	438.71	0.0250	5.50	0.95	7.09	40.29	47.38	0.05	0.01	0.01			47.42	47.44	47.41
No68	500	20490	418.3	482.04	0.0250	5.79	0.87	7.39	40.02	47.41	0.04	0.01	0.01			47.45	47.46	47.44
No69	500	20990	418.3	441.12	0.0250	5.63	0.95	7.17	40.26	47.43	0.05	0.01	0.01			47.47	47.49	47.46
No70	500	21490	418.3	445.25	0.0250	5.83	0.94	8.52	38.54	47.46	0.05	0.01	0.01			47.50	47.51	47.49
B14_No	500	21990	418.3	470.67	0.0250	5.06	0.89	7.30	40.19	47.49	0.04	0.00	0.01	Bridge	0.01			47.51
				472.05	0.0250	5.06	0.89	7.31		47.50	0.04	0.01				47.54	47.56	
No72	500	22490	418.3	480.85	0.0250	4.98	0.87	8.20	39.33	47.53	0.04	0.01	0.01			47.57	47.59	47.56
No73	500	22990	420.7	484.48	0.0250	6.05	0.87	7.71	39.85	47.56	0.04	0.01	0.01			47.60	47.61	47.59
No74	500	23490	420.7	467.77	0.0250	6.37	0.90	8.78	38.80	47.58	0.04	0.01	0.01			47.62	47.63	47.61
No75	500	23990	420.7	498.56	0.0250	5.94	0.84	8.44	39.16	47.60	0.04	0.01	0.01			47.64	47.65	47.63
No76	500	24490	422.0	516.45	0.0250	5.79	0.82	9.22	38.40	47.62	0.03	0.01	0.01			47.66	47.67	47.65
No77	500	24990	422.0	533.37	0.0250	6.38	0.79	8.47	39.17	47.64	0.03	0.01	0.01			47.68	47.69	47.67
No78	500	25490	422.0	477.99	0.0250	6.04	0.88	7.74	39.92	47.66	0.04	0.01	0.01			47.70	47.71	47.68
No79	500	25990	422.0	605.91	0.0250	6.90	0.70	8.76	38.53	47.69	0.02	0.00	0.01			47.71	47.72	47.71
No80	293	26283	422.0	584.15	0.0250	6.21	0.72	8.05	39.64	47.69	0.03	0.00	0.00			47.72	47.72	47.72
No81	207	26490	422.0	565.04	0.0250	6.25	0.75	9.11	38.59	47.70	0.03	0.01	0.00			47.73	47.73	47.72

G-5

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c) (m)	(d) (m)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	422.0	523.30	0.0250	5.99	0.81	9.08	38.63	47.71	0.03	0.01	0.01			47.74	47.75	47.73
No83	500	27490	422.0	536.45	0.0250	6.94	0.79	9.65	38.08	47.73	0.03	0.01	0.01			47.76	47.77	47.75
B13	455	27945	422.0	442.35	0.0250	4.93	0.95	7.49	40.25	47.74	0.05		0.02	Bridge	0.03			47.77
				444.53	0.0250	4.95	0.95	7.51		47.76	0.05	0.00				47.81	47.81	
No84	45	27990	422.0	510.98	0.0250	6.51	0.83	9.06	38.71	47.77	0.03	0.01	0.00			47.81	47.82	47.81
No85	500	28490	422.0	500.33	0.0250	5.66	0.84	8.61	39.18	47.79	0.04	0.01	0.01			47.83	47.84	47.82
No86	500	28990	422.0	491.77	0.0250	5.97	0.85	7.46	40.35	47.81	0.04	0.01	0.01			47.85	47.86	47.84
No87	500	29490	422.0	470.73	0.0250	5.58	0.90	7.16	40.67	47.83	0.04	0.01	0.01			47.87	47.89	47.86
No88	500	29990	422.0	489.89	0.0250	5.97	0.85	7.51	40.35	47.86	0.04	0.01	0.01			47.90	47.91	47.89
No89	500	30490	422.0	507.08	0.0250	6.29	0.83	8.44	39.44	47.88	0.04	0.01	0.01			47.92	47.93	47.91
No90	500	30990	422.0	572.59	0.0250	6.79	0.74	9.40	38.50	47.90	0.03	0.01	0.01			47.93	47.94	47.93
No91	500	31490	422.0	515.75	0.0250	6.57	0.82	9.11	38.80	47.91	0.03	0.01	0.01			47.95	47.96	47.94
No92	500	31990	422.0	489.76	0.0250	6.26	0.85	8.09	39.84	47.93	0.04	0.01	0.01			47.97	47.98	47.96
No93	500	32490	422.0	461.15	0.0250	5.78	0.92	7.54	40.41	47.95	0.04	0.01	0.01			47.99	48.00	47.98
No94	500	32990	422.0	454.66	0.0250	5.47	0.93	7.97	40.00	47.97	0.04	0.00	0.01			48.01	48.02	48.00
B12	91	33081	422.0	392.65	0.0250	4.47	1.07	6.37	41.59	47.96	0.06		0.00	Bridge	0.03			48.02
				394.84	0.0250	4.48	1.07	6.40		47.99	0.06	0.02				48.05	48.07	
No95	409	33490	422.0	440.31	0.0250	5.66	0.95	7.94	40.09	48.03	0.05	0.01	0.01			48.08	48.09	48.07
B11_No	500	33990	422.0	425.22	0.0250	4.65	0.99	6.11	41.55	48.06	0.05		0.02	Bridge	0.02			48.09
				426.82	0.0250	4.66	0.99	6.13		48.08	0.05	0.02				48.13	48.15	
No97	500	34490	422.0	553.23	0.0250	6.04	0.75	8.07	40.06	48.13	0.03	0.01	0.01			48.16	48.17	48.15
No98	500	34990	422.0	494.68	0.0250	6.09	0.85	8.20	39.54	48.14	0.04	0.01	0.01			48.18	48.19	48.17
No99	500	35490	422.0	482.73	0.0250	6.22	0.87	8.20	39.96	48.16	0.04	0.01	0.01			48.20	48.21	48.19
No100	500	35990	422.0	458.18	0.0250	5.82	0.92	7.58	40.60	48.18	0.04	0.01	0.01			48.22	48.23	48.21
No101	500	36490	422.0	481.42	0.0250	6.02	0.88	7.81	40.39	48.20	0.04	0.01	0.01			48.24	48.25	48.23
No102	500	36990	422.5	522.20	0.0250	6.54	0.81	9.56	38.67	48.23	0.03	0.01	0.01			48.26	48.27	48.25
No103	500	37490	422.5	493.49	0.0250	6.08	0.85	7.64	40.60	48.24	0.04	0.01	0.01			48.28	48.29	48.27
No104	500	37990	422.5	461.41	0.0250	5.80	0.92	7.61	40.65	48.26	0.04	0.00	0.01			48.30	48.31	48.29
B10	170	38160	422.5	406.05	0.0250	4.91	1.04	6.31	41.55	48.26	0.06		0.01	Bridge	0.03			48.31
				408.11	0.0250	4.93	1.04	6.34		48.29	0.05	0.01				48.34	48.35	
No105	330	38490	422.5	488.36	0.0250	6.12	0.87	7.96	40.36	48.32	0.04	0.01	0.01			48.36	48.37	48.35
No106	500	38990	422.5	453.29	0.0250	6.07	0.93	7.71	40.63	48.34	0.04	0.01	0.01			48.38	48.40	48.37

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	422.5	499.87	0.0250	6.29	0.85	7.95	40.42	48.37	0.04	0.01	0.01			48.41	48.41	48.40
No108	500	39990	422.5	468.86	0.0250	5.70	0.90	7.63	40.76	48.39	0.04	0.00	0.01			48.43	48.43	48.41
B9	77	40067	422.5	464.69	0.0250	5.55	0.91	7.48	40.51	48.39	0.04		0.00	Bridge	0.01			48.43
				465.92	0.0250	5.56	0.91	7.49		48.40	0.04	0.01				48.45	48.46	
No109	423	40490	422.5	501.49	0.0250	6.73	0.84	9.15	39.28	48.43	0.04	0.01	0.01			48.46	48.47	48.46
No110	500	40990	422.5	468.48	0.0250	6.31	0.90	8.15	40.29	48.44	0.04	0.01	0.01			48.48	48.50	48.47
No111	500	41490	422.5	514.50	0.0250	6.43	0.82	8.50	39.57	48.47	0.03	0.01	0.01			48.50	48.51	48.49
No112	500	41990	422.5	507.13	0.0250	5.27	0.83	8.51	39.58	48.49	0.04	0.01	0.01			48.52	48.54	48.51
No113	500	42490	422.5	507.49	0.0250	5.39	0.83	8.20	40.31	48.51	0.04	0.01	0.01			48.55	48.56	48.54
No114	500	42990	422.5	529.88	0.0250	6.57	0.80	8.52	40.01	48.53	0.03	0.01	0.01			48.57	48.58	48.56
No115	500	43490	422.5	492.16	0.0250	6.13	0.86	7.79	40.76	48.55	0.04	0.01	0.01			48.59	48.60	48.58
B8_No1	500	43990	422.5	489.62	0.0250	6.02	0.86	7.80	40.77	48.57	0.04		0.01	Bridge	0.02			48.60
				490.92	0.0250	6.03	0.86	7.82		48.59	0.04	0.01				48.62	48.63	
No117	500	44490	422.5	514.07	0.0250	6.33	0.82	8.35	40.26	48.61	0.03	0.01	0.01			48.64	48.65	48.63
No118	500	44990	422.5	512.66	0.0250	6.26	0.82	8.17	40.46	48.63	0.03	0.01	0.01			48.66	48.67	48.65
No119	500	45490	422.5	504.79	0.0250	5.92	0.84	7.57	41.07	48.64	0.04	0.01	0.01			48.68	48.69	48.67
No120	500	45990	422.5	484.02	0.0250	4.91	0.87	7.37	41.30	48.67	0.04	0.01	0.01			48.70	48.72	48.69
B7	386	46376	422.5	527.40	0.0250	5.57	0.80	7.27	41.42	48.69	0.03		0.01	Bridge	0.01			48.72
				528.48	0.0250	5.57	0.80	7.28		48.70	0.03	0.00				48.74	48.74	
No121	114	46490	422.5	504.69	0.0250	6.08	0.84	7.84	40.86	48.70	0.04	0.01	0.00			48.74	48.75	48.74
No122	500	46990	422.5	482.76	0.0250	5.97	0.88	7.64	41.08	48.72	0.04	0.01	0.01			48.76	48.77	48.75
No123	500	47490	422.5	482.64	0.0250	6.00	0.88	7.66	41.08	48.74	0.04	0.01	0.01			48.78	48.79	48.77
No124	500	47990	422.5	481.81	0.0250	5.99	0.88	7.95	40.82	48.77	0.04	0.01	0.01			48.80	48.82	48.79
No125	500	48490	422.5	486.73	0.0250	6.08	0.87	7.86	40.53	48.79	0.04	0.01	0.01			48.83	48.84	48.82
No126	500	48990	422.5	481.48	0.0250	4.92	0.88	7.44	41.37	48.81	0.04	0.01	0.01			48.85	48.87	48.84
No127	500	49490	422.5	484.52	0.0250	5.92	0.87	7.52	41.32	48.84	0.04	0.01	0.01			48.88	48.89	48.87
No128	500	49990	422.5	465.33	0.0250	5.11	0.91	7.40	41.46	48.86	0.04	0.01	0.01			48.90	48.92	48.89
No129	500	50490	422.5	473.32	0.0250	5.48	0.89	7.70	41.19	48.89	0.04	0.01	0.01			48.93	48.94	48.92
No130	500	50990	422.5	501.27	0.0250	5.49	0.84	7.30	41.62	48.92	0.04	0.01	0.01			48.95	48.96	48.94
No131	500	51490	422.5	511.15	0.0250	6.16	0.83	7.94	41.00	48.94	0.03	0.01	0.01			48.97	48.98	48.96
No132	500	51990	422.5	478.28	0.0250	5.46	0.88	7.07	41.89	48.96	0.04	0.01	0.01			49.00	49.01	48.98
No133	500	52490	422.5	459.25	0.0250	5.13	0.92	6.91	42.07	48.98	0.04	0.01	0.01			49.02	49.03	49.01

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 > 49.49 NG

n= 0.0250

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	422.5	399.61	0.0250	4.97	1.05	7.49	41.50	48.99	0.06	0.01	0.01	Bridge	0.02			49.03
B5	45	52806	422.5	401.41	0.0250	4.99	1.05	7.51		49.01	0.06	0.00				49.07	49.07	
				452.22	0.0250	5.87	0.94	7.97	41.05	49.02	0.04	0.00	0.00	Bridge	0.02			49.07
No134	184	52990	422.5	444.91	0.0250	6.44	0.95	8.92	40.13	49.05	0.05	0.01	0.00			49.09	49.10	49.09
B4	236	53226	422.5	455.95	0.0250	6.50	0.93	9.30	39.77	49.07	0.04		0.01	0.01	Bridge	0.01		
				456.85	0.0250	6.51	0.92	9.31		49.08	0.04	0.01					49.12	49.13
No135	264	53490	422.5	446.18	0.0250	5.85	0.95	8.57	40.52	49.09	0.05	0.01	0.01			49.14	49.15	49.13
No135	500	53990	422.5	491.22	0.0250	5.99	0.85	8.17	40.55	49.12	0.04	0.01	0.01			49.16	49.17	49.15
No137	500	54490	422.5	549.11	0.0250	6.29	0.77	8.47	40.68	49.15	0.03	0.01	0.01			49.18	49.19	49.17
No138	500	54990	422.5	515.87	0.0250	6.00	0.82	8.41	40.75	49.16	0.03	0.01	0.01			49.20	49.21	49.19
No139	500	55490	422.5	472.87	0.0250	6.04	0.89	7.84	41.34	49.18	0.04	0.01	0.01			49.22	49.23	49.21
No140	500	55990	422.5	474.28	0.0250	6.14	0.89	8.34	40.86	49.20	0.04	0.01	0.01			49.24	49.25	49.23
No141	500	56490	422.5	434.52	0.0250	5.67	0.97	6.97	42.25	49.22	0.05	0.02	0.01			49.27	49.28	49.25
No142	516	57006	422.5	451.57	0.0250	6.23	0.94	8.13	41.12	49.25	0.04	0.00	0.01			49.29	49.30	49.28
No143	115	57121	422.5	446.89	0.0250	6.08	0.95	8.18	41.07	49.25	0.05	0.01	0.00			49.30	49.31	49.30
No144	369	57490	422.5	444.58	0.0250	6.39	0.95	8.28	40.99	49.27	0.05	0.01	0.01			49.32	49.33	49.31
No145	500	57990	422.5	468.04	0.0250	6.30	0.90	7.97	41.33	49.30	0.04	0.01	0.01			49.34	49.35	49.33
No145	500	58490	422.5	457.20	0.0250	5.60	0.92	7.01	42.31	49.32	0.04	0.01	0.01			49.36	49.38	49.35
No147	500	58990	422.5	449.52	0.0250	6.23	0.94	8.27	41.07	49.34	0.05	0.01	0.01			49.39	49.40	49.38
B3	443	59433	422.5	481.46	0.0250	6.37	0.88	9.15	40.22	49.37	0.04		0.01	0.01	Bridge	0.01		
				482.49	0.0250	6.37	0.88	9.16		49.38	0.04	0.00					49.42	49.42
No148	57	59490	422.5	477.65	0.0250	5.13	0.83	7.14	42.25	49.39	0.04	0.00	0.00			49.43	49.43	49.42
B2	116	59606	422.5	442.67	0.0250	5.23	0.95	6.42	42.97	49.39	0.05		0.00	0.00	Bridge	0.04		
				445.73	0.0250	5.26	0.95	6.45		49.42	0.05	0.01					49.47	49.48
No149	384	59990	422.5	490.97	0.0250	5.74	0.85	7.69	41.76	49.45	0.04	0.00	0.01			49.49	49.49	49.48
B1	152	60142	422.5	507.26	0.0250	5.95	0.83	8.46	41.00	49.46	0.04		0.00	0.00	Bridge	0.02		
				508.68	0.0250	5.96	0.83	8.48		49.48	0.04	0.01					49.51	49.52
No150	333	60475	422.5	473.85	0.0250	4.66	0.89	5.99	43.50	49.49	0.04		0.01			49.53		49.52

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 = 49.57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	405.6	625.04	0.0256	3.60	0.65	4.77	41.12	45.89	0.02	0.00				45.91	45.91	
No2	50	50	405.6	417.85	0.0256	4.40	0.97	5.64	40.23	45.87	0.05	0.00	0.00			45.91	45.92	45.91
No3	50	100	405.6	436.88	0.0256	5.03	0.93	6.08	39.79	45.87	0.04	0.00	0.00			45.92	45.92	45.92
No4	50	150	405.6	427.79	0.0256	5.13	0.95	6.62	39.26	45.88	0.05	0.00	0.00			45.92	45.92	45.92
B21	18	168	405.6	401.60	0.0256	4.54	1.01	5.88	39.59	45.87	0.05		0.00	Bridge	0.02			45.92
				403.38	0.0256	4.56	1.01	5.90		45.89	0.05	0.00				45.94	45.95	
No5	32	200	405.6	418.00	0.0256	5.08	0.97	6.88	39.02	45.90	0.05	0.00	0.00			45.95	45.95	45.95
No6	50	250	405.6	391.66	0.0256	5.47	1.04	7.29	38.61	45.90	0.05	0.00	0.00			45.95	45.95	45.95
No7	50	300	405.6	442.48	0.0256	5.51	0.92	7.31	38.60	45.91	0.04	0.00	0.00			45.95	45.95	45.95
No8	50	350	405.6	412.84	0.0256	5.40	0.98	7.71	38.20	45.91	0.05	0.00	0.00			45.96	45.96	45.95
No9	50	400	405.6	411.90	0.0256	4.55	0.98	5.79	40.12	45.91	0.05	0.00	0.00			45.96	45.96	45.96
No10	50	450	405.6	418.06	0.0256	4.40	0.97	5.57	40.35	45.92	0.05	0.00	0.00			45.96	45.97	45.96
No11	50	500	405.6	416.43	0.0256	4.35	0.97	5.40	40.52	45.92	0.05	0.00	0.00			45.97	45.97	45.97
No12	50	550	405.6	412.77	0.0256	4.26	0.98	5.44	40.48	45.92	0.05	0.00	0.00			45.97	45.98	45.97
No13	50	600	405.6	411.31	0.0256	4.16	0.99	5.19	40.74	45.93	0.05	0.00	0.00			45.98	45.98	45.97
No14	50	650	405.6	436.59	0.0256	4.35	0.93	5.34	40.60	45.94	0.04	0.00	0.00			45.98	45.98	45.98
No15	50	700	405.6	408.76	0.0256	4.27	0.99	5.24	40.70	45.94	0.05	0.00	0.00			45.99	45.99	45.98
No16	50	750	405.6	432.29	0.0256	4.21	0.94	4.95	41.00	45.95	0.04	0.00	0.00			45.99	45.99	45.99
No17	50	800	406.7	410.33	0.0256	4.00	0.99	4.57	41.37	45.94	0.05	0.00	0.00			46.00	45.00	45.99
No18	50	850	406.7	425.74	0.0256	4.12	0.96	4.84	41.11	45.95	0.05	0.00	0.00			46.00	45.00	46.00
No19	50	900	406.7	428.58	0.0256	4.16	0.95	4.96	41.00	45.96	0.05	0.00	0.00			46.00	45.01	46.00
No20	50	950	406.7	428.34	0.0256	4.01	0.95	4.73	41.23	45.96	0.05	0.00	0.00			46.01	45.01	46.01
B20	40	990	406.7	431.57	0.0256	3.93	0.94	4.99	40.58	45.97	0.05		0.00	Bridge	0.02			46.01
				433.83	0.0256	3.94	0.94	5.01		45.99	0.04	0.00				46.03	45.03	
No21	10	1000	406.7	428.20	0.0256	3.90	0.95	4.62	41.37	45.99	0.05	0.00	0.00			46.03	45.04	46.03
No22	50	1050	406.7	456.26	0.0256	4.03	0.89	4.77	41.23	46.00	0.04	0.00	0.00			46.04	45.04	46.04
No23	50	1100	406.7	450.81	0.0256	4.10	0.90	4.89	41.11	46.00	0.04	0.00	0.00			46.04	45.04	46.04
No24	50	1150	406.7	463.33	0.0256	4.21	0.88	5.08	40.93	46.01	0.04	0.00	0.00			46.05	45.05	46.04
No25	50	1200	406.7	466.88	0.0256	4.00	0.87	5.01	41.00	46.01	0.04	0.00	0.00			46.05	45.05	46.05
No26	50	1250	406.7	560.69	0.0256	3.82	0.73	4.97	41.06	46.03	0.03	0.00	0.00			46.05	45.05	46.05
No27	50	1300	406.7	433.50	0.0256	4.33	0.94	5.24	40.77	46.01	0.04	0.00	0.00			46.06	45.06	46.05
No28	50	1350	406.7	456.35	0.0256	4.55	0.89	5.67	40.35	46.02	0.04	0.00	0.00			46.06	45.06	46.06

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 = 49.57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	406.7	404.94	0.0256	4.39	1.00	5.70	40.31	46.01	0.05	0.00	0.00			46.06	45.07	46.06
No30	50	1450	406.7	395.39	0.0256	4.57	1.03	5.52	40.49	46.01	0.05	0.02	0.00			46.07	45.09	46.07
No31	540	1990	406.7	414.53	0.0256	4.71	0.98	5.76	40.31	46.07	0.05	0.02	0.02			46.11	45.13	46.09
No32	500	2490	406.7	406.62	0.0256	4.60	1.00	6.03	40.08	46.11	0.05	0.02	0.02			46.16	45.18	46.13
No33	500	2990	406.7	422.85	0.0256	4.72	0.96	5.92	40.23	46.15	0.05	0.02	0.02			46.20	45.22	46.18
No34	500	3490	407.2	421.94	0.0256	4.44	0.97	5.63	40.56	46.19	0.05	0.02	0.02			46.24	45.26	46.22
No35	500	3990	407.2	422.75	0.0256	4.42	0.96	5.59	40.64	46.23	0.05	0.02	0.02			46.28	45.30	46.26
No36	500	4490	407.4	418.63	0.0256	4.38	0.97	5.22	41.05	46.27	0.05	0.02	0.02			46.32	45.34	46.30
No37	500	4990	407.4	429.42	0.0256	4.90	0.95	6.04	40.27	46.31	0.05	0.02	0.02			46.36	45.38	46.34
No38	500	5490	407.8	447.37	0.0256	5.09	0.91	6.38	39.57	46.35	0.04	0.02	0.02			46.39	45.41	46.38
No39	500	5990	407.8	455.58	0.0256	4.78	0.90	5.69	40.69	46.38	0.04	0.02	0.02			46.43	45.44	46.41
No40	500	6490	407.8	516.51	0.0256	5.60	0.79	7.20	39.22	46.42	0.03	0.00	0.01			46.45	45.45	46.44
B19	55	6545	407.8	425.79	0.0256	5.08	0.96	6.21	40.20	46.41	0.05		0.00	Bridge	0.02			46.45
				427.37	0.0256	5.10	0.95	6.23		46.43	0.05	0.02				46.47	45.49	
No41	445	6990	407.8	435.78	0.0256	4.87	0.94	6.05	40.41	46.46	0.04	0.02	0.02			46.50	45.52	46.49
No42	500	7490	407.8	459.21	0.0256	5.00	0.89	6.26	40.24	46.50	0.04	0.02	0.02			46.54	45.55	46.52
No43	500	7990	408.2	443.95	0.0256	4.87	0.92	6.33	40.20	46.53	0.04	0.02	0.02			46.57	45.59	46.55
No44	500	8490	408.2	450.59	0.0256	4.88	0.91	6.18	40.38	46.56	0.04	0.02	0.02			46.60	45.62	46.59
No45	500	8990	408.3	441.83	0.0256	4.86	0.92	6.28	40.31	46.59	0.04	0.02	0.02			46.64	45.65	46.62
No46	500	9490	408.3	441.99	0.0256	4.67	0.92	5.55	41.08	46.63	0.04	0.02	0.02			46.67	45.69	46.65
No47	500	9990	408.3	455.57	0.0256	4.58	0.90	5.52	41.14	46.66	0.04	0.01	0.02			46.71	45.71	46.69
B18	280	10270	408.4	436.13	0.0256	4.60	0.94	5.64	41.04	46.68	0.04		0.01	Bridge	0.02			46.71
				437.98	0.0256	4.61	0.93	5.66		46.70	0.04	0.01				46.74	45.75	
No48	220	10490	408.4	443.59	0.0256	4.87	0.92	6.04	40.68	46.72	0.04	0.02	0.01			46.76	45.78	46.75
No49	500	10990	408.4	441.20	0.0256	4.65	0.93	5.61	41.14	46.75	0.04	0.02	0.02			46.80	45.81	46.78
No50	500	11490	408.4	427.42	0.0256	4.54	0.95	5.56	41.23	46.79	0.05	0.02	0.02			46.83	45.85	46.81
No51	500	11990	408.4	437.03	0.0256	4.68	0.93	5.93	40.90	46.83	0.04	0.02	0.02			46.87	45.89	46.85
No52	500	12490	408.4	427.63	0.0256	4.77	0.95	5.68	41.18	46.86	0.05	0.02	0.02			46.91	45.93	46.89
No53	500	12990	413.6	442.54	0.0256	4.93	0.93	6.02	40.88	46.90	0.04	0.02	0.02			46.94	45.96	46.93
B17	470	13460	413.6	474.59	0.0256	4.95	0.87	6.75	40.18	46.93	0.04		0.01	Bridge	0.01			46.96
				475.93	0.0256	4.96	0.87	6.77		46.95	0.04	0.00				46.99	45.99	
No54	30	13490	413.6	481.35	0.0256	5.29	0.85	7.12	39.83	46.95	0.04	0.00	0.00			46.99	45.99	46.99

G-10

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 = 49.57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
B16	94	13584	413.6	423.27	0.0256	4.89	0.98	6.15	40.80	46.95	0.05	0.00	Bridge	0.01			46.99		
				424.22	0.0256	4.90	0.97	6.16		46.96	0.05	0.02					47.01	47.02	
No55	406	13990	413.6	461.36	0.0256	4.80	0.93	6.10	40.89	46.99	0.04	0.02	0.01				47.03	47.05	47.02
No56	500	14490	413.6	475.52	0.0256	4.91	0.87	6.17	40.86	47.03	0.04	0.01	0.01				47.07	47.08	47.05
No57	500	14990	413.6	461.42	0.0256	4.80	0.90	5.48	41.58	47.06	0.04	0.02	0.02				47.10	47.11	47.08
No58	500	15490	415.6	447.63	0.0256	4.65	0.93	5.73	41.36	47.09	0.04	0.02	0.02				47.13	47.15	47.11
No59	500	15990	415.6	449.83	0.0256	4.56	0.92	6.11	41.01	47.12	0.04	0.02	0.02				47.17	47.19	47.15
No60	500	16490	417.0	443.78	0.0256	4.88	0.94	5.82	41.34	47.16	0.05	0.02	0.02				47.20	47.22	47.19
No61	500	16990	417.0	469.03	0.0256	4.86	0.89	5.74	41.46	47.20	0.04	0.02	0.02				47.24	47.25	47.22
No62	500	17490	417.0	443.08	0.0256	5.07	0.94	6.18	41.04	47.22	0.05	0.02	0.02				47.27	47.29	47.25
No63	500	17990	418.2	448.95	0.0256	4.84	0.93	6.11	41.15	47.26	0.04	0.02	0.02				47.30	47.32	47.29
B15	432	18422	418.2	400.50	0.0256	4.57	1.04	5.77	41.51	47.28	0.06	0.02	Bridge	0.03					47.32
				402.79	0.0256	4.58	1.04	5.80		47.31	0.05	0.00					47.36	47.37	
No64	68	18490	418.3	433.14	0.0256	4.93	0.97	6.11	41.21	47.32	0.05	0.02	0.00				47.37	47.39	47.37
No65	500	18990	418.3	484.69	0.0256	4.51	0.85	6.36	41.01	47.37	0.04	0.02	0.02				47.40	47.42	47.39
No66	500	19490	418.3	453.28	0.0256	4.31	0.92	6.30	41.10	47.40	0.04	0.02	0.02				47.44	47.46	47.42
No67	500	19990	418.3	442.75	0.0256	5.54	0.94	7.14	40.29	47.43	0.05	0.01	0.01				47.48	47.49	47.46
No68	500	20490	418.3	486.27	0.0256	5.83	0.85	7.44	40.02	47.46	0.04	0.01	0.01				47.50	47.51	47.49
No69	500	20990	418.3	445.18	0.0256	5.67	0.94	7.22	40.26	47.48	0.05	0.01	0.01				47.53	47.54	47.51
No70	500	21490	418.3	447.22	0.0256	5.86	0.94	8.57	38.54	47.51	0.04	0.01	0.01				47.56	47.57	47.54
B14_No	500	21990	418.3	475.78	0.0256	5.07	0.88	7.35	40.19	47.54	0.04	0.01	Bridge	0.01					47.57
				477.14	0.0256	5.07	0.88	7.37		47.56	0.04	0.01					47.60	47.61	
No72	500	22490	418.3	486.06	0.0256	5.02	0.85	8.26	39.33	47.59	0.04	0.01	0.01				47.63	47.64	47.61
No73	500	22990	420.7	488.72	0.0256	6.09	0.85	7.76	39.85	47.61	0.04	0.01	0.01				47.65	47.66	47.64
No74	500	23490	420.7	471.64	0.0256	6.41	0.89	8.83	38.80	47.63	0.04	0.01	0.01				47.67	47.68	47.66
No75	500	23990	420.7	503.16	0.0256	5.96	0.84	8.50	39.16	47.66	0.04	0.01	0.01				47.70	47.71	47.68
No76	500	24490	422.0	521.37	0.0256	5.80	0.81	9.28	38.40	47.68	0.03	0.01	0.01				47.72	47.73	47.71
No77	500	24990	422.0	537.89	0.0256	6.42	0.78	8.53	39.17	47.70	0.03	0.01	0.01				47.73	47.74	47.73
No78	500	25490	422.0	482.39	0.0256	6.08	0.87	7.80	39.92	47.72	0.04	0.01	0.01				47.75	47.77	47.74
No79	500	25990	422.0	610.68	0.0256	6.94	0.69	8.82	38.53	47.75	0.02	0.00	0.01				47.77	47.78	47.77
No80	293	26283	422.0	589.54	0.0256	6.25	0.72	8.11	39.64	47.75	0.03	0.00	0.00				47.78	47.78	47.77
No81	207	26490	422.0	570.11	0.0256	6.30	0.74	9.17	38.59	47.76	0.03	0.01	0.00				47.79	47.79	47.78

G-11

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 = 49.57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	422.0	528.24	0.0256	5.99	0.80	9.14	38.63	47.77	0.03	0.01	0.01			47.80	47.81	47.79
No83	500	27490	422.0	540.76	0.0256	6.98	0.73	9.71	38.08	47.79	0.03	0.01	0.01			47.82	47.83	47.81
B13	455	27945	422.0	447.66 449.79	0.0256 0.0256	4.98 4.99	0.94 0.94	7.55 7.57	40.25	47.80 47.82	0.05 0.04		0.02	Bridge	0.03			47.83
No84	45	27990	422.0	515.36	0.0256	6.55	0.82	9.12	38.71	47.83	0.03	0.01	0.00			47.87	47.88	47.87
No85	500	28490	422.0	505.35	0.0256	5.66	0.84	8.67	39.18	47.85	0.04	0.01	0.01			47.89	47.90	47.88
No86	500	28990	422.0	496.56	0.0256	6.01	0.85	7.52	40.35	47.87	0.04	0.01	0.01			47.91	47.92	47.90
No87	500	29490	422.0	475.77	0.0256	5.63	0.89	7.22	40.67	47.89	0.04	0.01	0.01			47.93	47.95	47.92
No88	500	29990	422.0	494.73	0.0256	6.02	0.85	7.57	40.35	47.92	0.04	0.01	0.01			47.96	47.97	47.95
No89	500	30490	422.0	511.89	0.0256	6.33	0.82	8.50	39.44	47.94	0.03	0.01	0.01			47.98	47.99	47.97
No90	500	30990	422.0	577.55	0.0256	6.83	0.73	9.47	38.50	47.97	0.03	0.01	0.01			47.99	48.00	47.99
No91	500	31490	422.0	520.38	0.0256	6.61	0.81	9.18	38.80	47.98	0.03	0.01	0.01			48.01	48.02	48.00
No92	500	31990	422.0	494.35	0.0256	6.30	0.85	8.15	39.84	47.99	0.04	0.01	0.01			48.03	48.04	48.02
No93	500	32490	422.0	465.91	0.0256	5.82	0.91	7.60	40.41	48.01	0.04	0.01	0.01			48.05	48.06	48.04
No94	500	32990	422.0	459.84	0.0256	5.49	0.92	8.04	40.00	48.04	0.04	0.00	0.01			48.08	48.08	48.06
B12	91	33081	422.0	398.26 400.39	0.0256 0.0256	4.51 4.52	1.05 1.05	6.44 6.46	41.59	48.03 48.05	0.06 0.06		0.00	Bridge	0.03			48.08
No95	409	33490	422.0	445.03	0.0256	5.68	0.95	8.01	40.09	48.10	0.05	0.01	0.01			48.11	48.13	48.13
B11_No	500	33990	422.0	431.04 432.60	0.0256 0.0256	4.70 4.71	0.93 0.93	6.18 6.19	41.55	48.13 48.14	0.05 0.05		0.02	Bridge	0.02			48.16
No97	500	34490	422.0	558.92	0.0256	6.09	0.76	8.13	40.06	48.19	0.03	0.01	0.01			48.19	48.21	48.21
No98	500	34990	422.0	499.63	0.0256	6.14	0.84	8.26	39.54	48.20	0.04	0.01	0.01			48.22	48.23	48.21
No99	500	35490	422.0	487.47	0.0256	6.27	0.87	8.26	39.96	48.22	0.04	0.01	0.01			48.24	48.25	48.23
No100	500	35990	422.0	463.11	0.0256	5.87	0.91	7.64	40.60	48.24	0.04	0.01	0.01			48.26	48.27	48.25
No101	500	36490	422.0	486.35	0.0256	6.06	0.87	7.88	40.39	48.27	0.04	0.01	0.01			48.28	48.30	48.27
No102	500	36990	422.5	527.16	0.0256	6.58	0.80	9.63	38.67	48.27	0.04	0.01	0.01			48.31	48.32	48.30
No103	500	37490	422.5	498.54	0.0256	6.12	0.85	7.71	40.60	48.30	0.03	0.01	0.01			48.33	48.34	48.32
No104	500	37990	422.5	466.48	0.0256	5.85	0.91	7.68	40.65	48.31	0.04	0.01	0.01			48.35	48.36	48.34
B10	170	38160	422.5	411.41 413.42	0.0256 0.0256	4.96 4.98	1.03 1.02	6.38 6.40	41.55	48.33 48.35	0.05 0.05		0.01	Bridge	0.03			48.37
No105	330	38490	422.5	493.37	0.0256	6.16	0.85	8.03	40.36	48.39	0.04	0.01	0.01			48.37	48.37	48.36
No106	500	38990	422.5	457.78	0.0256	6.12	0.92	7.78	40.63	48.41	0.04	0.01	0.01			48.41	48.42	48.42
No107	500	39490	422.5	475.77	0.0256	5.63	0.89	7.22	40.67	48.41	0.04	0.01	0.01			48.43	48.44	48.42
No108	500	39990	422.5	494.73	0.0256	6.02	0.85	7.57	40.35	48.42	0.04	0.01	0.01			48.45	48.46	48.44

G-12

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422,5m³/s

Necessary water level: 49,57 = 49,57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	422.5	504.91	0.0256	6.33	0.84	8.02	40.42	48.44	0.04	0.01	0.01			48.47	48.48	48.46
No108	500	39990	422.5	474.19	0.0256	5.74	0.89	7.69	40.76	48.45	0.04	0.00	0.01			48.49	48.50	48.48
B9	77	40067	422.5	470.15	0.0256	5.60	0.90	7.55	40.51	48.46	0.04		0.00	Bridge	0.01			48.50
				471.35	0.0256	5.60	0.90	7.56		48.47	0.04	0.01				48.51	48.52	
No109	423	40490	422.5	505.96	0.0256	6.78	0.84	9.22	39.28	48.50	0.04	0.01	0.01			48.53	48.54	48.52
No110	500	40990	422.5	473.19	0.0256	6.36	0.89	8.22	40.29	48.51	0.04	0.01	0.01			48.55	48.56	48.54
No111	500	41490	422.5	519.58	0.0256	6.48	0.81	8.57	39.57	48.54	0.03	0.01	0.01			48.57	48.58	48.56
No112	500	41990	422.5	513.39	0.0256	5.32	0.82	8.58	39.58	48.56	0.03	0.01	0.01			48.59	48.60	48.58
No113	500	42490	422.5	513.71	0.0256	5.31	0.82	8.27	40.31	48.58	0.03	0.01	0.01			48.62	48.63	48.60
No114	500	42990	422.5	535.14	0.0256	6.62	0.79	8.59	40.01	48.60	0.03	0.01	0.01			48.64	48.64	48.63
No115	500	43490	422.5	497.46	0.0256	6.19	0.85	7.86	40.76	48.62	0.04	0.01	0.01			48.66	48.67	48.64
B8_No1	500	43990	422.5	494.93	0.0256	6.07	0.85	7.87	40.77	48.64	0.04		0.01	Bridge	0.02			48.67
				496.20	0.0256	6.08	0.85	7.89		48.66	0.04	0.01				48.69	48.70	
No117	500	44490	422.5	519.32	0.0256	6.39	0.81	8.42	40.26	48.68	0.03	0.01	0.01			48.71	48.72	48.70
No118	500	44990	422.5	518.08	0.0256	6.31	0.82	8.24	40.46	48.70	0.03	0.01	0.01			48.73	48.74	48.72
No119	500	45490	422.5	510.58	0.0256	5.98	0.83	7.65	41.07	48.72	0.03	0.01	0.01			48.75	48.76	48.74
No120	500	45990	422.5	490.83	0.0256	4.96	0.86	7.44	41.30	48.74	0.04	0.01	0.01			48.78	48.79	48.76
B7	386	46376	422.5	533.88	0.0256	5.62	0.79	7.34	41.42	48.76	0.03		0.01	Bridge	0.01			48.79
				534.93	0.0256	5.63	0.79	7.35		48.77	0.03	0.00				48.81	48.81	
No121	114	46490	422.5	510.19	0.0256	6.13	0.83	7.92	40.86	48.78	0.03	0.01	0.00			48.81	48.82	48.81
No122	500	46990	422.5	488.22	0.0256	6.02	0.87	7.71	41.08	48.79	0.04	0.01	0.01			48.83	48.84	48.82
No123	500	47490	422.5	488.07	0.0256	6.05	0.87	7.74	41.08	48.82	0.04	0.01	0.01			48.85	48.86	48.84
No124	500	47990	422.5	487.35	0.0256	5.92	0.87	8.02	40.82	48.84	0.04	0.01	0.01			48.88	48.89	48.86
No125	500	48490	422.5	492.17	0.0256	6.14	0.86	7.93	40.53	48.86	0.04	0.01	0.01			48.90	48.91	48.89
No126	500	48990	422.5	488.53	0.0256	4.72	0.86	7.52	41.37	48.89	0.04	0.02	0.02			48.92	48.94	48.91
No127	500	49490	422.5	490.37	0.0256	5.97	0.86	7.59	41.32	48.91	0.04	0.01	0.01			48.95	48.96	48.94
No128	500	49990	422.5	471.77	0.0256	5.17	0.90	7.48	41.46	48.94	0.04	0.01	0.01			48.98	48.99	48.96
No129	500	50490	422.5	479.72	0.0256	5.53	0.88	7.78	41.19	48.97	0.04	0.01	0.01			49.00	49.02	48.99
No130	500	50990	422.5	508.00	0.0256	5.55	0.83	7.37	41.62	48.99	0.04	0.01	0.01			49.03	49.04	49.02
No131	500	51490	422.5	517.21	0.0256	6.21	0.82	8.02	41.00	49.02	0.03	0.01	0.01			49.05	49.06	49.04
No132	500	51990	422.5	484.84	0.0256	5.51	0.87	7.14	41.89	49.03	0.04	0.01	0.01			49.07	49.09	49.06
No133	500	52490	422.5	466.03	0.0256	5.18	0.91	6.99	42.07	49.06	0.04	0.01	0.02			49.10	49.11	49.09

G-13

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 = 49.57 OK

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	422.5	405.71	0.0256	5.03	1.04	7.56	41.50	49.06	0.06	0.01	0.01	Bridge	0.02			49.11
				407.46	0.0256	5.04	1.04	7.59		49.09	0.05	0.00				49.14	49.14	
B5	45	52806	422.5	456.23	0.0256	5.92	0.93	8.05	41.05	49.10	0.04	0.00	0.00	Bridge	0.02			49.14
				457.81	0.0256	5.93	0.92	8.07		49.12	0.04	0.00				49.17	49.17	
No134	184	52990	422.5	449.78	0.0256	6.47	0.94	9.00	40.13	49.13	0.05	0.01	0.00			49.17	49.18	49.17
B4	236	53226	422.5	460.82	0.0256	6.55	0.92	9.37	39.77	49.14	0.04	0.01	0.01	Bridge	0.01			49.18
				461.70	0.0256	6.56	0.92	9.39		49.16	0.04	0.01				49.20	49.20	
No135	264	53490	422.5	451.73	0.0256	5.90	0.94	8.65	40.52	49.17	0.04	0.01	0.01			49.21	49.23	49.20
No135	500	53990	422.5	497.16	0.0256	6.05	0.85	8.25	40.55	49.20	0.04	0.01	0.01			49.24	49.25	49.23
No137	500	54490	422.5	555.26	0.0256	6.35	0.76	8.55	40.68	49.23	0.03	0.01	0.01			49.25	49.26	49.25
No138	500	54990	422.5	522.17	0.0256	6.05	0.81	8.49	40.75	49.24	0.03	0.01	0.01			49.27	49.28	49.26
No139	500	55490	422.5	478.54	0.0256	6.10	0.88	7.91	41.34	49.25	0.04	0.01	0.01			49.29	49.31	49.28
No140	500	55990	422.5	479.94	0.0256	6.19	0.88	8.42	40.86	49.28	0.04	0.01	0.01			49.32	49.33	49.30
No141	500	56490	422.5	439.84	0.0256	5.73	0.96	7.04	42.25	49.29	0.05	0.02	0.01			49.34	49.36	49.33
No142	516	57006	422.5	456.77	0.0256	6.28	0.92	8.21	41.12	49.33	0.04	0.00	0.01			49.37	49.37	49.36
No143	115	57121	422.5	452.25	0.0256	6.13	0.93	8.26	41.07	49.33	0.04	0.01	0.00			49.38	49.38	49.37
No144	369	57490	422.5	449.45	0.0256	6.44	0.94	8.36	40.99	49.35	0.05	0.01	0.01			49.39	49.41	49.38
No145	500	57990	422.5	473.32	0.0256	6.36	0.89	8.05	41.33	49.38	0.04	0.01	0.01			49.42	49.43	49.41
No146	500	58490	422.5	463.22	0.0256	5.66	0.91	7.09	42.31	49.40	0.04	0.01	0.01			49.44	49.45	49.43
No147	500	58990	422.5	454.80	0.0256	6.28	0.93	8.35	41.07	49.42	0.04	0.01	0.01			49.47	49.48	49.45
B3	443	59433	422.5	487.06	0.0256	6.41	0.87	9.23	40.22	49.45	0.04	0.01	0.01	Bridge	0.01			49.48
				488.08	0.0256	6.42	0.87	9.24		49.46	0.04	0.00				49.50	49.50	
No148	57	59490	422.5	484.84	0.0256	5.19	0.87	7.21	42.25	49.46	0.04	0.00	0.00			49.50	49.51	49.50
B2	116	59606	422.5	449.13	0.0256	5.28	0.94	6.50	42.97	49.47	0.05	0.01	0.00	Bridge	0.04			49.51
				452.10	0.0256	5.31	0.93	6.53		49.50	0.04	0.01				49.55	49.56	
No149	384	59990	422.5	497.32	0.0256	5.79	0.85	7.77	41.76	49.53	0.04	0.00	0.01			49.57	49.57	49.56
B1	152	60142	422.5	513.66	0.0256	6.00	0.82	8.54	41.00	49.54	0.03	0.01	0.00	Bridge	0.02			49.57
				515.04	0.0256	6.01	0.82	8.56		49.56	0.03	0.01				49.59	49.60	
No150	333	60475	422.5	481.64	0.0256	4.72	0.88	6.07	43.50	49.57	0.04	0.01	0.01			49.61		49.60

G-14

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 < 49.63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	405.6	625.04	0.0260	3.60	0.65	4.77	41.12	45.89	0.02	0.00				45.91	45.91	
No2	50	50	405.6	417.87	0.0260	4.40	0.97	5.64	40.23	45.87	0.05	0.00	0.00			45.92	45.92	45.91
No3	50	100	405.6	436.90	0.0260	5.03	0.93	6.08	39.79	45.87	0.04	0.00	0.00			45.92	45.92	45.92
No4	50	150	405.6	427.82	0.0260	5.13	0.95	6.62	39.26	45.88	0.05	0.00	0.00			45.92	45.92	45.92
B21	18	168	405.6	401.63	0.0260	4.54	1.01	5.88	39.59	45.87	0.05		0.00	Bridge	0.02			45.92
				403.41	0.0260	4.56	1.01	5.90		45.89	0.05	0.00				45.94	45.95	
No5	32	200	405.6	418.03	0.0260	5.08	0.97	6.88	39.02	45.90	0.05	0.00	0.00			45.95	45.95	45.95
No6	50	250	405.6	391.70	0.0260	5.47	1.04	7.29	38.61	45.90	0.05	0.00	0.00			45.95	45.95	45.95
No7	50	300	405.6	442.53	0.0260	5.51	0.92	7.31	38.60	45.91	0.04	0.00	0.00			45.95	45.96	45.95
No8	50	350	405.6	412.89	0.0260	5.41	0.98	7.71	38.20	45.91	0.05	0.00	0.00			45.96	45.96	45.96
No9	50	400	405.6	411.99	0.0260	4.55	0.98	5.79	40.12	45.91	0.05	0.00	0.00			45.96	45.96	45.96
No10	50	450	405.6	418.17	0.0260	4.40	0.97	5.57	40.35	45.92	0.05	0.00	0.00			45.97	45.97	45.96
No11	50	500	405.6	416.54	0.0260	4.35	0.97	5.40	40.52	45.92	0.05	0.00	0.00			45.97	45.97	45.97
No12	50	550	405.6	412.90	0.0260	4.26	0.98	5.44	40.48	45.92	0.05	0.00	0.00			45.97	45.98	45.97
No13	50	600	405.6	411.46	0.0260	4.16	0.99	5.19	40.74	45.93	0.05	0.00	0.00			45.98	45.98	45.98
No14	50	650	405.6	436.75	0.0260	4.35	0.93	5.34	40.60	45.94	0.04	0.00	0.00			45.98	45.99	45.98
No15	50	700	405.6	408.92	0.0260	4.27	0.99	5.24	40.70	45.94	0.05	0.00	0.00			45.99	45.99	45.99
No16	50	750	405.6	432.48	0.0260	4.21	0.94	4.95	41.00	45.95	0.04	0.00	0.00			45.99	45.99	45.99
No17	50	800	406.7	410.53	0.0260	4.00	0.99	4.58	41.37	45.95	0.05	0.00	0.00			46.00	45.00	45.99
No18	50	850	406.7	425.96	0.0260	4.12	0.95	4.85	41.11	45.96	0.05	0.00	0.00			46.00	45.00	46.00
No19	50	900	406.7	428.81	0.0260	4.16	0.95	4.96	41.00	45.96	0.05	0.00	0.00			46.01	45.01	46.00
No20	50	950	406.7	428.60	0.0260	4.02	0.95	4.74	41.23	45.97	0.05	0.00	0.00			46.01	45.01	46.01
B20	40	990	406.7	431.85	0.0260	3.93	0.94	4.99	40.58	45.97	0.05		0.00	Bridge	0.02			46.01
				434.10	0.0260	3.95	0.94	5.01		45.99	0.04	0.00				46.04	45.04	
No21	10	1000	406.7	428.48	0.0260	3.90	0.95	4.62	41.37	45.99	0.05	0.00	0.00			46.04	45.04	46.04
No22	50	1050	406.7	456.56	0.0260	4.03	0.89	4.77	41.23	46.00	0.04	0.00	0.00			46.04	45.04	46.04
No23	50	1100	406.7	451.12	0.0260	4.10	0.90	4.89	41.11	46.00	0.04	0.00	0.00			46.04	45.05	46.04
No24	50	1150	406.7	463.64	0.0260	4.22	0.88	5.08	40.93	46.01	0.04	0.00	0.00			46.05	45.05	46.05
No25	50	1200	406.7	467.23	0.0260	4.01	0.87	5.01	41.00	46.01	0.04	0.00	0.00			46.05	45.05	46.05
No26	50	1250	406.7	561.14	0.0260	3.82	0.72	4.97	41.06	46.03	0.03	0.00	0.00			46.06	45.06	46.05
No27	50	1300	406.7	433.82	0.0260	4.33	0.94	5.24	40.77	46.01	0.04	0.00	0.00			46.06	45.06	46.06
No28	50	1350	406.7	456.68	0.0260	4.55	0.89	5.67	40.35	46.02	0.04	0.00	0.00			46.06	45.07	46.06

G-15

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422,5m³/s

Necessary water level: 49,57 < 49,63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	406.7	405.25	0.0260	4.39	1.00	5.71	40.31	46.02	0.05	0.00	0.00			46.07	45.07	46.07
No30	50	1450	406.7	395.69	0.0260	4.58	1.03	5.53	40.49	46.02	0.05	0.03	0.00			46.07	45.10	46.07
No31	540	1990	406.7	414.96	0.0260	4.72	0.98	5.76	40.31	46.07	0.05	0.02	0.02			46.12	45.14	46.10
No32	500	2490	406.7	407.15	0.0260	4.60	1.00	6.03	40.08	46.11	0.05	0.02	0.02			46.16	45.18	46.14
No33	500	2990	406.7	423.48	0.0260	4.72	0.96	5.93	40.23	46.16	0.05	0.02	0.02			46.20	45.22	46.18
No34	500	3490	407.2	422.71	0.0260	4.45	0.95	5.64	40.56	46.20	0.05	0.02	0.02			46.24	45.27	46.22
No35	500	3990	407.2	423.64	0.0260	4.42	0.95	5.60	40.64	46.24	0.05	0.02	0.02			46.29	45.31	46.27
No36	500	4490	407.4	419.61	0.0260	4.39	0.97	5.23	41.05	46.28	0.05	0.02	0.02			46.33	45.35	46.31
No37	500	4990	407.4	430.39	0.0260	4.91	0.95	6.06	40.27	46.33	0.05	0.02	0.02			46.37	45.39	46.35
No38	500	5490	407.8	448.42	0.0260	5.10	0.91	6.39	39.57	46.36	0.04	0.02	0.02			46.41	45.42	46.39
No39	500	5990	407.8	456.78	0.0260	4.79	0.89	5.71	40.69	46.40	0.04	0.02	0.02			46.44	45.45	46.42
No40	500	6490	407.8	517.73	0.0260	5.61	0.79	7.21	39.22	46.43	0.03	0.00	0.01			46.47	45.47	46.45
B19	55	6545	407.8	426.88	0.0260	5.09	0.95	6.22	40.20	46.42	0.05		0.00	Bridge	0.02			46.47
				428.45	0.0260	5.11	0.95	6.24		46.44	0.05	0.02				46.49	45.50	
No41	445	6990	407.8	437.02	0.0260	4.88	0.93	6.06	40.41	46.47	0.04	0.02	0.02			46.52	45.54	46.50
No42	500	7490	407.8	460.55	0.0260	5.01	0.89	6.27	40.24	46.51	0.04	0.02	0.02			46.55	45.57	46.54
No43	500	7990	408.2	445.36	0.0260	4.88	0.92	6.34	40.20	46.54	0.04	0.02	0.02			46.58	45.60	46.57
No44	500	8490	408.2	452.07	0.0260	4.89	0.90	6.20	40.38	46.58	0.04	0.02	0.02			46.62	45.63	46.60
No45	500	8990	408.3	443.34	0.0260	4.87	0.92	6.30	40.31	46.61	0.04	0.02	0.02			46.65	45.67	46.63
No46	500	9490	408.3	443.65	0.0260	4.88	0.92	5.56	41.08	46.64	0.04	0.02	0.02			46.69	45.71	46.67
No47	500	9990	408.3	457.39	0.0260	4.59	0.89	5.54	41.14	46.68	0.04	0.01	0.02			46.72	45.73	46.71
B18	280	10270	408.4	437.90	0.0260	4.61	0.93	5.66	41.04	46.70	0.04		0.01	Bridge	0.02			46.73
				439.73	0.0260	4.63	0.93	5.68		46.72	0.04	0.01				46.76	45.77	
No48	220	10490	408.4	445.29	0.0260	4.88	0.92	6.06	40.68	46.74	0.04	0.02	0.01			46.78	45.80	46.77
No49	500	10990	408.4	443.04	0.0260	4.66	0.92	5.63	41.14	46.77	0.04	0.02	0.02			46.81	45.83	46.80
No50	500	11490	408.4	429.32	0.0260	4.55	0.95	5.58	41.23	46.81	0.05	0.02	0.02			46.85	45.87	46.83
No51	500	11990	408.4	438.99	0.0260	4.70	0.93	5.95	40.90	46.85	0.04	0.02	0.02			46.89	45.91	46.87
No52	500	12490	408.4	429.54	0.0260	4.79	0.95	5.70	41.18	46.88	0.05	0.02	0.02			46.93	45.95	46.91
No53	500	12990	413.6	444.50	0.0260	4.94	0.93	6.04	40.88	46.92	0.04	0.02	0.02			46.97	45.98	46.95
B17	470	13460	413.6	476.77	0.0260	4.97	0.87	6.78	40.18	46.96	0.04		0.01	Bridge	0.01			46.98
				478.07	0.0260	4.98	0.87	6.79		46.97	0.04	0.00				47.01	47.01	
No54	30	13490	413.6	483.37	0.0260	5.30	0.85	7.14	39.83	46.97	0.04	0.00	0.00			47.01	47.01	47.01

G-16

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 < 49.63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B16	94	13584	413.6	425.20	0.0260	4.91	0.97	6.17	40.80	46.97	0.05	0.00	Bridge	0.01				47.01
				426.14	0.0260	4.92	0.97	6.18	40.89	46.98	0.05	0.02				47.03	47.04	
No55	406	13990	413.6	463.55	0.0260	4.81	0.89	6.13	40.89	47.02	0.04	0.02	0.01			47.06	47.07	47.04
No56	500	14490	413.6	477.71	0.0260	4.93	0.87	6.19	40.86	47.05	0.04	0.02	0.02			47.09	47.10	47.07
No57	500	14990	413.6	463.67	0.0260	4.82	0.89	5.50	41.58	47.08	0.04	0.02	0.02			47.12	47.14	47.10
No58	500	15490	415.6	449.95	0.0260	4.67	0.92	5.75	41.36	47.11	0.04	0.02	0.02			47.16	47.17	47.14
No59	500	15990	415.6	452.02	0.0260	4.57	0.92	6.14	41.01	47.15	0.04	0.02	0.02			47.19	47.21	47.17
No60	500	16490	417.0	446.08	0.0260	4.90	0.93	5.84	41.34	47.18	0.04	0.02	0.02			47.23	47.25	47.21
No61	500	16990	417.0	471.48	0.0260	4.88	0.88	5.76	41.46	47.22	0.04	0.02	0.02			47.26	47.28	47.25
No62	500	17490	417.0	445.32	0.0260	5.10	0.94	6.21	41.04	47.25	0.04	0.02	0.02			47.30	47.31	47.28
No63	500	17990	418.2	451.41	0.0260	4.86	0.93	6.14	41.15	47.29	0.04	0.02	0.02			47.33	47.35	47.31
B15	432	18422	418.2	402.91	0.0260	4.58	1.04	5.80	41.51	47.31	0.05	0.02	Bridge	0.03				47.35
				405.17	0.0260	4.58	1.03	5.83	41.51	47.34	0.05	0.00				47.39	47.40	
No64	68	18490	418.3	435.51	0.0260	4.95	0.96	6.14	41.21	47.35	0.05	0.02	0.00			47.40	47.42	47.40
No65	500	18990	418.3	487.89	0.0260	4.32	0.85	6.39	41.01	47.40	0.04	0.02	0.02			47.43	47.45	47.42
No66	500	19490	418.3	456.40	0.0260	4.32	0.92	6.33	41.10	47.43	0.04	0.02	0.02			47.47	47.49	47.45
No67	500	19990	418.3	445.12	0.0260	5.56	0.94	7.17	40.29	47.46	0.05	0.02	0.02			47.51	47.52	47.49
No68	500	20490	418.3	488.75	0.0260	5.86	0.85	7.48	40.02	47.50	0.04	0.01	0.01			47.53	47.55	47.52
No69	500	20990	418.3	447.58	0.0260	5.70	0.93	7.26	40.26	47.52	0.04	0.01	0.01			47.56	47.57	47.55
No70	500	21490	418.3	449.58	0.0260	5.89	0.93	8.60	38.54	47.54	0.04	0.01	0.01			47.59	47.60	47.57
B14_No	500	21990	418.3	478.82	0.0260	5.08	0.87	7.39	40.19	47.58	0.04	0.01	Bridge	0.01				47.60
				480.17	0.0260	5.08	0.87	7.40	40.19	47.59	0.04	0.01				47.63	47.65	
No72	500	22490	418.3	489.17	0.0260	5.04	0.85	8.29	39.33	47.62	0.04	0.01	0.01			47.66	47.67	47.65
No73	500	22990	420.7	491.25	0.0260	6.11	0.85	7.80	39.85	47.65	0.04	0.01	0.01			47.69	47.70	47.67
No74	500	23490	420.7	473.95	0.0260	6.43	0.89	8.87	38.80	47.67	0.04	0.01	0.01			47.71	47.72	47.70
No75	500	23990	420.7	505.93	0.0260	5.97	0.83	8.53	39.16	47.69	0.04	0.01	0.01			47.73	47.74	47.72
No76	500	24490	422.0	524.33	0.0260	5.81	0.80	9.32	38.40	47.72	0.03	0.01	0.01			47.75	47.76	47.74
No77	500	24990	422.0	540.60	0.0260	6.44	0.78	8.57	39.17	47.74	0.03	0.01	0.01			47.77	47.78	47.76
No78	500	25490	422.0	485.04	0.0260	6.11	0.87	7.83	39.92	47.75	0.04	0.01	0.01			47.79	47.80	47.78
No79	500	25990	422.0	613.56	0.0260	6.97	0.69	8.85	38.53	47.78	0.02	0.00	0.01			47.81	47.81	47.80
No80	293	26283	422.0	592.79	0.0260	6.27	0.71	8.15	39.64	47.79	0.03	0.00	0.00			47.81	47.82	47.81
No81	207	26490	422.0	573.18	0.0260	6.32	0.74	9.20	38.59	47.79	0.03	0.01	0.00			47.82	47.83	47.82

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 < -49.63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	422.0	531.25	0.0260	5.99	0.79	9.18	38.63	47.81	0.03	0.01	0.01			47.84	47.85	47.83
No83	500	27490	422.0	543.37	0.0260	7.00	0.73	9.75	38.08	47.83	0.03	0.01	0.01			47.86	47.86	47.85
B13	455	27945	422.0	450.88	0.0260	5.00	0.94	7.58	40.25	47.83	0.04		0.02	Bridge	0.02			47.86
				452.96	0.0260	5.02	0.93	7.61		47.86	0.04	0.00				47.90	47.90	
No84	45	27990	422.0	518.01	0.0260	6.57	0.81	9.16	38.71	47.87	0.03	0.01	0.00			47.90	47.91	47.90
No85	500	28490	422.0	508.41	0.0260	5.66	0.83	8.71	39.18	47.89	0.04	0.01	0.01			47.93	47.94	47.91
No86	500	28990	422.0	499.46	0.0260	6.04	0.84	7.56	40.35	47.91	0.04	0.01	0.01			47.95	47.96	47.94
No87	500	29490	422.0	478.83	0.0260	5.65	0.83	7.26	40.67	47.93	0.04	0.01	0.01			47.97	47.98	47.96
No88	500	29990	422.0	497.67	0.0260	6.04	0.85	7.61	40.35	47.96	0.04	0.01	0.01			48.00	48.01	47.98
No89	500	30490	422.0	514.81	0.0260	6.35	0.82	8.54	39.44	47.98	0.03	0.01	0.01			48.02	48.03	48.01
No90	500	30990	422.0	580.56	0.0260	6.86	0.73	9.51	38.50	48.01	0.03	0.01	0.01			48.03	48.04	48.03
No91	500	31490	422.0	523.20	0.0260	6.64	0.81	9.21	38.80	48.01	0.03	0.01	0.01			48.05	48.06	48.04
No92	500	31990	422.0	497.14	0.0260	6.33	0.85	8.19	39.84	48.03	0.04	0.01	0.01			48.07	48.08	48.06
No93	500	32490	422.0	468.82	0.0260	5.85	0.90	7.64	40.41	48.05	0.04	0.01	0.01			48.09	48.10	48.08
No94	500	32990	422.0	463.02	0.0260	5.50	0.91	8.08	40.00	48.08	0.04	0.00	0.01			48.12	48.12	48.10
B12	91	33081	422.0	401.71	0.0260	4.53	1.05	6.48	41.59	48.07	0.06		0.00	Bridge	0.02			48.12
				403.80	0.0260	4.55	1.05	6.50		48.09	0.06	0.02				48.15	48.17	
No95	409	33490	422.0	447.94	0.0260	5.70	0.94	8.05	40.09	48.14	0.05	0.01	0.01			48.18	48.20	48.17
B11_No	500	33990	422.0	434.62	0.0260	4.73	0.97	6.22	41.55	48.17	0.05		0.02	Bridge	0.02			48.20
				436.16	0.0260	4.74	0.97	6.23		48.18	0.05	0.02				48.23	48.25	
No97	500	34490	422.0	562.43	0.0260	6.12	0.75	8.17	40.06	48.23	0.03	0.01	0.01			48.26	48.27	48.25
No98	500	34990	422.0	502.67	0.0260	6.17	0.84	8.30	39.54	48.24	0.04	0.01	0.01			48.28	48.29	48.27
No99	500	35490	422.0	490.40	0.0260	6.29	0.85	8.30	39.56	48.26	0.04	0.01	0.01			48.30	48.31	48.29
No100	500	35990	422.0	466.16	0.0260	5.90	0.91	7.68	40.60	48.28	0.04	0.01	0.01			48.32	48.34	48.31
No101	500	36490	422.0	489.39	0.0260	6.09	0.85	7.92	40.39	48.31	0.04	0.01	0.01			48.35	48.36	48.34
No102	500	36990	422.5	530.23	0.0260	6.61	0.80	9.67	38.67	48.34	0.03	0.01	0.01			48.37	48.38	48.36
No103	500	37490	422.5	501.66	0.0260	6.15	0.84	7.75	40.60	48.35	0.04	0.01	0.01			48.39	48.40	48.38
No104	500	37990	422.5	469.60	0.0260	5.88	0.99	7.72	40.65	48.37	0.04	0.00	0.01			48.41	48.42	48.40
B10	170	38160	422.5	414.74	0.0260	4.99	1.02	6.42	41.55	48.37	0.05		0.01	Bridge	0.03			48.42
				416.72	0.0260	5.01	1.01	6.44		48.39	0.05	0.01				48.45	48.46	
No105	330	38490	422.5	496.92	0.0260	5.28	0.85	8.07	40.36	48.43	0.04	0.01	0.01			48.47	48.48	48.46
No106	500	38990	422.5	461.91	0.0260	5.01	0.91	7.83	40.63	48.46	0.04	0.02	0.02			48.50	48.52	48.48

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422,5m³/s

Necessary water level: 49,57 < 49,63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	422.5	508.94	0.0260	6.36	0.83	8.07	40.42	48.49	0.04	0.01	0.01			48.53	48.54	48.52
No108	500	39990	422.5	478.45	0.0260	5.76	0.88	7.75	40.76	48.51	0.04	0.00	0.01			48.55	48.55	48.54
B9	77	40067	422.5	474.51	0.0260	5.62	0.89	7.60	40.51	48.51	0.04		0.00	Bridge	0.01			48.55
				475.69	0.0260	5.63	0.89	7.62		48.53	0.04	0.01				48.57	48.58	
No109	423	40490	422.5	509.51	0.0260	6.82	0.83	9.27	39.28	48.55	0.04	0.01	0.01			48.59	48.59	48.58
No110	500	40990	422.5	476.92	0.0260	6.40	0.89	8.28	40.29	48.57	0.04	0.01	0.01			48.61	48.62	48.59
No111	500	41490	422.5	525.61	0.0260	6.52	0.81	8.62	39.57	48.59	0.03	0.01	0.01			48.63	48.63	48.62
No112	500	41990	422.5	518.34	0.0260	5.36	0.82	8.63	39.58	48.61	0.03	0.01	0.01			48.65	48.66	48.63
No113	500	42490	422.5	518.73	0.0260	5.24	0.81	8.33	40.31	48.64	0.03	0.01	0.01			48.67	48.68	48.66
No114	500	42990	422.5	539.27	0.0260	6.65	0.78	8.65	40.01	48.66	0.03	0.01	0.01			48.69	48.70	48.68
No115	500	43490	422.5	501.61	0.0260	6.23	0.84	7.91	40.76	48.67	0.04	0.01	0.01			48.71	48.72	48.70
B8_No1	500	43990	422.5	499.07	0.0260	6.11	0.85	7.92	40.77	48.69	0.04		0.01	Bridge	0.02			48.72
				500.33	0.0260	6.13	0.84	7.94		48.71	0.04	0.01				48.75	48.76	
No117	500	44490	422.5	525.41	0.0260	6.43	0.81	8.47	40.26	48.73	0.03	0.01	0.01			48.77	48.78	48.76
No118	500	44990	422.5	522.30	0.0260	6.35	0.81	8.29	40.46	48.75	0.03	0.01	0.01			48.79	48.80	48.78
No119	500	45490	422.5	515.07	0.0260	6.02	0.82	7.70	41.07	48.77	0.03	0.01	0.01			48.81	48.82	48.80
No120	500	45990	422.5	496.12	0.0260	5.01	0.85	7.49	41.30	48.79	0.04	0.01	0.01			48.83	48.84	48.82
B7	386	46376	422.5	538.90	0.0260	5.66	0.78	7.40	41.42	48.82	0.03		0.01	Bridge	0.01			48.84
				539.93	0.0260	5.67	0.78	7.41		48.83	0.03	0.00				48.86	48.86	
No121	114	46490	422.5	514.45	0.0260	6.17	0.82	7.97	40.86	48.83	0.03	0.01	0.00			48.87	48.88	48.86
No122	500	46990	422.5	492.44	0.0260	6.06	0.85	7.77	41.08	48.85	0.04	0.01	0.01			48.89	48.90	48.88
No123	500	47490	422.5	492.26	0.0260	6.10	0.85	7.79	41.08	48.87	0.04	0.01	0.01			48.91	48.92	48.90
No124	500	47990	422.5	491.70	0.0260	5.88	0.85	8.07	40.82	48.89	0.04	0.01	0.01			48.93	48.94	48.92
No125	500	48490	422.5	496.35	0.0260	6.18	0.85	7.99	40.53	48.92	0.04	0.01	0.01			48.95	48.96	48.94
No126	500	48990	422.5	494.39	0.0260	4.47	0.85	7.57	41.37	48.94	0.04	0.02	0.02			48.98	49.00	48.96
No127	500	49490	422.5	494.92	0.0260	6.01	0.85	7.65	41.32	48.97	0.04	0.01	0.01			49.01	49.02	49.00
No128	500	49990	422.5	476.77	0.0260	5.21	0.89	7.54	41.46	49.00	0.04	0.01	0.01			49.04	49.05	49.02
No129	500	50490	422.5	484.68	0.0260	5.57	0.87	7.83	41.19	49.02	0.04	0.01	0.01			49.06	49.08	49.05
No130	500	50990	422.5	513.20	0.0260	5.60	0.82	7.43	41.62	49.05	0.03	0.01	0.01			49.09	49.10	49.08
No131	500	51490	422.5	521.88	0.0260	6.26	0.81	8.08	41.00	49.08	0.03	0.01	0.01			49.11	49.12	49.10
No132	500	51990	422.5	489.90	0.0260	5.56	0.85	7.20	41.89	49.09	0.04	0.01	0.01			49.13	49.14	49.12
No133	500	52490	422.5	471.23	0.0260	5.22	0.90	7.05	42.07	49.12	0.04	0.01	0.01			49.16	49.17	49.14

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_maximum_422.5m³/s

Necessary water level: 49.57 < 49.63 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	422.5	410.39	0.0260	5.07	1.03	7.62	41.50	49.12	0.05	0.01	0.01	Bridge	0.02			49.17
B5	45	52806	422.5	412.10	0.0260	5.09	1.03	7.65		49.15	0.05	0.00				49.20	49.20	
				460.55	0.0260	5.96	0.92	8.11	41.05	49.16	0.04	0.00	0.00	Bridge	0.02			49.20
No134	184	52990	422.5	462.09	0.0260	5.97	0.91	8.13		49.18	0.04	0.00				49.22	49.23	
				453.52	0.0260	6.50	0.93	9.06	40.13	49.19	0.04	0.01	0.00			49.23	49.24	49.23
B4	236	53226	422.5	464.55	0.0260	6.59	0.91	9.43		49.20	0.04		0.01	0.01	Bridge	0.01		
				465.42	0.0260	6.60	0.91	9.44	39.77	49.21	0.04	0.01	0.01			49.26	49.26	49.24
No135	264	53490	422.5	455.98	0.0260	5.93	0.93	8.71	40.52	49.23	0.04	0.01	0.01			49.26	49.28	49.26
No135	500	53990	422.5	501.71	0.0260	6.09	0.84	8.31	40.55	49.26	0.04	0.01	0.01			49.29	49.30	49.28
No137	500	54490	422.5	559.95	0.0260	6.39	0.75	8.60	40.68	49.28	0.03	0.01	0.01			49.31	49.32	49.30
No138	500	54990	422.5	526.99	0.0260	6.09	0.80	8.55	40.75	49.30	0.03	0.01	0.01			49.33	49.34	49.32
No139	500	55490	422.5	482.86	0.0260	6.14	0.87	7.97	41.34	49.31	0.04	0.01	0.01			49.35	49.36	49.34
No140	500	55990	422.5	484.25	0.0260	6.22	0.87	8.48	40.86	49.34	0.04	0.01	0.01			49.37	49.39	49.36
No141	500	56490	422.5	443.88	0.0260	5.77	0.95	7.10	42.25	49.35	0.05	0.02	0.01			49.40	49.42	49.39
No142	516	57006	422.5	460.71	0.0260	6.32	0.92	8.26	41.12	49.38	0.04	0.00	0.01			49.43	49.43	49.42
No143	115	57121	422.5	456.30	0.0260	6.17	0.93	8.32	41.07	49.39	0.04	0.01	0.00			49.43	49.44	49.43
No144	369	57490	422.5	453.12	0.0260	6.48	0.93	8.42	40.99	49.41	0.04	0.01	0.01			49.45	49.46	49.44
No145	500	57990	422.5	477.30	0.0260	6.40	0.89	8.11	41.33	49.44	0.04	0.01	0.01			49.48	49.49	49.46
No145	500	58490	422.5	467.74	0.0260	5.71	0.90	7.15	42.31	49.46	0.04	0.01	0.01			49.50	49.51	49.49
No147	500	58990	422.5	458.77	0.0260	6.31	0.92	8.41	41.07	49.48	0.04	0.01	0.01			49.53	49.54	49.51
B3	443	59433	422.5	491.28	0.0260	6.44	0.85	9.29	40.22	49.51	0.04		0.01	0.01	Bridge	0.01		
				492.27	0.0260	6.45	0.85	9.30		49.52	0.04	0.00				49.56	49.56	49.54
No148	57	59490	422.5	490.22	0.0260	5.23	0.85	7.27	42.25	49.52	0.04	0.00	0.00			49.56	49.56	49.56
B2	116	59606	422.5	453.96	0.0260	5.32	0.93	6.55	42.97	49.52	0.04		0.00	0.00	Bridge	0.04		
				456.85	0.0260	5.34	0.92	6.59		49.56	0.04	0.01				49.60	49.62	49.56
No149	384	59990	422.5	502.07	0.0260	5.83	0.84	7.83	41.76	49.59	0.04	0.00	0.01			49.62	49.63	49.62
B1	152	60142	422.5	518.44	0.0260	6.04	0.81	8.60	41.00	49.60	0.03		0.00	0.00	Bridge	0.02		
				519.80	0.0260	6.05	0.81	8.61		49.61	0.03	0.01				49.65	49.65	49.63
No150	333	60475	422.5	487.46	0.0260	4.76	0.87	6.13	43.50	49.63	0.04		0.01			49.66	49.65	49.65

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Case; Estimation based on $Q=300.9\text{m}^3/\text{s}$

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	288.9	580.14	0.0260	3.35	0.50	4.50	41.12	45.62	0.01	0.00				45.63	45.63	
No2	50	50	288.9	393.95	0.0260	4.20	0.73	5.38	40.23	45.61	0.03	0.00	0.00			45.63	45.64	45.63
No3	50	100	288.9	415.19	0.0260	4.83	0.70	5.82	39.79	45.61	0.02	0.00	0.00			45.64	45.64	45.64
No4	50	150	288.9	406.91	0.0260	4.93	0.71	6.35	39.26	45.61	0.03	0.00	0.00			45.64	45.64	45.64
B21	18	168	288.9	379.42	0.0260	4.33	0.75	5.62	39.59	45.61	0.03	0.00	0.00	Bridge	0.01			45.64
				380.40	0.0260	4.34	0.75	5.63		45.62	0.03	0.00				45.65	45.65	
No5	32	200	288.9	396.63	0.0260	4.89	0.73	6.61	39.02	45.63	0.03	0.00	0.00			45.65	45.65	45.65
No6	50	250	288.9	373.57	0.0260	5.27	0.77	7.01	38.61	45.62	0.03	0.00	0.00			45.66	45.66	45.65
No7	50	300	288.9	421.31	0.0260	5.31	0.69	7.03	38.60	45.63	0.02	0.00	0.00			45.66	45.66	45.66
No8	50	350	288.9	393.15	0.0260	5.20	0.73	7.43	38.20	45.63	0.03	0.00	0.00			45.66	45.66	45.66
No9	50	400	288.9	387.57	0.0260	4.34	0.75	5.51	40.12	45.63	0.03	0.00	0.00			45.66	45.66	45.66
No10	50	450	288.9	392.38	0.0260	4.18	0.74	5.29	40.35	45.64	0.03	0.00	0.00			45.66	45.67	45.66
No11	50	500	288.9	390.30	0.0260	4.12	0.74	5.12	40.52	45.64	0.03	0.00	0.00			45.67	45.67	45.67
No12	50	550	288.9	386.06	0.0260	4.03	0.75	5.16	40.48	45.64	0.03	0.00	0.00			45.67	45.67	45.67
No13	50	600	288.9	383.87	0.0260	3.94	0.75	4.90	40.74	45.64	0.03	0.00	0.00			45.67	45.67	45.67
No14	50	650	288.9	408.44	0.0260	4.12	0.71	5.05	40.60	45.65	0.03	0.00	0.00			45.68	45.68	45.67
No15	50	700	288.9	382.01	0.0260	4.05	0.75	4.95	40.70	45.65	0.03	0.00	0.00			45.68	45.68	45.68
No16	50	750	288.9	403.25	0.0260	3.97	0.72	4.65	41.00	45.65	0.03	0.00	0.00			45.68	45.68	45.68
No17	50	800	289.7	381.29	0.0260	3.76	0.75	4.28	41.37	45.65	0.03	0.00	0.00			45.68	45.69	45.68
No18	50	850	289.7	396.17	0.0260	3.89	0.73	4.55	41.11	45.66	0.03	0.00	0.00			45.69	45.69	45.69
No19	50	900	289.7	398.97	0.0260	3.92	0.73	4.66	41.00	45.66	0.03	0.00	0.00			45.69	45.69	45.69
No20	50	950	289.7	397.33	0.0260	3.77	0.73	4.44	41.23	45.67	0.03	0.00	0.00			45.69	45.69	45.69
B20	40	990	289.7	399.56	0.0260	3.69	0.73	4.69	40.58	45.67	0.03	0.00	0.00	Bridge	0.01			45.69
				400.84	0.0260	3.70	0.72	4.70		45.68	0.03	0.00				45.71	45.71	
No21	10	1000	289.7	395.20	0.0260	3.64	0.73	4.31	41.37	45.68	0.03	0.00	0.00			45.71	45.71	45.71
No22	50	1050	289.7	421.80	0.0260	3.77	0.69	4.46	41.23	45.69	0.02	0.00	0.00			45.71	45.71	45.71
No23	50	1100	289.7	417.30	0.0260	3.85	0.69	4.58	41.11	45.69	0.02	0.00	0.00			45.71	45.71	45.71
No24	50	1150	289.7	429.54	0.0260	3.97	0.67	4.76	40.93	45.69	0.02	0.00	0.00			45.72	45.72	45.71
No25	50	1200	289.7	430.77	0.0260	3.75	0.67	4.69	41.00	45.69	0.02	0.00	0.00			45.72	45.72	45.72
No26	50	1250	289.7	514.70	0.0260	3.53	0.55	4.64	41.06	45.70	0.02	0.00	0.00			45.72	45.72	45.72
No27	50	1300	289.7	402.95	0.0260	4.08	0.72	4.93	40.77	45.70	0.03	0.00	0.00			45.72	45.72	45.72
No28	50	1350	289.7	425.27	0.0260	4.31	0.68	5.35	40.35	45.70	0.02	0.00	0.00			45.73	45.73	45.72

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss (c) (d) (m)		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												Type	Head or WL difference (m)	UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)			
No29	50	1400	289.7	376.71	0.0260	4.17	0.77	5.39	40.31	45.70	0.03	0.00	0.00			45.73	45.73	45.73
No30	50	1450	289.7	369.12	0.0260	4.33	0.78	5.21	40.49	45.70	0.03	0.02	0.00			45.73	45.75	45.73
No31	540	1990	289.7	386.23	0.0260	4.46	0.75	5.42	40.31	45.73	0.03	0.01	0.01			45.76	45.77	45.75
No32	500	2490	289.7	376.94	0.0260	4.38	0.77	5.68	40.08	45.76	0.03	0.01	0.01			45.79	45.80	45.77
No33	500	2990	289.7	391.51	0.0260	4.43	0.74	5.56	40.23	45.79	0.03	0.01	0.01			45.81	45.83	45.80
No34	500	3490	290.1	387.28	0.0260	4.15	0.75	5.25	40.56	45.81	0.03	0.01	0.01			45.84	45.86	45.83
No35	500	3990	290.1	386.73	0.0260	4.15	0.75	5.20	40.64	45.84	0.03	0.01	0.01			45.87	45.88	45.85
No36	500	4490	290.2	381.36	0.0260	4.07	0.76	4.82	41.05	45.87	0.03	0.02	0.02			45.90	45.91	45.88
No37	500	4990	290.2	394.52	0.0260	4.59	0.74	5.63	40.27	45.90	0.03	0.01	0.01			45.93	45.94	45.91
No38	500	5490	290.4	411.42	0.0260	4.77	0.71	5.95	39.57	45.92	0.03	0.01	0.01			45.95	45.96	45.94
No39	500	5990	290.4	415.54	0.0260	4.43	0.70	5.25	40.69	45.94	0.02	0.01	0.01			45.97	45.98	45.96
No40	500	6490	290.4	476.69	0.0260	5.26	0.61	6.75	39.22	45.97	0.02	0.00	0.01			45.99	45.99	45.98
B19	55	6545	290.4	390.72	0.0260	4.73	0.74	5.76	40.20	45.96	0.03		0.00	Bridge	0.01			45.99
				391.63	0.0260	4.74	0.74	5.77		45.97	0.03	0.01				46.00	45.01	
No41	445	6990	290.4	396.00	0.0260	4.52	0.73	5.59	40.41	46.00	0.03	0.01	0.01			46.02	45.03	46.01
No42	500	7490	290.4	417.42	0.0260	4.65	0.70	5.78	40.24	46.02	0.02	0.01	0.01			46.05	45.06	46.03
No43	500	7990	290.6	401.48	0.0260	4.52	0.72	5.84	40.20	46.04	0.03	0.01	0.01			46.07	45.08	46.06
No44	500	8490	290.6	406.87	0.0260	4.51	0.71	5.68	40.38	46.06	0.03	0.01	0.01			46.09	45.10	46.08
No45	500	8990	290.7	398.15	0.0260	4.48	0.73	5.78	40.31	46.09	0.03	0.01	0.01			46.11	45.13	46.10
No46	500	9490	290.7	395.10	0.0260	4.27	0.74	5.03	41.08	46.11	0.03	0.01	0.01			46.14	45.15	46.13
No47	500	9990	290.7	405.59	0.0260	4.23	0.72	5.00	41.14	46.14	0.03	0.01	0.01			46.17	45.17	46.15
B18	280	10270	290.8	387.91	0.0260	4.21	0.75	5.11	41.04	46.15	0.03		0.01	Bridge	0.01			46.17
				389.04	0.0260	4.22	0.75	5.12		46.16	0.03	0.01				46.19	45.20	
No48	220	10490	290.8	396.56	0.0260	4.46	0.73	5.50	40.68	46.18	0.03	0.01	0.01			46.20	45.22	46.20
No49	500	10990	290.8	391.54	0.0260	4.28	0.74	5.06	41.14	46.20	0.03	0.01	0.01			46.23	45.24	46.22
No50	500	11490	290.8	377.14	0.0260	4.17	0.77	5.00	41.23	46.23	0.03	0.01	0.01			46.26	45.27	46.24
No51	500	11990	290.8	386.16	0.0260	4.30	0.75	5.36	40.90	46.26	0.03	0.01	0.01			46.29	45.30	46.27
No52	500	12490	290.8	378.45	0.0260	4.33	0.77	5.10	41.18	46.28	0.03	0.01	0.01			46.31	45.33	46.30
No53	500	12990	294.5	392.36	0.0260	4.47	0.75	5.43	40.88	46.31	0.03	0.01	0.01			46.34	45.35	46.33
B17	470	13460	294.5	419.88	0.0260	4.56	0.70	6.16	40.18	46.34	0.03		0.01	Bridge	0.01			45.35
				420.70	0.0260	4.57	0.70	6.17		46.35	0.03	0.00				46.37	45.37	
No54	30	13490	294.5	428.95	0.0260	4.84	0.69	6.52	39.83	46.35	0.02	0.00	0.00			46.37	45.38	46.37

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B16	94	13584	294.5	374.06	0.0260	4.48	0.79	5.55	40.80	46.35	0.03	0.00	Bridge	0.01			46.38		
				374.63	0.0260	4.49	0.79	5.55		46.35	0.03	0.01					46.39	45.40	
No55	406	13990	294.5	404.76	0.0260	4.31	0.73	5.49	40.89	46.38	0.03	0.01	0.01				46.41	45.42	46.40
No56	500	14490	294.5	419.04	0.0260	4.41	0.70	5.55	40.86	46.41	0.03	0.01	0.01				46.43	45.44	46.42
No57	500	14990	294.5	404.13	0.0260	4.29	0.73	4.85	41.58	46.43	0.03	0.01	0.01				46.46	45.47	46.44
No58	500	15490	295.9	389.60	0.0260	4.13	0.76	5.09	41.36	46.45	0.03	0.01	0.01				46.48	45.50	46.47
No59	500	15990	295.9	395.50	0.0260	4.10	0.75	5.47	41.01	46.48	0.03	0.01	0.01				46.51	45.53	46.50
No60	500	16490	296.9	387.64	0.0260	4.37	0.77	5.17	41.34	46.51	0.03	0.01	0.01				46.54	45.56	46.53
No61	500	16990	296.9	409.37	0.0260	4.34	0.73	5.08	41.46	46.54	0.03	0.01	0.01				46.57	45.58	46.55
No62	500	17490	296.9	388.78	0.0260	4.54	0.76	5.52	41.14	46.56	0.03	0.01	0.01				46.59	45.61	46.58
No63	500	17990	297.8	389.88	0.0260	4.27	0.76	5.44	41.15	46.59	0.03	0.01	0.01				46.62	45.63	46.61
B15	432	18422	297.8	346.22	0.0260	4.23	0.85	5.10	41.51	46.61	0.04	0.02	Bridge	0.02					46.63
				347.73	0.0260	4.24	0.85	5.12		46.63	0.04	0.00							46.67
No64	68	18490	297.9	376.28	0.0260	4.46	0.79	5.43	41.21	46.64	0.03	0.01	0.00				46.67	45.69	46.67
No65	500	18990	297.9	420.36	0.0260	4.52	0.71	5.66	41.01	46.67	0.03	0.01	0.01				46.70	45.71	46.69
No66	500	19490	297.9	395.79	0.0260	4.66	0.75	5.59	41.10	46.69	0.03	0.01	0.01				46.72	45.73	46.71
No67	500	19990	297.9	389.80	0.0260	5.00	0.76	6.42	40.29	46.71	0.03	0.01	0.01				46.74	45.76	46.73
No68	500	20490	297.9	430.52	0.0260	5.28	0.69	6.72	40.02	46.74	0.02	0.01	0.01				46.76	45.77	46.76
No69	500	20990	297.9	392.20	0.0260	5.14	0.75	6.50	40.26	46.76	0.03	0.01	0.01				46.78	45.80	46.77
No70	500	21490	297.9	395.51	0.0260	5.36	0.75	7.84	38.54	46.78	0.03	0.01	0.01				46.81	45.82	46.80
B14_No	500	21990	297.9	410.93	0.0260	4.69	0.72	6.61	40.19	46.80	0.03	0.01	Bridge	0.01					46.82
				411.80	0.0260	4.70	0.72	6.62		46.81	0.03	0.01							46.84
No72	500	22490	297.9	428.03	0.0260	5.64	0.70	7.50	39.33	46.83	0.02	0.01	0.01				46.86	45.86	46.85
No73	500	22990	299.6	432.15	0.0260	5.55	0.69	7.00	39.85	46.85	0.02	0.01	0.01				46.87	45.88	46.86
No74	500	23490	299.6	420.30	0.0260	5.91	0.71	8.06	38.80	46.86	0.03	0.01	0.01				46.89	45.90	46.88
No75	500	23990	299.6	443.47	0.0260	5.72	0.68	7.72	39.16	46.88	0.02	0.01	0.01				46.90	45.91	46.90
No76	500	24490	300.5	458.26	0.0260	5.66	0.66	8.50	38.40	46.90	0.02	0.01	0.01				46.92	45.93	46.91
No77	500	24990	300.5	477.61	0.0260	5.88	0.63	7.74	39.17	46.91	0.02	0.01	0.01				46.93	45.94	46.93
No78	500	25490	300.5	424.15	0.0260	5.52	0.71	7.00	39.92	46.92	0.03	0.01	0.01				46.95	45.96	46.94
No79	500	25990	300.5	546.58	0.0260	6.37	0.55	8.02	38.53	46.95	0.02	0.00	0.00				46.96	45.96	46.96
No80	293	26283	300.5	518.00	0.0260	5.71	0.58	7.31	39.64	46.95	0.02	0.00	0.00				46.97	45.97	46.96
No81	207	26490	300.5	502.63	0.0260	5.74	0.60	8.36	38.59	46.95	0.02	0.01	0.00				46.97	45.98	46.97

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	300.5	465.95	0.0260	6.06	0.64	8.33	38.63	46.96	0.02	0.01	0.01			46.98	45.99	46.98
No83	500	27490	300.5	483.77	0.0260	6.48	0.62	8.90	38.08	46.98	0.02	0.00	0.01			46.99	47.00	46.99
B13	455	27945	300.5	377.98	0.0260	4.32	0.80	6.73	40.25	46.98	0.03		0.01	Bridge	0.02			47.00
				379.43	0.0260	4.33	0.79	6.75		47.00	0.03	0.00				47.03	47.03	
No84	45	27990	300.5	456.28	0.0260	6.00	0.65	8.30	38.71	47.01	0.02	0.01	0.00			47.03	47.04	47.03
No85	500	28490	300.5	441.47	0.0260	5.73	0.68	7.84	39.18	47.02	0.02	0.01	0.01			47.05	47.05	47.04
No86	500	28990	300.5	432.28	0.0260	5.41	0.70	6.69	40.35	47.04	0.02	0.01	0.01			47.06	47.07	47.05
No87	500	29490	300.5	408.84	0.0260	5.06	0.73	6.38	40.67	47.05	0.03	0.01	0.01			47.08	47.09	47.07
No88	500	29990	300.5	430.08	0.0260	5.42	0.70	6.73	40.35	47.08	0.02	0.01	0.01			47.10	47.11	47.09
No89	500	30490	300.5	447.83	0.0260	5.76	0.67	7.65	39.44	47.09	0.02	0.01	0.01			47.12	47.12	47.11
No90	500	30990	300.5	510.86	0.0260	6.24	0.59	8.61	38.50	47.11	0.02	0.01	0.01			47.13	47.13	47.12
No91	500	31490	300.5	458.48	0.0260	6.03	0.65	8.32	38.80	47.12	0.02	0.01	0.01			47.14	47.15	47.13
No92	500	31990	300.5	433.17	0.0260	5.71	0.69	7.29	39.84	47.13	0.02	0.01	0.01			47.16	47.16	47.15
No93	500	32490	300.5	403.04	0.0260	5.26	0.75	6.74	40.41	47.15	0.03	0.01	0.01			47.17	47.18	47.16
No94	500	32990	300.5	392.13	0.0260	4.94	0.77	7.17	40.00	47.17	0.03	0.00	0.01			47.20	47.20	47.18
B12	91	33081	300.5	326.08	0.0260	3.94	0.92	5.57	41.59	47.16	0.04		0.00	Bridge	0.02			47.20
				327.63	0.0260	3.96	0.92	5.59		47.18	0.04	0.02				47.22	47.24	
No95	409	33490	300.5	382.86	0.0260	5.20	0.73	7.13	40.09	47.22	0.03	0.01	0.01			47.25	47.26	47.24
B11_No	500	33990	300.5	353.66	0.0260	4.02	0.85	5.29	41.85	47.24	0.04		0.02	Bridge	0.01			47.26
				354.79	0.0260	4.03	0.85	5.31		47.26	0.04	0.02				47.29	47.31	
No97	500	34490	300.5	480.89	0.0260	5.40	0.62	7.24	40.06	47.30	0.02	0.01	0.01			47.32	47.33	47.31
No98	500	34990	300.5	432.33	0.0260	5.50	0.70	7.37	39.94	47.31	0.02	0.01	0.01			47.33	47.34	47.33
No99	500	35490	300.5	423.19	0.0260	5.65	0.71	7.36	39.96	47.32	0.03	0.01	0.01			47.35	47.36	47.34
No100	500	35990	300.5	396.62	0.0260	5.23	0.75	6.74	40.60	47.34	0.03	0.01	0.01			47.37	47.38	47.36
No101	500	36490	300.5	419.76	0.0260	5.44	0.72	6.97	40.39	47.36	0.03	0.01	0.01			47.39	47.40	47.38
No102	500	36990	300.9	459.81	0.0260	5.95	0.65	8.71	38.67	47.38	0.02	0.01	0.01			47.40	47.41	47.40
No103	500	37490	300.9	430.03	0.0260	5.45	0.70	6.79	40.60	47.39	0.02	0.01	0.01			47.42	47.43	47.41
No104	500	37990	300.9	398.41	0.0260	5.18	0.75	6.76	40.65	47.41	0.03	0.00	0.01			47.44	47.44	47.43
B10	170	38160	300.9	340.11	0.0260	4.28	0.88	5.46	41.85	47.41	0.04		0.01	Bridge	0.02			47.44
				341.55	0.0260	4.29	0.88	5.48		47.43	0.04	0.01				47.47	47.48	
No105	330	38490	300.9	424.77	0.0260	5.51	0.71	7.10	40.36	47.46	0.03	0.01	0.01			47.49	47.49	47.48
No105	500	38990	300.9	396.01	0.0260	5.44	0.75	6.85	40.63	47.48	0.03	0.01	0.01			47.51	47.52	47.49

G-25

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	300.9	435.87	0.0260	5.66	0.69	7.08	40.42	47.50	0.02	0.01	0.01			47.52	47.53	47.52
No108	500	39990	300.9	402.18	0.0260	5.09	0.75	6.75	40.76	47.51	0.03	0.00	0.01			47.54	47.54	47.53
B9	77	40067	300.9	396.08	0.0260	4.92	0.75	6.61	40.51	47.52	0.03		0.00	Bridge	0.01			47.54
				396.89	0.0260	4.92	0.75	6.62		47.53	0.03	0.01				47.56	47.57	
No109	423	40490	300.9	443.92	0.0260	6.12	0.68	8.27	39.28	47.55	0.02	0.01	0.01			47.57	47.58	47.57
No110	500	40990	300.9	408.59	0.0260	5.70	0.74	7.27	40.29	47.56	0.03	0.01	0.01			47.59	47.60	47.58
No111	500	41490	300.9	449.20	0.0260	5.77	0.67	7.61	39.57	47.58	0.02	0.01	0.01			47.60	47.61	47.60
No112	500	41990	300.9	438.19	0.0260	5.85	0.69	7.61	39.58	47.59	0.02	0.01	0.01			47.62	47.63	47.61
No113	500	42490	300.9	437.24	0.0260	5.44	0.69	7.30	40.31	47.61	0.02	0.01	0.01			47.63	47.64	47.63
No114	500	42990	300.9	462.69	0.0260	5.91	0.65	7.62	40.01	47.63	0.02	0.01	0.01			47.65	47.66	47.64
No115	500	43490	300.9	424.74	0.0260	5.46	0.71	6.88	40.76	47.64	0.03	0.01	0.01			47.66	47.67	47.66
B8_No1	500	43990	300.9	421.88	0.0260	5.32	0.71	6.89	40.77	47.66	0.03		0.01	Bridge	0.01			47.67
				422.72	0.0260	5.32	0.71	6.90		47.67	0.03	0.01				47.69	47.70	
No117	500	44490	300.9	446.23	0.0260	5.63	0.67	7.43	40.26	47.69	0.02	0.01	0.01			47.71	47.72	47.70
No118	500	44990	300.9	442.99	0.0260	5.56	0.68	7.24	40.46	47.70	0.02	0.01	0.01			47.73	47.73	47.72
No119	500	45490	300.9	430.78	0.0260	5.22	0.70	6.65	41.07	47.72	0.02	0.01	0.01			47.74	47.75	47.73
No120	500	45990	300.9	407.99	0.0260	5.02	0.74	6.43	41.30	47.73	0.03	0.01	0.01			47.76	47.77	47.75
B7	386	46376	300.9	446.89	0.0260	5.08	0.67	6.33	41.42	47.75	0.02		0.01	Bridge	0.01			47.77
				447.61	0.0260	5.09	0.67	6.34		47.76	0.02	0.00				47.79	47.79	
No121	114	46490	300.9	435.19	0.0260	5.37	0.69	6.91	40.86	47.77	0.02	0.01	0.00			47.79	47.80	47.79
No122	500	46990	300.9	412.24	0.0260	5.26	0.73	6.70	41.08	47.78	0.03	0.01	0.01			47.81	47.82	47.80
No123	500	47490	300.9	412.59	0.0260	5.29	0.73	6.72	41.08	47.80	0.03	0.01	0.01			47.83	47.84	47.82
No124	500	47990	300.9	412.54	0.0260	5.38	0.73	7.00	40.82	47.82	0.03	0.01	0.01			47.85	47.86	47.84
No125	500	48490	300.9	417.09	0.0260	5.36	0.72	6.91	40.93	47.84	0.03	0.01	0.01			47.87	47.88	47.86
No125	500	48990	300.9	408.04	0.0260	5.28	0.74	6.49	41.37	47.86	0.03	0.01	0.01			47.89	47.90	47.88
No127	500	49490	300.9	411.66	0.0260	5.21	0.73	6.56	41.32	47.88	0.03	0.01	0.01			47.91	47.92	47.90
No128	500	49990	300.9	394.27	0.0260	5.24	0.75	6.44	41.46	47.90	0.03	0.01	0.01			47.93	47.94	47.92
No129	500	50490	300.9	394.73	0.0260	4.86	0.76	6.73	41.19	47.92	0.03	0.01	0.01			47.95	47.96	47.94
No130	500	50990	300.9	417.11	0.0260	4.73	0.72	6.33	41.62	47.95	0.03	0.01	0.01			47.97	47.98	47.96
No131	500	51490	300.9	435.67	0.0260	5.47	0.69	6.97	41.00	47.97	0.02	0.01	0.01			47.99	48.00	47.98
No132	500	51990	300.9	396.93	0.0260	4.72	0.75	6.09	41.89	47.98	0.03	0.01	0.01			48.01	48.02	48.00
No133	500	52490	300.9	376.61	0.0260	4.48	0.80	5.94	42.07	48.01	0.03	0.01	0.01			48.04	48.05	48.02

G-26

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 > 48.45 NG

n= 0.0260

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B6	271	52761	300.9	325.36	0.0260	4.26	0.92	6.51	41.50	48.01	0.04	0.01	0.01	Bridge	0.02			48.05	
B5	45	52806	300.9	326.68	0.0260	4.28	0.92	6.53		48.03	0.04	0.00				48.07	48.08		
				381.71	0.0260	5.20	0.79	7.00	41.05	48.05	0.03	0.00	0.00	Bridge	0.02			48.08	
No134	184	52990	300.9	383.99	0.0260	5.87	0.73	7.94	40.13	48.07	0.03	0.00	0.00			48.09	48.10	48.10	
B4	236	53226	300.9	393.76	0.0260	5.82	0.75	8.31	39.77	48.08	0.03		0.00	0.00	Bridge	0.01			48.11
				394.33	0.0260	5.83	0.75	8.32		48.09	0.03	0.00						48.12	48.12
No135	264	53490	300.9	375.66	0.0260	5.19	0.80	7.58	40.52	48.10	0.03	0.01	0.01			48.12	48.13	48.12	
No135	500	53990	300.9	414.96	0.0260	5.29	0.73	7.18	40.55	48.13	0.03	0.01	0.01			48.13	48.14	48.12	
No135	500	53990	300.9	414.96	0.0260	5.29	0.73	7.18	40.55	48.13	0.03	0.01	0.01			48.15	48.16	48.14	
No137	500	54490	300.9	469.20	0.0260	5.55	0.64	7.47	40.68	48.15	0.02	0.01	0.01			48.17	48.18	48.16	
No138	500	54990	300.9	435.35	0.0260	5.33	0.69	7.41	40.75	48.16	0.02	0.01	0.01			48.18	48.19	48.18	
No139	500	55490	300.9	399.88	0.0260	5.28	0.75	6.83	41.34	48.17	0.03	0.01	0.01			48.20	48.21	48.19	
No140	500	55990	300.9	402.24	0.0260	5.46	0.75	7.33	40.86	48.19	0.03	0.01	0.01			48.22	48.23	48.21	
No141	500	56490	300.9	366.38	0.0260	4.95	0.82	5.96	42.25	48.21	0.03	0.01	0.01			48.25	48.26	48.23	
No142	516	57006	300.9	385.00	0.0260	5.49	0.78	7.12	41.12	48.24	0.03	0.00	0.01			48.27	48.27	48.26	
No143	115	57121	300.9	379.13	0.0260	5.41	0.79	7.17	41.07	48.24	0.03	0.01	0.00			48.28	48.28	48.27	
No144	369	57490	300.9	382.59	0.0260	5.72	0.79	7.27	40.99	48.26	0.03	0.01	0.01			48.29	48.30	48.28	
No145	500	57990	300.9	400.44	0.0260	5.56	0.75	6.95	41.33	48.28	0.03	0.01	0.01			48.31	48.32	48.30	
No145	500	58490	300.9	380.09	0.0260	4.79	0.79	5.99	42.31	48.30	0.03	0.01	0.01			48.33	48.35	48.32	
No147	500	58990	300.9	383.30	0.0260	5.60	0.79	7.26	41.07	48.33	0.03	0.01	0.01			48.36	48.37	48.35	
B3	443	59433	300.9	411.54	0.0260	5.81	0.73	8.13	40.22	48.35	0.03		0.01	0.01	Bridge	0.01			48.37
				412.21	0.0260	5.81	0.73	8.14		48.36	0.03	0.00						48.39	48.39
No148	57	59490	300.9	385.69	0.0260	4.31	0.73	6.11	42.25	48.36	0.03	0.00	0.00			48.39	48.39	48.39	
B2	116	59606	300.9	362.08	0.0260	4.58	0.83	5.39	42.97	48.36	0.04		0.00	0.00	Bridge	0.03			48.39
				364.37	0.0260	4.60	0.83	5.42		48.39	0.03	0.01						48.42	48.44
No149	384	59990	300.9	408.51	0.0260	5.02	0.74	6.66	41.76	48.42	0.03	0.00	0.01			48.44	48.45	48.44	
B1	152	60142	300.9	424.80	0.0260	5.30	0.71	7.42	41.00	48.42	0.03		0.00	0.00	Bridge	0.01			48.45
				425.79	0.0260	5.31	0.71	7.44		48.44	0.03	0.01						48.46	48.47
No150	333	60475	300.9	372.30	0.0260	3.86	0.81	4.95	43.50	48.45	0.03		0.01			48.48		48.47	

G-27

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	288.9	580.14	0.0267	3.35	0.50	4.50	41.12	45.62	0.01	0.00				45.63	45.63	
No2	50	50	288.9	393.96	0.0267	4.20	0.73	5.38	40.23	45.61	0.03	0.00	0.00			45.63	45.64	45.63
No3	50	100	288.9	415.21	0.0267	4.83	0.70	5.82	39.79	45.61	0.02	0.00	0.00			45.64	45.64	45.64
No4	50	150	288.9	406.94	0.0267	4.93	0.71	6.35	39.26	45.61	0.03	0.00	0.00			45.64	45.64	45.64
B21	18	168	288.9	379.45	0.0267	4.33	0.75	5.62	39.59	45.61	0.03		0.00	Bridge	0.01			45.64
				380.43	0.0267	4.34	0.75	5.63		45.62	0.03	0.00				45.65	45.65	
No5	32	200	288.9	396.67	0.0267	4.89	0.73	6.61	39.02	45.63	0.03	0.00	0.00			45.65	45.65	45.65
No6	50	250	288.9	373.61	0.0267	5.27	0.77	7.02	38.61	45.63	0.03	0.00	0.00			45.66	45.66	45.65
No7	50	300	288.9	421.37	0.0267	5.31	0.69	7.03	38.60	45.63	0.02	0.00	0.00			45.66	45.66	45.66
No8	50	350	288.9	393.21	0.0267	5.20	0.73	7.43	38.20	45.63	0.03	0.00	0.00			45.66	45.66	45.66
No9	50	400	288.9	387.66	0.0267	4.34	0.75	5.51	40.12	45.63	0.03	0.00	0.00			45.66	45.66	45.66
No10	50	450	288.9	392.48	0.0267	4.18	0.74	5.29	40.35	45.64	0.03	0.00	0.00			45.66	45.67	45.66
No11	50	500	288.9	390.41	0.0267	4.12	0.74	5.12	40.52	45.64	0.03	0.00	0.00			45.67	45.67	45.67
No12	50	550	288.9	386.20	0.0267	4.03	0.75	5.16	40.48	45.64	0.03	0.00	0.00			45.67	45.67	45.67
No13	50	600	288.9	384.02	0.0267	3.94	0.75	4.90	40.74	45.64	0.03	0.00	0.00			45.67	45.68	45.67
No14	50	650	288.9	408.61	0.0267	4.12	0.71	5.05	40.60	45.65	0.03	0.00	0.00			45.68	45.68	45.68
No15	50	700	288.9	382.19	0.0267	4.05	0.75	4.95	40.70	45.65	0.03	0.00	0.00			45.68	45.68	45.68
No16	50	750	288.9	403.45	0.0267	3.98	0.72	4.66	41.00	45.66	0.03	0.00	0.00			45.68	45.68	45.68
No17	50	800	289.7	381.51	0.0267	3.76	0.75	4.29	41.37	45.66	0.03	0.00	0.00			45.69	45.69	45.68
No18	50	850	289.7	396.41	0.0267	3.89	0.73	4.55	41.11	45.66	0.03	0.00	0.00			45.69	45.69	45.69
No19	50	900	289.7	399.23	0.0267	3.92	0.73	4.67	41.00	45.67	0.03	0.00	0.00			45.69	45.69	45.69
No20	50	950	289.7	397.61	0.0267	3.77	0.73	4.44	41.23	45.67	0.03	0.00	0.00			45.70	45.70	45.69
B20	40	990	289.7	399.86	0.0267	3.70	0.72	4.69	40.58	45.67	0.03		0.00	Bridge	0.01			45.70
				401.14	0.0267	3.71	0.72	4.70		45.68	0.03	0.00				45.71	45.71	
No21	10	1000	289.7	395.50	0.0267	3.64	0.73	4.31	41.37	45.68	0.03	0.00	0.00			45.71	45.71	45.71
No22	50	1050	289.7	422.13	0.0267	3.77	0.69	4.46	41.23	45.69	0.02	0.00	0.00			45.71	45.71	45.71
No23	50	1100	289.7	417.64	0.0267	3.85	0.69	4.58	41.11	45.69	0.02	0.00	0.00			45.72	45.72	45.71
No24	50	1150	289.7	429.89	0.0267	3.97	0.67	4.77	40.93	45.70	0.02	0.00	0.00			45.72	45.72	45.72
No25	50	1200	289.7	431.16	0.0267	3.75	0.67	4.70	41.00	45.70	0.02	0.00	0.00			45.72	45.72	45.72
No26	50	1250	289.7	515.20	0.0267	3.54	0.55	4.65	41.06	45.71	0.02	0.00	0.00			45.72	45.72	45.72
No27	50	1300	289.7	403.30	0.0267	4.08	0.72	4.93	40.77	45.70	0.03	0.00	0.00			45.73	45.73	45.72
No28	50	1350	289.7	425.64	0.0267	4.31	0.68	5.36	40.35	45.71	0.02	0.00	0.00			45.73	45.73	45.73

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	289.7	377.06	0.0267	4.17	0.77	5.39	40.31	45.70	0.03	0.00	0.00			45.73	45.73	45.73
No30	50	1450	289.7	369.45	0.0267	4.33	0.78	5.21	40.49	45.70	0.03	0.02	0.00			45.73	45.75	45.73
No31	540	1990	289.7	386.70	0.0267	4.46	0.75	5.43	40.31	45.74	0.03	0.01	0.01			45.77	45.78	45.75
No32	500	2490	289.7	377.52	0.0267	4.39	0.77	5.68	40.08	45.76	0.03	0.01	0.01			45.79	45.81	45.78
No33	500	2990	289.7	392.22	0.0267	4.44	0.74	5.56	40.23	45.79	0.03	0.01	0.01			45.82	45.84	45.81
No34	500	3490	290.1	388.16	0.0267	4.16	0.75	5.26	40.56	45.82	0.03	0.01	0.01			45.85	45.87	45.84
No35	500	3990	290.1	387.73	0.0267	4.15	0.75	5.21	40.64	45.85	0.03	0.01	0.01			45.88	45.89	45.87
No36	500	4490	290.2	382.48	0.0267	4.08	0.76	4.83	41.05	45.88	0.03	0.02	0.02			45.91	45.93	45.89
No37	500	4990	290.2	395.64	0.0267	4.60	0.73	5.64	40.27	45.91	0.03	0.01	0.01			45.94	45.95	45.93
No38	500	5490	290.4	412.63	0.0267	4.78	0.70	5.97	39.57	45.94	0.03	0.01	0.01			45.96	45.97	45.95
No39	500	5990	290.4	416.95	0.0267	4.44	0.70	5.27	40.69	45.96	0.02	0.01	0.01			45.99	45.00	45.97
No40	500	6490	290.4	478.12	0.0267	5.27	0.61	6.77	39.22	45.99	0.02	0.00	0.01			46.00	45.00	46.00
B19	55	6545	290.4	392.01	0.0267	4.75	0.74	5.78	40.20	45.98	0.03		0.00	Bridge	0.01			46.00
				392.91	0.0267	4.75	0.74	5.79		45.99	0.03	0.01				46.02	45.03	
No41	445	6990	290.4	397.47	0.0267	4.53	0.73	5.60	40.41	46.01	0.03	0.01	0.01			46.04	45.05	46.03
No42	500	7490	290.4	419.01	0.0267	4.66	0.69	5.80	40.24	46.04	0.02	0.01	0.01			46.06	45.07	46.05
No43	500	7990	290.6	403.14	0.0267	4.53	0.72	5.86	40.20	46.06	0.03	0.01	0.01			46.09	45.10	46.07
No44	500	8490	290.6	408.64	0.0267	4.52	0.71	5.71	40.38	46.09	0.03	0.01	0.01			46.11	45.12	46.10
No45	500	8990	290.7	399.98	0.0267	4.49	0.73	5.80	40.31	46.11	0.03	0.01	0.01			46.14	45.15	46.12
No46	500	9490	290.7	397.11	0.0267	4.28	0.73	5.05	41.08	46.13	0.03	0.01	0.01			46.16	45.18	46.15
No47	500	9990	290.7	407.77	0.0267	4.25	0.71	5.02	41.14	46.16	0.03	0.01	0.01			46.19	45.20	46.18
B18	280	10270	290.8	390.06	0.0267	4.23	0.75	5.14	41.04	46.18	0.03		0.01	Bridge	0.01			46.20
				391.18	0.0267	4.24	0.74	5.15		46.19	0.03	0.01				46.22	45.22	
No48	220	10490	290.8	398.64	0.0267	4.48	0.73	5.52	40.68	46.20	0.03	0.01	0.01			46.23	45.24	46.22
No49	500	10990	290.8	393.78	0.0267	4.30	0.74	5.09	41.14	46.23	0.03	0.01	0.01			46.26	45.27	46.24
No50	500	11490	290.8	379.46	0.0267	4.19	0.77	5.02	41.23	46.25	0.03	0.02	0.02			46.28	45.30	46.27
No51	500	11990	290.8	388.56	0.0267	4.32	0.75	5.39	40.90	46.29	0.03	0.01	0.01			46.31	45.33	46.30
No52	500	12490	290.8	380.83	0.0267	4.35	0.75	5.13	41.18	46.31	0.03	0.01	0.01			46.34	45.36	46.33
No53	500	12990	294.5	394.83	0.0267	4.49	0.75	5.46	40.88	46.34	0.03	0.01	0.01			46.37	45.38	46.36
B17	470	13460	294.5	422.58	0.0267	4.58	0.70	6.19	40.18	46.37	0.02		0.01	Bridge	0.01			45.38
				423.39	0.0267	4.59	0.70	6.20		46.38	0.02	0.00				46.40	45.40	
No54	30	13490	294.5	431.52	0.0267	4.86	0.68	6.55	39.83	46.38	0.02	0.00	0.00			46.40	45.41	46.40

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B16	94	13584	294.5	376.49	0.0267	4.50	0.73	5.58	40.80	46.38	0.03	0.00	Bridge	0.01			46.41		
				377.05	0.0267	4.51	0.73	5.58		46.38	0.03	0.01					46.42	45.43	
No55	406	13990	294.5	407.57	0.0267	4.34	0.72	5.52	40.89	46.41	0.03	0.01	0.01				46.44	45.45	46.43
No56	500	14490	294.5	421.89	0.0267	4.44	0.70	5.58	40.86	46.44	0.02	0.01	0.01				46.46	45.48	46.45
No57	500	14990	294.5	407.06	0.0267	4.32	0.72	4.88	41.58	46.46	0.03	0.01	0.01				46.49	45.50	46.48
No58	500	15490	295.9	392.62	0.0267	4.16	0.75	5.13	41.36	46.49	0.03	0.02	0.02				46.52	45.53	46.50
No59	500	15990	295.9	398.35	0.0267	4.13	0.74	5.51	41.01	46.52	0.03	0.01	0.01				46.55	45.56	46.53
No60	500	16490	296.9	390.64	0.0267	4.40	0.75	5.21	41.34	46.55	0.03	0.01	0.01				46.58	45.59	46.56
No61	500	16990	296.9	412.58	0.0267	4.37	0.72	5.12	41.46	46.58	0.03	0.01	0.01				46.60	45.62	46.59
No62	500	17490	296.9	391.75	0.0267	4.57	0.76	5.56	41.14	46.60	0.03	0.01	0.01				46.63	45.64	46.62
No63	500	17990	297.8	393.15	0.0267	4.30	0.75	5.48	41.15	46.63	0.03	0.01	0.01				46.66	45.67	46.64
B15	432	18422	297.8	349.24	0.0267	4.26	0.85	5.14	41.51	46.65	0.04	0.02	Bridge	0.02					46.67
				350.72	0.0267	4.27	0.85	5.16		46.67	0.04	0.00					46.70	45.71	
No64	68	18490	297.9	379.37	0.0267	4.48	0.79	5.47	41.21	46.68	0.03	0.01	0.00				46.71	45.72	46.71
No65	500	18990	297.9	423.85	0.0267	4.55	0.70	5.70	41.01	46.71	0.03	0.01	0.01				46.74	45.75	46.72
No66	500	19490	297.9	398.93	0.0267	4.69	0.75	5.63	41.10	46.73	0.03	0.01	0.01				46.76	45.77	46.75
No67	500	19990	297.9	392.72	0.0267	5.03	0.75	6.46	40.29	46.75	0.03	0.01	0.01				46.78	45.80	46.77
No68	500	20490	297.9	433.61	0.0267	5.32	0.69	6.76	40.02	46.78	0.02	0.01	0.01				46.80	45.81	46.80
No69	500	20990	297.9	395.15	0.0267	5.17	0.75	6.54	40.26	46.80	0.03	0.01	0.01				46.83	45.84	46.81
No70	500	21490	297.9	398.41	0.0267	5.39	0.75	7.88	38.54	46.82	0.03	0.01	0.01				46.85	45.86	46.84
B14_No	500	21990	297.9	414.54	0.0267	4.72	0.72	6.65	40.19	46.84	0.03	0.01	Bridge	0.01					46.86
				415.40	0.0267	4.73	0.72	6.66		46.85	0.03	0.01					46.88	45.89	
No72	500	22490	297.9	431.10	0.0267	5.67	0.69	7.54	39.33	46.87	0.02	0.01	0.01				46.90	45.91	46.89
No73	500	22990	299.6	435.30	0.0267	5.58	0.69	7.04	39.85	46.89	0.02	0.01	0.01				46.92	45.92	46.91
No74	500	23490	299.6	423.18	0.0267	5.94	0.71	8.11	38.80	46.91	0.03	0.01	0.01				46.93	45.94	46.92
No75	500	23990	299.6	446.73	0.0267	5.73	0.67	7.77	39.16	46.93	0.02	0.01	0.01				46.95	45.96	46.94
No76	500	24490	300.5	461.68	0.0267	5.66	0.65	8.54	38.40	46.94	0.02	0.01	0.01				46.96	45.97	46.96
No77	500	24990	300.5	481.02	0.0267	5.91	0.62	7.79	39.17	46.96	0.02	0.01	0.01				46.98	45.98	46.97
No78	500	25490	300.5	427.47	0.0267	5.55	0.70	7.05	39.92	46.97	0.03	0.01	0.01				46.99	47.00	46.98
No79	500	25990	300.5	550.23	0.0267	6.40	0.55	8.06	38.53	46.99	0.02	0.00	0.00				47.01	47.01	47.00
No80	293	26283	300.5	522.05	0.0267	5.74	0.58	7.36	39.64	47.00	0.02	0.00	0.00				47.01	47.01	47.01
No81	207	26490	300.5	506.47	0.0267	5.78	0.59	8.41	38.59	47.00	0.02	0.01	0.00				47.02	47.02	47.01

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	300.5	469.33	0.0267	6.05	0.64	8.38	38.63	47.01	0.02	0.01	0.01			47.03	47.04	47.02
No83	500	27490	300.5	487.03	0.0267	6.51	0.62	8.94	38.08	47.02	0.02	0.01	0.01			47.04	47.05	47.04
B13	455	27945	300.5	382.06	0.0267	4.36	0.79	6.78	40.25	47.03	0.03		0.01	Bridge	0.02			47.05
				383.48	0.0267	4.37	0.78	6.80		47.05	0.03	0.00				47.08	47.08	
No84	45	27990	300.5	459.65	0.0267	6.03	0.65	8.35	38.71	47.06	0.02	0.01	0.00			47.08	47.09	47.08
No85	500	28490	300.5	444.91	0.0267	5.72	0.68	7.89	39.18	47.07	0.02	0.01	0.01			47.09	47.10	47.09
No86	500	28990	300.5	435.98	0.0267	5.45	0.69	6.74	40.35	47.09	0.02	0.01	0.01			47.11	47.12	47.10
No87	500	29490	300.5	412.70	0.0267	5.09	0.73	6.43	40.67	47.10	0.03	0.01	0.01			47.13	47.14	47.12
No88	500	29990	300.5	433.83	0.0267	5.45	0.69	6.78	40.35	47.13	0.02	0.01	0.01			47.15	47.16	47.14
No89	500	30490	300.5	451.55	0.0267	5.80	0.67	7.70	39.44	47.14	0.02	0.01	0.01			47.17	47.17	47.16
No90	500	30990	300.5	514.74	0.0267	6.27	0.58	8.66	38.50	47.16	0.02	0.01	0.01			47.18	47.18	47.17
No91	500	31490	300.5	462.10	0.0267	6.07	0.65	8.37	38.80	47.17	0.02	0.01	0.01			47.19	47.20	47.18
No92	500	31990	300.5	436.77	0.0267	5.75	0.69	7.34	39.84	47.18	0.02	0.01	0.01			47.21	47.21	47.20
No93	500	32490	300.5	406.75	0.0267	5.29	0.74	6.79	40.41	47.20	0.03	0.01	0.01			47.23	47.24	47.21
No94	500	32990	300.5	396.13	0.0267	4.97	0.76	7.22	40.00	47.22	0.03	0.00	0.01			47.25	47.25	47.24
B12	91	33081	300.5	330.36	0.0267	3.98	0.91	5.62	41.59	47.21	0.04		0.00	Bridge	0.02			47.25
				331.87	0.0267	3.99	0.91	5.64		47.23	0.04	0.02				47.27	47.29	
No95	409	33490	300.5	386.50	0.0267	5.24	0.73	7.18	40.09	47.27	0.03	0.01	0.01			47.30	47.31	47.29
B11_No	500	33990	300.5	358.26	0.0267	4.06	0.84	5.35	41.85	47.30	0.04		0.02	Bridge	0.01			47.31
				359.36	0.0267	4.07	0.84	5.36		47.31	0.04	0.02				47.34	47.36	
No97	500	34490	300.5	485.47	0.0267	5.44	0.62	7.29	40.06	47.35	0.02	0.01	0.01			47.37	47.38	47.36
No98	500	34990	300.5	436.30	0.0267	5.54	0.69	7.42	39.54	47.36	0.02	0.01	0.01			47.39	47.40	47.38
No99	500	35490	300.5	427.00	0.0267	5.69	0.70	7.42	39.56	47.38	0.03	0.01	0.01			47.40	47.41	47.40
No100	500	35990	300.5	400.58	0.0267	5.27	0.75	6.79	40.60	47.39	0.03	0.01	0.01			47.42	47.43	47.41
No101	500	36490	300.5	423.74	0.0267	5.48	0.71	7.03	40.39	47.42	0.03	0.01	0.01			47.44	47.45	47.43
No102	500	36990	300.9	463.84	0.0267	5.99	0.65	8.77	38.67	47.44	0.02	0.01	0.01			47.46	47.47	47.45
No103	500	37490	300.9	434.16	0.0267	5.49	0.69	6.85	40.60	47.45	0.02	0.01	0.01			47.48	47.48	47.47
No104	500	37990	300.9	402.53	0.0267	5.22	0.75	6.82	40.65	47.47	0.03	0.00	0.01			47.50	47.50	47.48
B10	170	38160	300.9	344.46	0.0267	4.32	0.87	5.52	41.85	47.47	0.04		0.01	Bridge	0.02			47.50
				345.85	0.0267	4.33	0.87	5.53		47.48	0.04	0.01				47.52	47.54	
No105	330	38490	300.9	428.85	0.0267	5.55	0.70	7.16	40.36	47.52	0.03	0.01	0.01			47.54	47.55	47.54
No106	500	38990	300.9	399.75	0.0267	5.48	0.75	6.90	40.63	47.53	0.03	0.01	0.01			47.56	47.57	47.55

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	300.9	440.01	0.0267	5.71	0.68	7.14	40.42	47.56	0.02	0.01	0.01			47.58	47.59	47.57
No108	500	39990	300.9	406.52	0.0267	5.13	0.74	6.81	40.76	47.57	0.03	0.00	0.01			47.60	47.60	47.59
B9	77	40067	300.9	400.54	0.0267	4.96	0.75	6.66	40.51	47.57	0.03		0.00	Bridge	0.01			47.60
				401.33	0.0267	4.97	0.75	6.67		47.58	0.03	0.01				47.61	47.62	
No109	423	40490	300.9	447.65	0.0267	6.16	0.67	8.33	39.28	47.61	0.02	0.01	0.01			47.63	47.64	47.62
No110	500	40990	300.9	412.48	0.0267	5.74	0.73	7.33	40.29	47.62	0.03	0.01	0.01			47.64	47.65	47.64
No111	500	41490	300.9	453.45	0.0267	5.81	0.65	7.67	39.57	47.64	0.02	0.01	0.01			47.66	47.67	47.65
No112	500	41990	300.9	442.32	0.0267	5.89	0.63	7.67	39.58	47.65	0.02	0.01	0.01			47.68	47.68	47.67
No113	500	42490	300.9	441.67	0.0267	5.49	0.68	7.36	40.31	47.67	0.02	0.01	0.01			47.69	47.70	47.68
No114	500	42990	300.9	467.04	0.0267	5.96	0.64	7.68	40.01	47.69	0.02	0.01	0.01			47.71	47.71	47.70
No115	500	43490	300.9	429.14	0.0267	5.50	0.70	6.94	40.76	47.70	0.03	0.01	0.01			47.72	47.73	47.71
B8_No1	500	43990	300.9	426.33	0.0267	5.36	0.71	6.95	40.77	47.72	0.03		0.01	Bridge	0.01			47.73
				427.16	0.0267	5.37	0.70	6.96		47.73	0.03	0.01				47.75	47.76	
No117	500	44490	300.9	450.65	0.0267	5.68	0.67	7.49	40.26	47.75	0.02	0.01	0.01			47.77	47.78	47.76
No118	500	44990	300.9	447.53	0.0267	5.61	0.67	7.30	40.46	47.76	0.02	0.01	0.01			47.79	47.79	47.78
No119	500	45490	300.9	435.61	0.0267	5.26	0.69	6.71	41.07	47.78	0.02	0.01	0.01			47.80	47.81	47.79
No120	500	45990	300.9	412.79	0.0267	5.07	0.73	6.50	41.30	47.80	0.03	0.01	0.01			47.82	47.83	47.81
B7	386	46376	300.9	452.07	0.0267	5.13	0.67	6.40	41.42	47.82	0.02		0.01	Bridge	0.01			47.83
				452.77	0.0267	5.14	0.66	6.40		47.82	0.02	0.00				47.85	47.85	
No121	114	46490	300.9	437.85	0.0267	5.41	0.69	6.97	40.86	47.83	0.02	0.01	0.00			47.85	47.86	47.85
No122	500	46990	300.9	416.85	0.0267	5.31	0.72	6.76	41.08	47.84	0.03	0.01	0.01			47.87	47.88	47.86
No123	500	47490	300.9	417.19	0.0267	5.34	0.72	6.78	41.08	47.86	0.03	0.01	0.01			47.89	47.90	47.88
No124	500	47990	300.9	417.09	0.0267	5.42	0.72	7.06	40.82	47.88	0.03	0.01	0.01			47.91	47.92	47.90
No125	500	48490	300.9	421.69	0.0267	5.41	0.71	6.97	40.93	47.90	0.03	0.01	0.01			47.93	47.94	47.92
No125	500	48990	300.9	412.65	0.0267	5.33	0.73	6.55	41.37	47.92	0.03	0.01	0.01			47.95	47.96	47.94
No127	500	49490	300.9	416.46	0.0267	5.26	0.72	6.62	41.32	47.94	0.03	0.01	0.01			47.97	47.98	47.96
No128	500	49990	300.9	398.75	0.0267	5.29	0.75	6.50	41.46	47.96	0.03	0.01	0.01			47.99	48.00	47.98
No129	500	50490	300.9	399.85	0.0267	4.90	0.75	6.79	41.19	47.98	0.03	0.01	0.01			48.01	48.02	48.00
No130	500	50990	300.9	422.68	0.0267	4.78	0.71	6.39	41.62	48.01	0.03	0.01	0.01			48.04	48.05	48.02
No131	500	51490	300.9	440.65	0.0267	5.52	0.68	7.03	41.00	48.03	0.02	0.01	0.01			48.06	48.06	48.05
No132	500	51990	300.9	402.32	0.0267	4.77	0.75	6.16	41.89	48.05	0.03	0.01	0.01			48.08	48.09	48.06
No133	500	52490	300.9	382.07	0.0267	4.52	0.79	6.00	42.07	48.07	0.03	0.01	0.01			48.10	48.11	48.09

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 = 48.52 OK

n= 0.0267

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	300.9	330.35	0.0267	4.31	0.91	6.58	41.50	48.08	0.04	0.01	0.01	Bridge	0.02			48.11
				331.63	0.0267	4.33	0.91	6.60		48.10	0.04	0.00				48.14	48.14	
B5	45	52806	300.9	385.22	0.0267	5.25	0.73	7.06	41.05	48.11	0.03		0.00	Bridge	0.01			48.14
				386.30	0.0267	5.26	0.73	7.08		48.13	0.03	0.00				48.16	48.16	
No134	184	52990	300.9	387.96	0.0267	5.92	0.73	8.01	40.13	48.14	0.03	0.00	0.00			48.17	48.17	48.16
B4	236	53226	300.9	397.85	0.0267	5.87	0.76	8.38	39.77	48.15	0.03		0.00	Bridge	0.01			48.17
				398.41	0.0267	5.88	0.76	8.38		48.15	0.03	0.01				48.18	48.19	48.17
No135	264	53490	300.9	380.22	0.0267	5.23	0.79	7.64	40.52	48.16	0.03	0.01	0.01			48.20	48.21	48.19
No135	500	53990	300.9	419.92	0.0267	5.33	0.72	7.24	40.55	48.19	0.03	0.01	0.01			48.22	48.23	48.21
No137	500	54490	300.9	474.43	0.0267	5.60	0.63	7.53	40.68	48.21	0.02	0.01	0.01			48.23	48.24	48.23
No138	500	54990	300.9	440.59	0.0267	5.38	0.68	7.48	40.75	48.23	0.02	0.01	0.01			48.25	48.26	48.24
No139	500	55490	300.9	404.71	0.0267	5.33	0.74	6.90	41.34	48.24	0.03	0.01	0.01			48.27	48.28	48.26
No140	500	55990	300.9	406.98	0.0267	5.50	0.74	7.40	40.86	48.26	0.03	0.01	0.01			48.29	48.30	48.28
No141	500	56490	300.9	370.95	0.0267	5.00	0.81	6.03	42.25	48.28	0.03	0.01	0.01			48.31	48.33	48.30
No142	516	57006	300.9	389.46	0.0267	5.54	0.77	7.19	41.12	48.31	0.03	0.00	0.01			48.34	48.34	48.33
No143	115	57121	300.9	383.64	0.0267	5.46	0.73	7.24	41.07	48.31	0.03	0.01	0.00			48.34	48.35	48.34
No144	369	57490	300.9	386.75	0.0267	5.76	0.73	7.34	40.99	48.33	0.03	0.01	0.01			48.36	48.37	48.35
No145	500	57990	300.9	405.00	0.0267	5.62	0.74	7.02	41.33	48.35	0.03	0.01	0.01			48.38	48.39	48.37
No145	500	58490	300.9	385.34	0.0267	4.84	0.73	6.06	42.31	48.37	0.03	0.01	0.01			48.40	48.42	48.39
No147	500	58990	300.9	387.74	0.0267	5.64	0.78	7.33	41.07	48.40	0.03	0.01	0.01			48.43	48.44	48.42
B3	443	59433	300.9	416.19	0.0267	5.85	0.72	8.20	40.22	48.42	0.03		0.01	Bridge	0.01			48.44
				416.85	0.0267	5.85	0.72	8.21		48.43	0.03	0.00				48.45	48.46	48.44
No148	57	59490	300.9	391.86	0.0267	4.36	0.77	6.18	42.25	48.43	0.03	0.00	0.00			48.46	48.46	48.46
B2	116	59606	300.9	367.42	0.0267	4.63	0.82	5.46	42.97	48.43	0.03		0.00	Bridge	0.03			48.46
				369.65	0.0267	4.64	0.81	5.49		48.46	0.03	0.01				48.49	48.50	48.46
No149	384	59990	300.9	413.90	0.0267	5.07	0.73	6.73	41.76	48.49	0.03	0.00	0.01			48.51	48.52	48.50
B1	152	60142	300.9	430.15	0.0267	5.35	0.70	7.49	41.00	48.49	0.02		0.00	Bridge	0.01			48.50
				431.11	0.0267	5.35	0.70	7.51		48.51	0.02	0.01				48.53	48.54	48.50
No150	333	60475	300.9	378.91	0.0267	3.91	0.79	5.02	43.50	48.52	0.03		0.01			48.55		48.54

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 < 48.55 NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
No1		0	288.9	580.14	0.0270	3.35	0.50	4.50	41.12	45.62	0.01	0.00				45.63	45.63		
No2	50	50	288.9	393.97	0.0270	4.20	0.73	5.38	40.23	45.61	0.03	0.00	0.00			45.64	45.64	45.63	
No3	50	100	288.9	415.22	0.0270	4.83	0.70	5.82	39.79	45.61	0.02	0.00	0.00			45.64	45.64	45.64	
No4	50	150	288.9	406.95	0.0270	4.93	0.71	6.35	39.26	45.61	0.03	0.00	0.00			45.64	45.64	45.64	
B21	18	168	288.9	379.47	0.0270	4.33	0.75	5.62	39.59	45.61	0.03		0.00	Bridge	0.01		45.65	45.65	45.64
				380.45	0.0270	4.34	0.75	5.63		45.62	0.03	0.00				45.65	45.65		
No5	32	200	288.9	396.68	0.0270	4.89	0.73	6.61	39.02	45.63	0.03	0.00	0.00			45.65	45.65	45.65	
No6	50	250	288.9	373.63	0.0270	5.28	0.77	7.02	38.61	45.63	0.03	0.00	0.00			45.66	45.66	45.65	
No7	50	300	288.9	421.39	0.0270	5.31	0.69	7.03	38.60	45.63	0.02	0.00	0.00			45.66	45.66	45.66	
No8	50	350	288.9	393.24	0.0270	5.20	0.73	7.43	38.20	45.63	0.03	0.00	0.00			45.66	45.66	45.66	
No9	50	400	288.9	387.70	0.0270	4.34	0.75	5.51	40.12	45.63	0.03	0.00	0.00			45.66	45.66	45.66	
No10	50	450	288.9	392.53	0.0270	4.18	0.74	5.29	40.35	45.64	0.03	0.00	0.00			45.67	45.67	45.66	
No11	50	500	288.9	390.47	0.0270	4.12	0.74	5.12	40.52	45.64	0.03	0.00	0.00			45.67	45.67	45.67	
No12	50	550	288.9	386.26	0.0270	4.03	0.75	5.16	40.48	45.64	0.03	0.00	0.00			45.67	45.67	45.67	
No13	50	600	288.9	384.09	0.0270	3.95	0.75	4.91	40.74	45.65	0.03	0.00	0.00			45.67	45.68	45.67	
No14	50	650	288.9	408.68	0.0270	4.12	0.71	5.05	40.60	45.65	0.03	0.00	0.00			45.68	45.68	45.68	
No15	50	700	288.9	382.26	0.0270	4.06	0.75	4.95	40.70	45.65	0.03	0.00	0.00			45.68	45.68	45.68	
No16	50	750	288.9	403.55	0.0270	3.98	0.72	4.66	41.00	45.66	0.03	0.00	0.00			45.68	45.69	45.68	
No17	50	800	289.7	381.61	0.0270	3.76	0.75	4.29	41.37	45.66	0.03	0.00	0.00			45.69	45.69	45.69	
No18	50	850	289.7	396.51	0.0270	3.89	0.73	4.55	41.11	45.66	0.03	0.00	0.00			45.69	45.69	45.69	
No19	50	900	289.7	399.33	0.0270	3.92	0.73	4.67	41.00	45.67	0.03	0.00	0.00			45.69	45.69	45.69	
No20	50	950	289.7	397.73	0.0270	3.77	0.73	4.44	41.23	45.67	0.03	0.00	0.00			45.70	45.70	45.69	
B20	40	990	289.7	399.98	0.0270	3.70	0.72	4.69	40.58	45.67	0.03		0.00	Bridge	0.01		45.71	45.71	45.70
				401.27	0.0270	3.71	0.72	4.70		45.68	0.03	0.00				45.71	45.71		
No21	10	1000	289.7	395.63	0.0270	3.64	0.73	4.31	41.37	45.68	0.03	0.00	0.00			45.71	45.71	45.71	
No22	50	1050	289.7	422.27	0.0270	3.77	0.69	4.46	41.23	45.69	0.02	0.00	0.00			45.71	45.72	45.71	
No23	50	1100	289.7	417.78	0.0270	3.85	0.69	4.58	41.11	45.69	0.02	0.00	0.00			45.72	45.72	45.72	
No24	50	1150	289.7	430.04	0.0270	3.97	0.67	4.77	40.93	45.70	0.02	0.00	0.00			45.72	45.72	45.72	
No25	50	1200	289.7	431.32	0.0270	3.76	0.67	4.70	41.00	45.70	0.02	0.00	0.00			45.72	45.72	45.72	
No26	50	1250	289.7	515.41	0.0270	3.54	0.55	4.65	41.06	45.71	0.02	0.00	0.00			45.73	45.73	45.72	
No27	50	1300	289.7	403.45	0.0270	4.08	0.72	4.93	40.77	45.70	0.03	0.00	0.00			45.73	45.73	45.73	
No28	50	1350	289.7	425.80	0.0270	4.31	0.68	5.36	40.35	45.71	0.02	0.00	0.00			45.73	45.73	45.73	

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52

< 48.55

NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	289.7	377.20	0.0270	4.17	0.77	5.39	40.31	45.70	0.03	0.00	0.00			45.73	45.73	45.73
No30	50	1450	289.7	369.60	0.0270	4.33	0.78	5.22	40.49	45.71	0.03	0.02	0.00			45.74	45.75	45.73
No31	540	1990	289.7	386.91	0.0270	4.46	0.75	5.43	40.31	45.74	0.03	0.01	0.02			45.77	45.78	45.75
No32	500	2490	289.7	377.78	0.0270	4.39	0.77	5.69	40.08	45.77	0.03	0.01	0.01			45.80	45.81	45.78
No33	500	2990	289.7	392.52	0.0270	4.44	0.74	5.57	40.23	45.80	0.03	0.01	0.01			45.83	45.84	45.81
No34	500	3490	290.1	388.54	0.0270	4.16	0.75	5.27	40.56	45.83	0.03	0.02	0.02			45.85	45.87	45.84
No35	500	3990	290.1	388.16	0.0270	4.16	0.75	5.22	40.64	45.86	0.03	0.02	0.02			45.88	45.90	45.87
No36	500	4490	290.2	382.97	0.0270	4.08	0.76	4.84	41.05	45.89	0.03	0.02	0.02			45.92	45.93	45.90
No37	500	4990	290.2	396.13	0.0270	4.60	0.73	5.65	40.27	45.92	0.03	0.01	0.01			45.94	45.96	45.93
No38	500	5490	290.4	413.16	0.0270	4.78	0.70	5.97	39.57	45.94	0.03	0.01	0.01			45.97	45.98	45.96
No39	500	5990	290.4	417.56	0.0270	4.45	0.70	5.28	40.69	45.97	0.02	0.01	0.01			45.99	46.00	45.98
No40	500	6490	290.4	478.74	0.0270	5.27	0.61	6.77	39.22	45.99	0.02	0.00	0.01			46.01	46.01	46.00
B19	55	6545	290.4	392.56	0.0270	4.75	0.74	5.79	40.20	45.99	0.03		0.00	Bridge	0.01			46.01
				393.46	0.0270	4.76	0.74	5.80		46.00	0.03	0.01				46.02	46.04	
No41	445	6990	290.4	398.11	0.0270	4.53	0.73	5.61	40.41	46.02	0.03	0.01	0.01			46.05	46.06	46.04
No42	500	7490	290.4	419.69	0.0270	4.67	0.69	5.81	40.24	46.05	0.02	0.01	0.01			46.07	46.08	46.06
No43	500	7990	290.6	403.87	0.0270	4.54	0.72	5.87	40.20	46.07	0.03	0.01	0.01			46.09	46.11	46.08
No44	500	8490	290.6	409.41	0.0270	4.53	0.71	5.71	40.38	46.09	0.03	0.01	0.01			46.12	46.13	46.11
No45	500	8990	290.7	400.76	0.0270	4.50	0.73	5.81	40.31	46.12	0.03	0.01	0.01			46.14	46.16	46.13
No46	500	9490	290.7	397.98	0.0270	4.29	0.73	5.06	41.08	46.14	0.03	0.01	0.01			46.17	46.19	46.16
No47	500	9990	290.7	408.71	0.0270	4.25	0.71	5.03	41.14	46.17	0.03	0.01	0.01			46.20	46.21	46.19
B18	280	10270	290.8	390.99	0.0270	4.23	0.74	5.15	41.04	46.19	0.03		0.01	Bridge	0.01			46.21
				392.10	0.0270	4.24	0.74	5.16		46.20	0.03	0.01				46.23	46.23	
No48	220	10490	290.8	399.53	0.0270	4.49	0.73	5.53	40.68	46.21	0.03	0.01	0.01			46.24	46.25	46.23
No49	500	10990	290.8	394.74	0.0270	4.30	0.74	5.10	41.14	46.24	0.03	0.01	0.01			46.27	46.28	46.25
No50	500	11490	290.8	380.45	0.0270	4.20	0.75	5.04	41.23	46.27	0.03	0.02	0.02			46.30	46.31	46.28
No51	500	11990	290.8	389.59	0.0270	4.33	0.75	5.40	40.90	46.30	0.03	0.01	0.01			46.33	46.34	46.31
No52	500	12490	290.8	381.86	0.0270	4.36	0.75	5.15	41.18	46.33	0.03	0.01	0.01			46.35	46.37	46.34
No53	500	12990	294.5	395.90	0.0270	4.50	0.74	5.47	40.88	46.35	0.03	0.01	0.01			46.38	46.40	46.37
B17	470	13460	294.5	423.74	0.0270	4.59	0.70	6.20	40.18	46.38	0.02		0.01	Bridge	0.01			46.40
				424.55	0.0270	4.59	0.69	6.21		46.39	0.02	0.00				46.42	46.42	
No54	30	13490	294.5	432.62	0.0270	4.87	0.68	6.56	39.83	46.39	0.02	0.00	0.00			46.42	46.42	46.42

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52 < 48.55 NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B16	94	13584	294.5	377.53	0.0270	4.51	0.73	5.59	40.80	46.39	0.03	0.00	Bridge	0.01			46.42		
				378.10	0.0270	4.52	0.73	5.60		46.40	0.03	0.01					46.43	45.44	
No55	406	13990	294.5	408.77	0.0270	4.35	0.72	5.53	40.89	46.42	0.03	0.01	0.01				46.45	45.46	46.44
No56	500	14490	294.5	423.11	0.0270	4.45	0.70	5.59	40.86	46.45	0.02	0.01	0.01				46.48	45.49	46.46
No57	500	14990	294.5	408.32	0.0270	4.33	0.72	4.90	41.58	46.48	0.03	0.01	0.01				46.50	45.52	46.49
No58	500	15490	295.9	393.91	0.0270	4.17	0.75	5.14	41.36	46.50	0.03	0.02	0.02				46.53	45.55	46.52
No59	500	15990	295.9	399.58	0.0270	4.14	0.74	5.52	41.01	46.53	0.03	0.02	0.02				46.56	45.58	46.55
No60	500	16490	296.9	391.92	0.0270	4.41	0.76	5.22	41.34	46.56	0.03	0.01	0.01				46.59	45.60	46.58
No61	500	16990	296.9	413.96	0.0270	4.38	0.72	5.13	41.46	46.59	0.03	0.01	0.01				46.62	45.63	46.60
No62	500	17490	296.9	393.04	0.0270	4.58	0.76	5.58	41.04	46.62	0.03	0.01	0.01				46.64	45.66	46.63
No63	500	17990	297.8	394.57	0.0270	4.32	0.75	5.49	41.15	46.64	0.03	0.01	0.01				46.67	45.69	46.66
B15	432	18422	297.8	350.53	0.0270	4.27	0.85	5.16	41.51	46.67	0.04	0.02	Bridge	0.02					46.69
				352.01	0.0270	4.29	0.85	5.17		46.68	0.04	0.00					46.72	45.72	
No64	68	18490	297.9	380.70	0.0270	4.49	0.73	5.48	41.21	46.69	0.03	0.02	0.00				46.72	45.74	46.72
No65	500	18990	297.9	425.34	0.0270	4.56	0.70	5.72	41.01	46.73	0.03	0.01	0.01				46.75	45.76	46.74
No66	500	19490	297.9	400.27	0.0270	4.70	0.74	5.65	41.10	46.75	0.03	0.01	0.01				46.78	45.79	46.76
No67	500	19990	297.9	393.98	0.0270	5.04	0.76	6.48	40.29	46.77	0.03	0.01	0.01				46.80	45.81	46.79
No68	500	20490	297.9	434.93	0.0270	5.33	0.68	6.78	40.02	46.80	0.02	0.01	0.01				46.82	45.83	46.81
No69	500	20990	297.9	396.43	0.0270	5.19	0.75	6.55	40.26	46.81	0.03	0.01	0.01				46.84	45.85	46.83
No70	500	21490	297.9	399.65	0.0270	5.41	0.75	7.90	38.54	46.84	0.03	0.01	0.01				46.86	45.88	46.85
B14_No	500	21990	297.9	416.09	0.0270	4.73	0.72	6.67	40.19	46.86	0.03	0.01	Bridge	0.01					46.88
				416.94	0.0270	4.74	0.71	6.68		46.87	0.03	0.01					46.90	45.91	
No72	500	22490	297.9	432.42	0.0270	5.68	0.69	7.56	39.33	46.89	0.02	0.01	0.01				46.92	45.93	46.91
No73	500	22990	299.6	436.65	0.0270	5.59	0.69	7.06	39.85	46.91	0.02	0.01	0.01				46.93	45.94	46.93
No74	500	23490	299.6	424.41	0.0270	5.95	0.71	8.13	38.80	46.93	0.03	0.01	0.01				46.95	45.96	46.94
No75	500	23990	299.6	448.13	0.0270	5.74	0.67	7.78	39.16	46.94	0.02	0.01	0.01				46.97	45.98	46.96
No76	500	24490	300.5	463.15	0.0270	5.67	0.65	8.56	38.40	46.96	0.02	0.01	0.01				46.98	45.99	46.98
No77	500	24990	300.5	482.48	0.0270	5.92	0.62	7.81	39.17	46.98	0.02	0.01	0.01				47.00	47.00	46.99
No78	500	25490	300.5	428.89	0.0270	5.57	0.70	7.07	39.92	46.99	0.03	0.01	0.01				47.01	47.02	47.00
No79	500	25990	300.5	551.79	0.0270	6.41	0.54	8.08	38.53	47.01	0.02	0.00	0.00				47.03	47.03	47.02
No80	293	26283	300.5	523.78	0.0270	5.76	0.57	7.38	39.64	47.02	0.02	0.00	0.00				47.03	47.03	47.03
No81	207	26490	300.5	508.11	0.0270	5.79	0.59	8.43	38.59	47.02	0.02	0.01	0.00				47.04	47.04	47.03

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52

< 48.55

NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	300.5	470.78	0.0270	6.05	0.64	8.40	38.63	47.03	0.02	0.01	0.01			47.05	47.06	47.04
No83	500	27490	300.5	488.43	0.0270	6.53	0.62	8.96	38.08	47.04	0.02	0.01	0.01			47.06	47.07	47.06
B13	455	27945	300.5	385.80	0.0270	4.38	0.73	6.80	40.25	47.05	0.03		0.01	Bridge	0.02			47.07
				385.21	0.0270	4.39	0.73	6.82		47.07	0.03	0.00				47.10	47.10	
No84	45	27990	300.5	461.09	0.0270	6.05	0.65	8.37	38.71	47.08	0.02	0.01	0.00			47.10	47.11	47.10
No85	500	28490	300.5	446.39	0.0270	5.71	0.67	7.91	39.18	47.09	0.02	0.01	0.01			47.11	47.12	47.11
No86	500	28990	300.5	437.56	0.0270	5.46	0.69	6.76	40.35	47.11	0.02	0.01	0.01			47.13	47.14	47.12
No87	500	29490	300.5	414.34	0.0270	5.10	0.73	6.45	40.67	47.12	0.03	0.01	0.01			47.15	47.16	47.14
No88	500	29990	300.5	435.43	0.0270	5.47	0.69	6.80	40.35	47.15	0.02	0.01	0.01			47.17	47.18	47.16
No89	500	30490	300.5	453.14	0.0270	5.81	0.66	7.73	39.44	47.17	0.02	0.01	0.01			47.19	47.20	47.18
No90	500	30990	300.5	516.40	0.0270	6.29	0.58	8.68	38.50	47.18	0.02	0.01	0.01			47.20	47.21	47.20
No91	500	31490	300.5	463.65	0.0270	6.08	0.65	8.39	38.80	47.19	0.02	0.01	0.01			47.21	47.22	47.21
No92	500	31990	300.5	438.32	0.0270	5.76	0.69	7.36	39.84	47.20	0.02	0.01	0.01			47.23	47.24	47.22
No93	500	32490	300.5	408.34	0.0270	5.31	0.74	6.81	40.41	47.22	0.03	0.01	0.01			47.25	47.26	47.24
No94	500	32990	300.5	397.84	0.0270	4.99	0.76	7.24	40.00	47.24	0.03	0.00	0.01			47.27	47.27	47.26
B12	91	33081	300.5	332.19	0.0270	3.99	0.90	5.64	41.59	47.23	0.04		0.00	Bridge	0.02			47.27
				333.69	0.0270	4.01	0.90	5.66		47.25	0.04	0.02				47.29	47.31	
No95	409	33490	300.5	388.06	0.0270	5.25	0.77	7.20	40.09	47.29	0.03	0.01	0.01			47.32	47.34	47.31
B11_No	500	33990	300.5	360.24	0.0270	4.08	0.83	5.37	41.85	47.32	0.04		0.02	Bridge	0.01			47.34
				361.32	0.0270	4.09	0.83	5.38		47.33	0.04	0.02				47.37	47.39	
No97	500	34490	300.5	487.44	0.0270	5.46	0.62	7.31	40.06	47.37	0.02	0.01	0.01			47.39	47.40	47.39
No98	500	34990	300.5	438.01	0.0270	5.56	0.69	7.45	39.54	47.39	0.02	0.01	0.01			47.41	47.42	47.40
No99	500	35490	300.5	428.63	0.0270	5.70	0.70	7.44	39.96	47.40	0.03	0.01	0.01			47.43	47.44	47.42
No100	500	35990	300.5	402.28	0.0270	5.28	0.75	6.82	40.60	47.42	0.03	0.01	0.01			47.45	47.46	47.44
No101	500	36490	300.5	425.44	0.0270	5.49	0.71	7.05	40.39	47.44	0.03	0.01	0.01			47.47	47.48	47.46
No102	500	36990	300.9	465.56	0.0270	6.01	0.65	8.79	38.67	47.46	0.02	0.01	0.01			47.48	47.49	47.48
No103	500	37490	300.9	435.93	0.0270	5.51	0.69	6.87	40.60	47.47	0.02	0.01	0.01			47.50	47.51	47.49
No104	500	37990	300.9	404.30	0.0270	5.24	0.74	6.84	40.65	47.49	0.03	0.00	0.01			47.52	47.52	47.51
B10	170	38160	300.9	346.31	0.0270	4.34	0.87	5.54	41.85	47.49	0.04		0.01	Bridge	0.02			47.52
				347.68	0.0270	4.35	0.87	5.56		47.51	0.04	0.01				47.55	47.56	
No105	330	38490	300.9	430.60	0.0270	5.57	0.70	7.18	40.36	47.54	0.02	0.01	0.01			47.57	47.57	47.56
No106	500	38990	300.9	401.35	0.0270	5.50	0.75	6.93	40.63	47.56	0.03	0.01	0.01			47.58	47.60	47.57

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52

< 48.55

NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	300.9	441.78	0.0270	5.72	0.68	7.16	40.42	47.58	0.02	0.01	0.01			47.60	47.61	47.60
No108	500	39990	300.9	408.37	0.0270	5.15	0.74	6.84	40.76	47.60	0.03	0.00	0.01			47.62	47.62	47.61
B9	77	40067	300.9	402.44	0.0270	4.98	0.75	6.69	40.51	47.60	0.03		0.00	Bridge	0.01			47.62
				403.23	0.0270	4.99	0.75	6.70		47.61	0.03	0.01				47.64	47.65	
No109	423	40490	300.9	449.25	0.0270	6.18	0.67	8.35	39.28	47.63	0.02	0.01	0.01			47.65	47.66	47.65
No110	500	40990	300.9	414.14	0.0270	5.76	0.73	7.35	40.29	47.64	0.03	0.01	0.01			47.67	47.68	47.66
No111	500	41490	300.9	455.27	0.0270	5.83	0.65	7.69	39.57	47.66	0.02	0.01	0.01			47.69	47.69	47.68
No112	500	41990	300.9	444.08	0.0270	5.91	0.63	7.70	39.58	47.68	0.02	0.01	0.01			47.70	47.71	47.69
No113	500	42490	300.9	443.57	0.0270	5.50	0.68	7.38	40.31	47.69	0.02	0.01	0.01			47.72	47.73	47.71
No114	500	42990	300.9	468.90	0.0270	5.98	0.64	7.70	40.01	47.71	0.02	0.01	0.01			47.73	47.74	47.73
No115	500	43490	300.9	431.03	0.0270	5.52	0.70	6.96	40.76	47.72	0.02	0.01	0.01			47.75	47.76	47.74
B8_No1	500	43990	300.9	428.24	0.0270	5.38	0.70	6.97	40.77	47.74	0.03		0.01	Bridge	0.01			47.76
				429.06	0.0270	5.39	0.70	6.98		47.75	0.03	0.01				47.78	47.79	
No117	500	44490	300.9	452.54	0.0270	5.70	0.65	7.51	40.26	47.77	0.02	0.01	0.01			47.80	47.80	47.79
No118	500	44990	300.9	449.47	0.0270	5.63	0.67	7.33	40.46	47.79	0.02	0.01	0.01			47.81	47.82	47.80
No119	500	45490	300.9	437.68	0.0270	5.28	0.69	6.74	41.07	47.81	0.02	0.01	0.01			47.83	47.84	47.82
No120	500	45990	300.9	414.84	0.0270	5.09	0.73	6.52	41.30	47.82	0.03	0.01	0.01			47.85	47.86	47.84
B7	386	46376	300.9	454.28	0.0270	5.15	0.65	6.42	41.42	47.84	0.02		0.01	Bridge	0.01			47.86
				454.96	0.0270	5.16	0.66	6.43		47.85	0.02	0.00				47.87	47.88	
No121	114	46490	300.9	439.82	0.0270	5.43	0.68	6.99	40.86	47.85	0.02	0.01	0.00			47.88	47.89	47.87
No122	500	46990	300.9	418.80	0.0270	5.33	0.72	6.79	41.08	47.87	0.03	0.01	0.01			47.90	47.91	47.89
No123	500	47490	300.9	419.14	0.0270	5.36	0.72	6.81	41.08	47.89	0.03	0.01	0.01			47.92	47.93	47.91
No124	500	47990	300.9	419.02	0.0270	5.44	0.72	7.09	40.82	47.91	0.03	0.01	0.01			47.94	47.95	47.93
No125	500	48490	300.9	423.65	0.0270	5.43	0.71	7.00	40.93	47.93	0.03	0.01	0.01			47.96	47.96	47.95
No125	500	48990	300.9	414.60	0.0270	5.35	0.73	6.58	41.37	47.95	0.03	0.01	0.01			47.97	47.99	47.96
No127	500	49490	300.9	418.50	0.0270	5.28	0.72	6.65	41.32	47.97	0.03	0.01	0.01			48.00	48.01	47.99
No128	500	49990	300.9	400.65	0.0270	5.31	0.75	6.53	41.46	47.99	0.03	0.01	0.01			48.02	48.03	48.01
No129	500	50490	300.9	402.02	0.0270	4.92	0.75	6.82	41.19	48.01	0.03	0.01	0.01			48.04	48.05	48.03
No130	500	50990	300.9	425.04	0.0270	4.80	0.71	6.42	41.62	48.04	0.03	0.01	0.01			48.06	48.07	48.05
No131	500	51490	300.9	442.77	0.0270	5.54	0.68	7.06	41.00	48.06	0.02	0.01	0.01			48.08	48.09	48.07
No132	500	51990	300.9	404.62	0.0270	4.80	0.74	6.19	41.89	48.08	0.03	0.01	0.01			48.10	48.12	48.09
No133	500	52490	300.9	384.39	0.0270	4.54	0.73	6.03	42.07	48.10	0.03	0.01	0.01			48.13	48.14	48.12

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2014_300.9m³/s

Necessary water level: 48.52

< 48.55

NG

n= 0.0270

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	300.9	332.47	0.0270	4.34	0.91	6.61	41.50	48.11	0.04	0.01	0.01	Bridge	0.02			48.14
				333.74	0.0270	4.35	0.90	6.63		48.13	0.04	0.00				48.17	48.17	
B5	45	52806	300.9	387.19	0.0270	5.27	0.73	7.09	41.05	48.14	0.03	0.00	0.00	Bridge	0.01			48.17
				388.25	0.0270	5.28	0.73	7.10		48.15	0.03	0.00				48.19	48.19	
No134	184	52990	300.9	389.65	0.0270	5.93	0.77	8.03	40.13	48.16	0.03	0.00	0.00			48.19	48.20	48.19
B4	236	53226	300.9	399.58	0.0270	5.89	0.75	8.40	39.77	48.17	0.03	0.00	0.00	Bridge	0.01			48.20
				400.14	0.0270	5.89	0.75	8.41		48.18	0.03	0.01				48.21	48.22	
No135	264	53490	300.9	382.17	0.0270	5.25	0.79	7.67	40.52	48.19	0.03	0.01	0.01			48.22	48.24	48.22
No135	500	53990	300.9	422.03	0.0270	5.35	0.71	7.27	40.55	48.22	0.03	0.01	0.01			48.25	48.26	48.24
No137	500	54490	300.9	476.65	0.0270	5.62	0.63	7.56	40.68	48.24	0.02	0.01	0.01			48.26	48.27	48.25
No138	500	54990	300.9	442.81	0.0270	5.40	0.68	7.50	40.75	48.25	0.02	0.01	0.01			48.28	48.29	48.27
No139	500	55490	300.9	406.76	0.0270	5.36	0.74	6.93	41.34	48.27	0.03	0.01	0.01			48.30	48.31	48.29
No140	500	55990	300.9	408.99	0.0270	5.52	0.74	7.43	40.86	48.29	0.03	0.01	0.01			48.32	48.33	48.31
No141	500	56490	300.9	372.88	0.0270	5.02	0.81	6.06	42.25	48.31	0.03	0.01	0.01			48.34	48.36	48.33
No142	516	57006	300.9	391.36	0.0270	5.56	0.77	7.22	41.12	48.34	0.03	0.00	0.01			48.37	48.37	48.36
No143	115	57121	300.9	385.55	0.0270	5.48	0.73	7.27	41.07	48.34	0.03	0.01	0.00			48.37	48.38	48.37
No144	369	57490	300.9	388.52	0.0270	5.78	0.77	7.37	40.99	48.36	0.03	0.01	0.01			48.39	48.40	48.38
No145	500	57990	300.9	406.93	0.0270	5.64	0.74	7.05	41.33	48.38	0.03	0.01	0.01			48.41	48.42	48.40
No145	500	58490	300.9	387.56	0.0270	4.87	0.73	6.09	42.31	48.40	0.03	0.01	0.01			48.43	48.45	48.42
No147	500	58990	300.9	389.63	0.0270	5.66	0.77	7.36	41.07	48.43	0.03	0.01	0.01			48.46	48.47	48.45
B3	443	59433	300.9	418.16	0.0270	5.86	0.72	8.23	40.22	48.45	0.03	0.00	0.01	Bridge	0.01			48.47
				418.82	0.0270	5.87	0.72	8.24		48.46	0.03	0.00				48.48	48.48	
No148	57	59490	300.9	394.48	0.0270	4.38	0.76	6.21	42.25	48.46	0.03	0.00	0.00			48.49	48.49	48.48
B2	116	59606	300.9	369.70	0.0270	4.64	0.81	5.49	42.97	48.46	0.03	0.00	0.00	Bridge	0.03			48.49
				371.90	0.0270	4.66	0.81	5.52		48.49	0.03	0.01				48.52	48.53	
No149	384	59990	300.9	416.19	0.0270	5.09	0.72	6.76	41.76	48.52	0.03	0.00	0.01			48.54	48.55	48.53
B1	152	60142	300.9	432.43	0.0270	5.37	0.70	7.52	41.00	48.52	0.02	0.00	0.00	Bridge	0.01			48.54
				433.38	0.0270	5.37	0.69	7.54		48.54	0.02	0.01				48.56	48.57	
No150	333	60475	300.9	381.72	0.0270	3.93	0.79	5.05	43.50	48.55	0.03	0.01	0.01			48.58		48.57

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Case; Estimation based on $Q=190.4\text{m}^3/\text{s}$

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
No1		0	182.8	560.18	0.0295	3.24	0.33	4.38	41.12	45.50	0.01	0.00				45.51	45.51		
No2	50	50	182.8	383.68	0.0295	4.11	0.48	5.27	40.23	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No3	50	100	182.8	405.74	0.0295	4.73	0.45	5.71	39.79	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No4	50	150	182.8	397.82	0.0295	4.85	0.46	6.24	39.26	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
B21	18	168	182.8	369.83	0.0295	4.24	0.49	5.51	39.59	45.50	0.01	0.00	0.00	Bridge	0.00		45.51	45.51	45.51
				370.20	0.0295	4.24	0.49	5.51		45.50	0.01	0.00				45.51	45.51		
No5	32	200	182.8	387.11	0.0295	4.80	0.47	6.48	39.02	45.50	0.01	0.00	0.00			45.51	45.52	45.51	
No6	50	250	182.8	365.51	0.0295	5.19	0.50	6.89	38.61	45.50	0.01	0.00	0.00			45.52	45.52	45.52	
No7	50	300	182.8	411.76	0.0295	5.22	0.44	6.91	38.60	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No8	50	350	182.8	384.28	0.0295	5.11	0.48	7.31	38.20	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No9	50	400	182.8	376.65	0.0295	4.24	0.49	5.39	40.12	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No10	50	450	182.8	380.80	0.0295	4.08	0.48	5.16	40.35	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No11	50	500	182.8	378.47	0.0295	4.01	0.48	4.99	40.52	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No12	50	550	182.8	373.97	0.0295	3.93	0.49	5.03	40.48	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No13	50	600	182.8	371.43	0.0295	3.84	0.49	4.77	40.74	45.51	0.01	0.00	0.00			45.53	45.53	45.52	
No14	50	650	182.8	395.51	0.0295	4.01	0.46	4.92	40.60	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No15	50	700	182.8	369.78	0.0295	3.95	0.49	4.82	40.70	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No16	50	750	182.8	389.83	0.0295	3.86	0.47	4.52	41.00	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No17	50	800	183.3	367.88	0.0295	3.65	0.50	4.15	41.37	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No18	50	850	183.3	382.42	0.0295	3.77	0.48	4.41	41.11	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No19	50	900	183.3	385.13	0.0295	3.80	0.48	4.52	41.00	45.52	0.01	0.00	0.00			45.54	45.54	45.53	
No20	50	950	183.3	382.80	0.0295	3.65	0.48	4.30	41.23	45.53	0.01	0.00	0.00			45.54	45.54	45.54	
B20	40	990	183.3	384.55	0.0295	3.58	0.48	4.55	40.58	45.53	0.01	0.00	0.00	Bridge	0.00		45.54	45.54	45.54
				385.07	0.0295	3.59	0.48	4.55		45.53	0.01	0.00				45.54	45.54		
No21	10	1000	183.3	379.36	0.0295	3.51	0.48	4.16	41.37	45.53	0.01	0.00	0.00			45.54	45.54	45.54	
No22	50	1050	183.3	405.10	0.0295	3.64	0.45	4.30	41.23	45.53	0.01	0.00	0.00			45.55	45.55	45.54	
No23	50	1100	183.3	401.04	0.0295	3.72	0.46	4.43	41.11	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No24	50	1150	183.3	413.12	0.0295	3.85	0.44	4.61	40.93	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No25	50	1200	183.3	413.17	0.0295	3.63	0.44	4.54	41.00	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No26	50	1250	183.3	491.85	0.0295	3.39	0.37	4.48	41.06	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No27	50	1300	183.3	387.99	0.0295	3.95	0.47	4.77	40.77	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No28	50	1350	183.3	410.01	0.0295	4.19	0.45	5.19	40.35	45.54	0.01	0.00	0.00			45.55	45.55	45.55	

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	183.3	362.97	0.0295	4.05	0.50	5.23	40.31	45.54	0.01	0.00	0.00			45.55	45.56	45.55
No30	50	1450	183.3	356.23	0.0295	4.20	0.51	5.05	40.49	45.54	0.01	0.01	0.00			45.56	45.57	45.56
No31	540	1990	183.3	371.94	0.0295	4.33	0.49	5.25	40.31	45.56	0.01	0.01	0.01			45.57	45.58	45.57
No32	500	2490	183.3	361.79	0.0295	4.26	0.51	5.50	40.08	45.58	0.01	0.01	0.01			45.59	45.60	45.58
No33	500	2990	183.3	375.00	0.0295	4.28	0.49	5.36	40.23	45.59	0.01	0.01	0.01			45.60	45.61	45.60
No34	500	3490	183.5	368.77	0.0295	3.99	0.50	5.05	40.56	45.61	0.01	0.01	0.01			45.62	45.63	45.61
No35	500	3990	183.5	367.20	0.0295	3.99	0.50	4.99	40.64	45.63	0.01	0.01	0.01			45.64	45.65	45.63
No36	500	4490	183.6	360.69	0.0295	3.89	0.51	4.59	41.05	45.64	0.01	0.01	0.01			45.66	45.66	45.65
No37	500	4990	183.6	374.79	0.0295	4.40	0.49	5.39	40.27	45.66	0.01	0.01	0.01			45.67	45.68	45.66
No38	500	5490	183.8	390.82	0.0295	4.57	0.47	5.70	39.57	45.67	0.01	0.01	0.01			45.69	45.69	45.68
No39	500	5990	183.8	392.32	0.0295	4.22	0.47	5.00	40.69	45.69	0.01	0.01	0.01			45.70	45.71	45.69
No40	500	6490	183.8	453.34	0.0295	5.05	0.41	6.48	39.22	45.70	0.01	0.00	0.00			45.71	45.71	45.71
B19	55	6545	183.8	370.21	0.0295	4.52	0.50	5.50	40.20	45.70	0.01		0.00	Bridge	0.00			45.71
				370.57	0.0295	4.53	0.50	5.50	45.70	45.70	0.01	0.01				45.72	45.72	
No41	445	6990	183.8	372.50	0.0295	4.30	0.49	5.31	40.41	45.72	0.01	0.01	0.01			45.73	45.74	45.72
No42	500	7490	183.8	392.48	0.0295	4.43	0.47	5.49	40.24	45.73	0.01	0.01	0.01			45.74	45.75	45.74
No43	500	7990	184.0	376.04	0.0295	4.30	0.49	5.54	40.20	45.74	0.01	0.01	0.01			45.76	45.76	45.75
No44	500	8490	184.0	380.36	0.0295	4.27	0.48	5.38	40.38	45.76	0.01	0.01	0.01			45.77	45.78	45.76
No45	500	8990	184.0	371.45	0.0295	4.24	0.50	5.46	40.31	45.77	0.01	0.01	0.01			45.79	45.79	45.78
No46	500	9490	184.0	366.21	0.0295	4.01	0.50	4.71	41.08	45.79	0.01	0.01	0.01			45.80	45.81	45.79
No47	500	9990	184.0	374.74	0.0295	3.96	0.49	4.67	41.14	45.81	0.01	0.00	0.01			45.82	45.82	45.81
B18	280	10270	184.0	357.95	0.0295	3.96	0.51	4.78	41.04	45.82	0.01		0.01	Bridge	0.01			45.82
				358.44	0.0295	3.96	0.51	4.78	45.82	45.82	0.01	0.00				45.84	45.84	
No48	220	10490	184.0	366.88	0.0295	4.19	0.50	5.15	40.68	45.83	0.01	0.01	0.00			45.84	45.85	45.84
No49	500	10990	184.0	360.19	0.0295	4.00	0.51	4.71	41.14	45.85	0.01	0.01	0.01			45.86	45.87	45.85
No50	500	11490	184.0	345.31	0.0295	3.90	0.53	4.63	41.23	45.86	0.01	0.01	0.01			45.88	45.89	45.87
No51	500	11990	184.0	353.67	0.0295	4.03	0.52	4.98	40.90	45.88	0.01	0.01	0.01			45.90	45.91	45.89
No52	500	12490	184.0	346.35	0.0295	4.02	0.53	4.72	41.18	45.90	0.01	0.01	0.01			45.92	45.93	45.91
No53	500	12990	186.4	359.29	0.0295	4.15	0.52	5.04	40.88	45.92	0.01	0.01	0.01			45.93	45.94	45.93
B17	470	13460	186.4	384.10	0.0295	4.26	0.49	5.76	40.18	45.94	0.01		0.01	Bridge	0.00			45.94
				384.45	0.0295	4.27	0.48	5.76	45.94	45.94	0.01	0.00				45.95	45.95	
No54	30	13490	186.4	394.14	0.0295	4.53	0.47	6.11	39.83	45.94	0.01	0.00	0.00			45.95	45.96	45.95

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B16	94	13584	186.4	341.66	0.0295	4.18	0.55	5.14	40.80	45.94	0.02		0.00	Bridge	0.00			45.96	
				341.90	0.0295	4.18	0.55	5.15		45.95	0.02	0.01						45.96	45.97
No55	406	13990	186.4	366.86	0.0295	3.98	0.51	5.07	40.89	45.96	0.01	0.01	0.01					45.98	45.98
No56	500	14490	186.4	380.67	0.0295	4.06	0.49	5.12	40.86	45.98	0.01	0.01	0.01					45.99	45.00
No57	500	14990	186.4	365.11	0.0295	3.93	0.51	4.42	41.58	46.00	0.01	0.01	0.01					46.01	45.02
No58	500	15490	187.3	349.88	0.0295	3.77	0.54	4.65	41.36	46.01	0.01	0.01	0.01					46.03	45.04
No59	500	15990	187.3	358.22	0.0295	3.78	0.52	5.03	41.01	46.04	0.01	0.01	0.01					46.05	45.06
No60	500	16490	187.9	348.87	0.0295	4.01	0.54	4.72	41.34	46.06	0.01	0.01	0.01					46.07	45.08
No61	500	16990	187.9	367.75	0.0295	3.97	0.51	4.62	41.46	46.08	0.01	0.01	0.01					46.09	45.10
No62	500	17490	187.9	350.48	0.0295	4.15	0.54	5.05	41.14	46.09	0.01	0.01	0.01					46.11	45.12
No63	500	17990	188.5	347.97	0.0295	3.88	0.54	4.96	41.15	46.11	0.01	0.01	0.01					46.13	45.14
B15	432	18422	188.5	308.51	0.0295	3.86	0.61	4.62	41.51	46.13	0.02		0.01	Bridge	0.01				46.14
				309.23	0.0295	3.86	0.61	4.63		46.14	0.02	0.00						46.16	45.16
No64	68	18490	188.5	336.36	0.0295	4.10	0.56	4.93	41.21	46.14	0.02	0.01	0.00					46.16	45.17
No65	500	18990	188.5	375.11	0.0295	4.15	0.50	5.16	41.01	46.17	0.01	0.01	0.01					46.18	45.19
No66	500	19490	188.5	355.00	0.0295	4.23	0.53	5.08	41.10	46.18	0.01	0.01	0.01					46.20	45.20
No67	500	19990	188.5	352.14	0.0295	4.60	0.54	5.91	40.29	46.20	0.01	0.01	0.01					46.21	45.22
No68	500	20490	188.5	390.64	0.0295	4.88	0.48	6.20	40.02	46.22	0.01	0.01	0.01					46.23	45.23
No69	500	20990	188.5	354.45	0.0295	4.75	0.53	5.97	40.26	46.23	0.01	0.01	0.01					46.24	45.25
No70	500	21490	188.5	358.77	0.0295	4.99	0.53	7.30	38.54	46.24	0.01	0.01	0.01					46.26	45.26
B14_No	500	21990	188.5	365.37	0.0295	4.30	0.52	6.07	40.19	46.26	0.01		0.01	Bridge	0.00				46.26
				365.78	0.0295	4.30	0.52	6.07		46.26	0.01	0.01						46.28	45.28
No72	500	22490	188.5	388.59	0.0295	5.25	0.49	6.95	39.33	46.28	0.01	0.01	0.01					46.29	45.30
No73	500	22990	189.6	391.67	0.0295	5.14	0.48	6.44	39.85	46.29	0.01	0.01	0.01					46.30	45.31
No74	500	23490	189.6	383.62	0.0295	5.53	0.49	7.50	38.80	46.30	0.01	0.01	0.01					46.31	45.32
No75	500	23990	189.6	402.36	0.0295	5.36	0.47	7.15	39.16	46.31	0.01	0.01	0.01					46.32	45.33
No76	500	24490	190.2	415.26	0.0295	5.31	0.46	7.92	38.40	46.32	0.01	0.00	0.00					46.33	45.34
No77	500	24990	190.2	434.26	0.0295	5.47	0.44	7.16	39.17	46.33	0.01	0.00	0.00					46.34	45.35
No78	500	25490	190.2	382.31	0.0295	5.10	0.50	6.42	39.92	46.34	0.01	0.01	0.01					46.35	45.36
No79	500	25990	190.2	499.98	0.0295	5.93	0.38	7.42	38.53	46.35	0.01	0.00	0.00					46.36	45.36
No80	293	26283	190.2	466.85	0.0295	5.30	0.41	6.72	39.64	46.36	0.01	0.00	0.00					46.36	45.37
No81	207	26490	190.2	454.16	0.0295	5.33	0.42	7.77	38.59	46.36	0.01	0.00	0.00					46.37	45.37

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	190.2	424.17	0.0295	5.74	0.45	7.74	38.63	46.37	0.01	0.00	0.00			46.38	45.38	46.37
No83	500	27490	190.2	442.86	0.0295	6.11	0.43	8.29	38.08	46.37	0.01	0.00	0.00			46.38	45.39	46.38
B13	455	27945	190.2	328.02	0.0295	3.89	0.58	6.13	40.25	46.38	0.02		0.01	Bridge	0.01			46.39
				328.76	0.0295	3.89	0.58	6.14		46.39	0.02	0.00				46.41	45.41	
No84	45	27990	190.2	413.33	0.0295	5.58	0.45	7.69	38.71	46.40	0.01	0.00	0.00			46.41	45.41	46.41
No85	500	28490	190.2	398.70	0.0295	5.39	0.48	7.23	39.18	46.41	0.01	0.01	0.01			46.42	45.42	46.41
No86	500	28990	190.2	385.63	0.0295	4.95	0.49	6.07	40.35	46.42	0.01	0.01	0.01			46.43	45.44	46.42
No87	500	29490	190.2	360.86	0.0295	4.62	0.53	5.76	40.67	46.43	0.01	0.01	0.01			46.44	45.45	46.44
No88	500	29990	190.2	383.03	0.0295	4.96	0.50	6.10	40.35	46.45	0.01	0.01	0.01			46.46	45.46	46.45
No89	500	30490	190.2	401.42	0.0295	5.33	0.47	7.02	39.44	46.46	0.01	0.01	0.01			46.47	45.47	46.46
No90	500	30990	190.2	461.92	0.0295	5.78	0.41	7.97	38.50	46.47	0.01	0.00	0.00			46.48	45.48	46.47
No91	500	31490	190.2	413.17	0.0295	5.59	0.46	7.68	38.80	46.48	0.01	0.00	0.00			46.49	45.49	46.48
No92	500	31990	190.2	388.25	0.0295	5.26	0.49	6.64	39.84	46.48	0.01	0.01	0.01			46.50	45.50	46.49
No93	500	32490	190.2	357.20	0.0295	4.82	0.53	6.09	40.41	46.50	0.01	0.01	0.01			46.51	45.52	46.50
No94	500	32990	190.2	343.16	0.0295	4.49	0.55	6.51	40.00	46.51	0.02	0.00	0.01			46.53	45.53	46.52
B12	91	33081	190.2	275.05	0.0295	3.50	0.69	4.92	41.59	46.51	0.02		0.00	Bridge	0.01			46.53
				275.88	0.0295	3.51	0.69	4.93		46.52	0.02	0.02				46.54	45.56	
No95	409	33490	190.2	337.54	0.0295	4.78	0.56	6.46	40.09	46.55	0.02	0.01	0.01			46.57	45.57	46.56
B11_No	500	33990	190.2	296.73	0.0295	3.48	0.64	4.62	41.85	46.57	0.02		0.02	Bridge	0.01			46.57
				297.33	0.0295	3.49	0.64	4.63		46.58	0.02	0.02				46.60	45.61	
No97	500	34490	190.2	422.09	0.0295	4.88	0.45	6.55	40.06	46.61	0.01	0.01	0.01			46.62	45.63	46.61
No98	500	34990	190.2	381.71	0.0295	5.00	0.50	6.68	39.94	46.62	0.01	0.01	0.01			46.63	45.64	46.63
No99	500	35490	190.2	374.88	0.0295	5.16	0.51	6.67	39.96	46.63	0.01	0.01	0.01			46.64	45.65	46.64
No100	500	35990	190.2	346.74	0.0295	4.72	0.55	6.04	40.60	46.64	0.02	0.01	0.01			46.66	45.67	46.65
No101	500	36490	190.2	369.56	0.0295	4.94	0.51	6.27	40.39	46.66	0.01	0.01	0.01			46.67	45.68	46.67
No102	500	36990	190.4	408.81	0.0295	5.45	0.47	8.00	38.67	46.67	0.01	0.00	0.00			46.69	45.69	46.68
No103	500	37490	190.4	377.81	0.0295	4.91	0.50	6.08	40.60	46.68	0.01	0.01	0.01			46.70	45.70	46.69
No104	500	37990	190.4	346.79	0.0295	4.64	0.55	6.05	40.65	46.70	0.02	0.00	0.01			46.71	45.71	46.70
B10	170	38160	190.4	286.56	0.0295	3.73	0.66	4.75	41.85	46.70	0.02		0.01	Bridge	0.01			46.71
				287.32	0.0295	3.73	0.66	4.76		46.71	0.02	0.01				46.73	45.74	
No105	330	38490	190.4	372.41	0.0295	4.98	0.51	6.37	40.36	46.73	0.01	0.01	0.00			46.75	45.75	46.74
No106	500	38990	190.4	347.93	0.0295	4.88	0.55	6.11	40.63	46.74	0.02	0.01	0.01			46.76	45.77	46.75

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	190.4	382.90	0.0295	5.12	0.50	6.34	40.42	46.76	0.01	0.01	0.01			46.77	45.78	46.77
No108	500	39990	190.4	347.10	0.0295	4.52	0.55	6.01	40.76	46.77	0.02	0.00	0.01			46.79	45.79	46.78
B9	77	40067	190.4	339.69	0.0295	4.36	0.56	5.87	40.51	46.78	0.02		0.00	Bridge	0.00			46.79
				340.10	0.0295	4.37	0.56	5.87		46.78	0.02	0.01				46.80	45.80	
No109	423	40490	190.4	395.48	0.0295	5.58	0.48	7.52	39.28	46.80	0.01	0.01	0.00			46.81	45.81	46.80
No110	500	40990	190.4	358.80	0.0295	5.16	0.53	6.52	40.29	46.81	0.01	0.01	0.01			46.82	45.83	46.81
No111	500	41490	190.4	394.33	0.0295	5.19	0.48	6.85	39.57	46.82	0.01	0.01	0.01			46.83	45.84	46.83
No112	500	41990	190.4	385.21	0.0295	5.28	0.49	6.85	39.58	46.83	0.01	0.01	0.01			46.84	45.85	46.84
No113	500	42490	190.4	380.51	0.0295	4.88	0.50	6.53	40.31	46.84	0.01	0.01	0.01			46.86	45.86	46.85
No114	500	42990	190.4	406.83	0.0295	5.34	0.47	6.85	40.01	46.86	0.01	0.01	0.01			46.87	45.87	46.86
No115	500	43490	190.4	368.59	0.0295	4.86	0.52	6.11	40.76	46.87	0.01	0.01	0.01			46.88	45.89	46.87
B8_No1	500	43990	190.4	364.85	0.0295	4.70	0.52	6.11	40.77	46.88	0.01		0.01	Bridge	0.01			46.89
				365.26	0.0295	4.70	0.52	6.12		46.89	0.01	0.01				46.90	45.91	
No117	500	44490	190.4	388.89	0.0295	5.02	0.49	6.64	40.26	46.90	0.01	0.01	0.01			46.91	45.92	46.91
No118	500	44990	190.4	384.54	0.0295	4.95	0.50	6.45	40.46	46.91	0.01	0.01	0.01			46.93	45.93	46.92
No119	500	45490	190.4	368.95	0.0295	4.59	0.52	5.86	41.07	46.93	0.01	0.01	0.01			46.94	45.95	46.93
No120	500	45990	190.4	347.23	0.0295	4.43	0.55	5.64	41.30	46.94	0.02	0.01	0.01			46.96	45.96	46.95
B7	386	46376	190.4	380.71	0.0295	4.45	0.50	5.54	41.42	46.96	0.01		0.01	Bridge	0.00			46.96
				381.06	0.0295	4.45	0.50	5.54		46.96	0.01	0.00				46.97	45.98	
No121	114	46490	190.4	375.08	0.0295	4.74	0.51	6.10	40.86	46.96	0.01	0.01	0.00			46.98	45.98	46.98
No122	500	46990	190.4	353.20	0.0295	4.63	0.54	5.90	41.08	46.98	0.01	0.01	0.01			46.99	47.00	46.98
No123	500	47490	190.4	353.73	0.0295	4.66	0.54	5.91	41.08	46.99	0.01	0.01	0.01			47.01	47.02	47.00
No124	500	47990	190.4	354.69	0.0295	4.78	0.54	6.19	40.82	47.01	0.01	0.01	0.01			47.02	47.03	47.02
No125	500	48490	190.4	358.23	0.0295	4.72	0.53	6.10	40.93	47.03	0.01	0.01	0.01			47.04	47.05	47.03
No126	500	48990	190.4	349.47	0.0295	4.65	0.54	5.67	41.37	47.04	0.02	0.01	0.01			47.06	47.06	47.05
No127	500	49490	190.4	350.88	0.0295	4.58	0.54	5.74	41.32	47.06	0.02	0.01	0.01			47.07	47.08	47.06
No128	500	49990	190.4	337.43	0.0295	4.60	0.56	5.61	41.46	47.07	0.02	0.01	0.01			47.09	47.10	47.08
No129	500	50490	190.4	331.40	0.0295	4.31	0.57	5.90	41.19	47.09	0.02	0.01	0.01			47.11	47.12	47.10
No130	500	50990	190.4	347.49	0.0295	4.11	0.55	5.49	41.62	47.11	0.02	0.01	0.01			47.13	47.14	47.12
No131	500	51490	190.4	373.02	0.0295	4.85	0.51	6.13	41.00	47.13	0.01	0.01	0.01			47.15	47.15	47.14
No132	500	51990	190.4	329.98	0.0295	4.13	0.58	5.26	41.89	47.15	0.02	0.01	0.01			47.16	47.17	47.15
No133	500	52490	190.4	309.52	0.0295	3.89	0.62	5.10	42.07	47.17	0.02	0.01	0.01			47.19	47.20	47.17

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 > 47.52 NG

n= 0.0295

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss (c) (d) (m)		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												Type	Head or WL difference (m)	UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)			
B6	271	52761	190.4	265.38	0.0295	3.77	0.72	5.68	41.50	47.18	0.03	0.01	0.01	Bridge	0.01			47.20
				266.13	0.0295	3.77	0.72	5.69		47.19	0.03	0.00				47.22	47.22	
B5	45	52806	190.4	322.39	0.0295	4.59	0.59	6.15	41.05	47.20	0.02	0.00	0.00	Bridge	0.01			47.22
				322.97	0.0295	4.60	0.59	6.16		47.21	0.02	0.00				47.23	47.23	
No134	184	52990	190.4	333.09	0.0295	5.30	0.57	7.09	40.13	47.22	0.02	0.00	0.00			47.23	47.24	47.23
B4	236	53226	190.4	341.08	0.0295	5.21	0.55	7.46	39.77	47.23	0.02	0.00	0.00	Bridge	0.00			47.24
				341.35	0.0295	5.22	0.55	7.46		47.23	0.02	0.00				47.25	47.25	
No135	264	53490	190.4	317.54	0.0295	4.65	0.60	6.72	40.52	47.24	0.02	0.01	0.01			47.25	47.26	47.25
No135	500	53990	190.4	350.94	0.0295	4.65	0.54	6.31	40.55	47.26	0.02	0.01	0.01			47.27	47.28	47.26
No137	500	54490	190.4	400.92	0.0295	4.88	0.47	6.60	40.68	47.28	0.01	0.01	0.01			47.29	47.29	47.28
No138	500	54990	190.4	368.24	0.0295	4.73	0.52	6.54	40.75	47.29	0.01	0.01	0.01			47.30	47.31	47.29
No139	500	55490	190.4	337.56	0.0295	4.60	0.55	5.96	41.34	47.30	0.02	0.01	0.01			47.32	47.33	47.31
No140	500	55990	190.4	341.74	0.0295	4.84	0.55	6.46	40.86	47.32	0.02	0.01	0.01			47.33	47.34	47.33
No141	500	56490	190.4	307.77	0.0295	4.28	0.62	5.08	42.25	47.33	0.02	0.01	0.01			47.35	47.37	47.34
No142	516	57006	190.4	327.77	0.0295	4.82	0.58	6.24	41.12	47.36	0.02	0.00	0.01			47.38	47.38	47.37
No143	115	57121	190.4	322.09	0.0295	4.81	0.59	6.29	41.07	47.36	0.02	0.01	0.00			47.38	47.39	47.38
No144	369	57490	190.4	329.48	0.0295	5.10	0.58	6.39	40.99	47.38	0.02	0.01	0.01			47.39	47.40	47.39
No145	500	57990	190.4	342.07	0.0295	4.89	0.55	6.06	41.33	47.39	0.02	0.01	0.01			47.41	47.42	47.40
No145	500	58490	190.4	313.25	0.0295	4.06	0.61	5.10	42.31	47.41	0.02	0.01	0.01			47.43	47.44	47.42
No147	500	58990	190.4	327.21	0.0295	4.96	0.58	6.36	41.07	47.43	0.02	0.01	0.01			47.45	47.46	47.44
B3	443	59433	190.4	353.17	0.0295	5.21	0.54	7.23	40.22	47.45	0.01	0.00	0.01	Bridge	0.00			47.46
				353.51	0.0295	5.21	0.54	7.23		47.45	0.01	0.00				47.47	47.47	
No148	57	59490	190.4	308.65	0.0295	3.68	0.62	5.20	42.25	47.45	0.02	0.00	0.00			47.47	47.48	47.47
B2	116	59606	190.4	294.64	0.0295	3.87	0.65	4.49	42.97	47.46	0.02	0.01	0.00	Bridge	0.02			47.48
				295.98	0.0295	3.88	0.64	4.51		47.48	0.02	0.01				47.50	47.51	
No149	384	59990	190.4	338.01	0.0295	4.30	0.55	5.74	41.76	47.50	0.02	0.00	0.01			47.52	47.52	47.51
B1	152	60142	190.4	356.45	0.0295	4.79	0.53	6.51	41.00	47.51	0.01	0.00	0.00	Bridge	0.01			47.52
				356.98	0.0295	4.80	0.53	6.51		47.51	0.01	0.01				47.53	47.53	
No150	333	60475	190.4	286.49	0.0295	3.12	0.65	4.02	43.50	47.52	0.02	0.01	0.01			47.55		47.53

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56

= 47.56

OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c) (m)	(d) (m)	Type	Head or WL. difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
No1		0	182.8	560.18	0.0300	3.24	0.33	4.38	41.12	45.50	0.01	0.00				45.51	45.51		
No2	50	50	182.8	383.69	0.0300	4.11	0.48	5.27	40.23	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No3	50	100	182.8	405.75	0.0300	4.73	0.45	5.71	39.79	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No4	50	150	182.8	397.83	0.0300	4.85	0.46	6.24	39.26	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
B21	18	168	182.8	369.84	0.0300	4.24	0.49	5.51	39.59	45.50	0.01	0.00	0.00	Bridge	0.00		45.51	45.51	45.51
				370.21	0.0300	4.24	0.49	5.51		45.50	0.01	0.00				45.51	45.51		
No5	32	200	182.8	387.12	0.0300	4.80	0.47	6.48	39.02	45.50	0.01	0.00	0.00			45.51	45.52	45.51	
No6	50	250	182.8	365.52	0.0300	5.19	0.50	6.89	38.61	45.50	0.01	0.00	0.00			45.52	45.52	45.52	
No7	50	300	182.8	411.78	0.0300	5.22	0.44	6.91	38.60	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No8	50	350	182.8	384.30	0.0300	5.11	0.48	7.31	38.20	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No9	50	400	182.8	376.68	0.0300	4.24	0.49	5.39	40.12	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No10	50	450	182.8	380.83	0.0300	4.08	0.48	5.16	40.35	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No11	50	500	182.8	378.51	0.0300	4.01	0.48	4.99	40.52	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No12	50	550	182.8	374.01	0.0300	3.93	0.49	5.03	40.48	45.51	0.01	0.00	0.00			45.52	45.53	45.52	
No13	50	600	182.8	371.48	0.0300	3.84	0.49	4.77	40.74	45.51	0.01	0.00	0.00			45.53	45.53	45.53	
No14	50	650	182.8	395.57	0.0300	4.01	0.46	4.92	40.60	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No15	50	700	182.8	369.84	0.0300	3.95	0.49	4.82	40.70	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No16	50	750	182.8	389.89	0.0300	3.86	0.47	4.52	41.00	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No17	50	800	183.3	367.95	0.0300	3.65	0.50	4.15	41.37	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No18	50	850	183.3	382.50	0.0300	3.77	0.48	4.41	41.11	45.52	0.01	0.00	0.00			45.53	45.54	45.53	
No19	50	900	183.3	385.21	0.0300	3.80	0.48	4.52	41.00	45.52	0.01	0.00	0.00			45.54	45.54	45.54	
No20	50	950	183.3	382.89	0.0300	3.65	0.48	4.30	41.23	45.53	0.01	0.00	0.00			45.54	45.54	45.54	
B20	40	990	183.3	384.65	0.0300	3.58	0.48	4.55	40.58	45.53	0.01	0.00	0.00	Bridge	0.00		45.54	45.54	45.54
				385.17	0.0300	3.59	0.48	4.55		45.53	0.01	0.00				45.54	45.54		
No21	10	1000	183.3	379.47	0.0300	3.52	0.48	4.16	41.37	45.53	0.01	0.00	0.00			45.54	45.55	45.54	
No22	50	1050	183.3	405.22	0.0300	3.64	0.45	4.31	41.23	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No23	50	1100	183.3	401.15	0.0300	3.72	0.46	4.43	41.11	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No24	50	1150	183.3	413.24	0.0300	3.85	0.44	4.61	40.93	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No25	50	1200	183.3	413.30	0.0300	3.63	0.44	4.54	41.00	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No26	50	1250	183.3	492.03	0.0300	3.39	0.37	4.48	41.06	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No27	50	1300	183.3	388.11	0.0300	3.95	0.47	4.77	40.77	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No28	50	1350	183.3	410.13	0.0300	4.19	0.45	5.19	40.35	45.54	0.01	0.00	0.00			45.55	45.56	45.55	

G-47

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 = 47.56 OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	183.3	363.09	0.0300	4.05	0.50	5.23	40.31	45.54	0.01	0.00	0.00			45.56	45.56	45.56
No30	50	1450	183.3	356.35	0.0300	4.21	0.51	5.05	40.49	45.54	0.01	0.01	0.00			45.56	45.57	45.56
No31	540	1990	183.3	372.10	0.0300	4.33	0.49	5.25	40.31	45.56	0.01	0.01	0.01			45.58	45.58	45.57
No32	500	2490	183.3	361.99	0.0300	4.26	0.51	5.50	40.08	45.58	0.01	0.01	0.01			45.59	45.60	45.58
No33	500	2990	183.3	375.25	0.0300	4.28	0.49	5.37	40.23	45.60	0.01	0.01	0.01			45.61	45.62	45.60
No34	500	3490	183.5	369.08	0.0300	4.00	0.50	5.05	40.56	45.61	0.01	0.01	0.01			45.62	45.63	45.62
No35	500	3990	183.5	367.56	0.0300	3.99	0.50	4.99	40.64	45.63	0.01	0.01	0.01			45.64	45.65	45.63
No36	500	4490	183.6	361.11	0.0300	3.89	0.51	4.60	41.05	45.65	0.01	0.01	0.01			45.66	45.67	45.65
No37	500	4990	183.6	375.21	0.0300	4.41	0.49	5.39	40.27	45.66	0.01	0.01	0.01			45.68	45.68	45.67
No38	500	5490	183.8	391.28	0.0300	4.58	0.47	5.71	39.57	45.68	0.01	0.01	0.01			45.69	45.70	45.68
No39	500	5990	183.8	392.85	0.0300	4.22	0.47	5.00	40.69	45.69	0.01	0.01	0.01			45.70	45.71	45.70
No40	500	6490	183.8	453.88	0.0300	5.06	0.40	6.49	39.22	45.71	0.01	0.00	0.00			45.72	45.72	45.71
B19	55	6545	183.8	370.70	0.0300	4.53	0.50	5.50	40.20	45.70	0.01		0.00	Bridge	0.00			45.72
				371.05	0.0300	4.53	0.50	5.51	45.71	45.71	0.01	0.01				45.72	45.73	
No41	445	6990	183.8	373.06	0.0300	4.31	0.49	5.31	40.41	45.72	0.01	0.01	0.01			45.74	45.74	45.73
No42	500	7490	183.8	393.09	0.0300	4.44	0.47	5.50	40.24	45.74	0.01	0.01	0.01			45.75	45.76	45.74
No43	500	7990	184.0	376.68	0.0300	4.31	0.49	5.55	40.20	45.75	0.01	0.01	0.01			45.76	45.77	45.76
No44	500	8490	184.0	381.04	0.0300	4.28	0.48	5.39	40.38	45.77	0.01	0.01	0.01			45.78	45.79	45.77
No45	500	8990	184.0	372.15	0.0300	4.24	0.49	5.47	40.31	45.78	0.01	0.01	0.01			45.79	45.80	45.79
No46	500	9490	184.0	366.99	0.0300	4.02	0.50	4.72	41.08	45.80	0.01	0.01	0.01			45.81	45.82	45.80
No47	500	9990	184.0	375.59	0.0300	3.97	0.49	4.68	41.14	45.82	0.01	0.00	0.01			45.83	45.83	45.82
B18	280	10270	184.0	358.79	0.0300	3.96	0.51	4.79	41.04	45.83	0.01		0.01	Bridge	0.01			45.83
				359.28	0.0300	3.97	0.51	4.79	45.83	45.83	0.01	0.00				45.84	45.85	
No48	220	10490	184.0	367.70	0.0300	4.20	0.50	5.16	40.68	45.84	0.01	0.01	0.00			45.85	45.86	45.85
No49	500	10990	184.0	361.08	0.0300	4.01	0.51	4.72	41.14	45.86	0.01	0.01	0.01			45.87	45.88	45.86
No50	500	11490	184.0	346.23	0.0300	3.90	0.53	4.64	41.23	45.87	0.01	0.01	0.01			45.89	45.90	45.88
No51	500	11990	184.0	354.63	0.0300	4.04	0.52	5.00	40.90	45.90	0.01	0.01	0.01			45.91	45.92	45.90
No52	500	12490	184.0	347.32	0.0300	4.03	0.53	4.73	41.18	45.91	0.01	0.01	0.01			45.93	45.94	45.92
No53	500	12990	186.4	360.30	0.0300	4.16	0.52	5.05	40.88	45.93	0.01	0.01	0.01			45.95	45.96	45.94
B17	470	13460	186.4	385.20	0.0300	4.27	0.48	5.77	40.18	45.95	0.01		0.01	Bridge	0.00			45.96
				385.55	0.0300	4.28	0.48	5.77	45.95	45.95	0.01	0.00				45.97	45.97	
No54	30	13490	186.4	395.19	0.0300	4.54	0.47	6.13	39.83	45.96	0.01	0.00	0.00			45.97	45.97	45.97

G-48

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 = 47.56 OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B16	94	13584	186.4	342.66	0.0300	4.19	0.54	5.16	40.80	45.96	0.02	0.00	Bridge	0.00			45.97	
				342.90	0.0300	4.19	0.54	5.16		45.96	0.02	0.01				45.97	45.98	
No55	406	13990	186.4	368.02	0.0300	3.99	0.51	5.09	40.89	45.98	0.01	0.01	0.01			45.99	45.00	45.98
No56	500	14490	186.4	381.85	0.0300	4.07	0.49	5.13	40.86	45.99	0.01	0.01	0.01			46.01	45.01	46.00
No57	500	14990	186.4	366.33	0.0300	3.95	0.51	4.43	41.58	46.01	0.01	0.01	0.01			46.02	45.03	46.01
No58	500	15490	187.3	351.15	0.0300	3.78	0.53	4.67	41.36	46.03	0.01	0.01	0.01			46.04	45.05	46.03
No59	500	15990	187.3	359.43	0.0300	3.79	0.52	5.04	41.01	46.05	0.01	0.01	0.01			46.06	45.08	46.05
No60	500	16490	187.9	350.14	0.0300	4.02	0.54	4.73	41.34	46.07	0.01	0.01	0.01			46.09	45.10	46.08
No61	500	16990	187.9	369.13	0.0300	3.98	0.51	4.63	41.46	46.09	0.01	0.01	0.01			46.10	45.11	46.10
No62	500	17490	187.9	351.77	0.0300	4.16	0.53	5.07	41.04	46.11	0.01	0.01	0.01			46.12	45.13	46.11
No63	500	17990	188.5	349.39	0.0300	3.89	0.54	4.98	41.15	46.13	0.01	0.01	0.01			46.14	45.15	46.13
B15	432	18422	188.5	309.82	0.0300	3.87	0.61	4.64	41.51	46.15	0.02	0.01	Bridge	0.01				46.15
				310.53	0.0300	3.88	0.61	4.64		46.15	0.02	0.00				46.17	45.18	
No64	68	18490	188.5	337.70	0.0300	4.11	0.55	4.95	41.21	46.16	0.02	0.01	0.00			46.18	45.19	46.18
No65	500	18990	188.5	376.63	0.0300	4.16	0.50	5.17	41.01	46.18	0.01	0.01	0.01			46.20	45.20	46.19
No66	500	19490	188.5	356.40	0.0300	4.25	0.53	5.10	41.10	46.20	0.01	0.01	0.01			46.21	45.22	46.20
No67	500	19990	188.5	353.44	0.0300	4.61	0.53	5.93	40.29	46.22	0.01	0.01	0.01			46.23	45.24	46.22
No68	500	20490	188.5	392.02	0.0300	4.89	0.48	6.21	40.02	46.23	0.01	0.01	0.01			46.25	45.25	46.24
No69	500	20990	188.5	355.77	0.0300	4.76	0.53	5.98	40.26	46.24	0.01	0.01	0.01			46.26	45.27	46.25
No70	500	21490	188.5	360.05	0.0300	5.01	0.52	7.32	38.54	46.26	0.01	0.01	0.01			46.27	45.28	46.27
B14_No	500	21990	188.5	366.97	0.0300	4.31	0.51	6.09	40.19	46.28	0.01	0.01	Bridge	0.00				46.28
				367.38	0.0300	4.31	0.51	6.09		46.28	0.01	0.01				46.29	45.30	
No72	500	22490	188.5	389.97	0.0300	5.27	0.48	6.97	39.33	46.30	0.01	0.01	0.01			46.31	45.31	46.30
No73	500	22990	189.6	393.09	0.0300	5.16	0.48	6.46	39.85	46.31	0.01	0.01	0.01			46.32	45.33	46.31
No74	500	23490	189.6	384.91	0.0300	5.54	0.49	7.52	38.80	46.32	0.01	0.01	0.01			46.33	45.34	46.33
No75	500	23990	189.6	403.81	0.0300	5.38	0.47	7.17	39.16	46.33	0.01	0.01	0.01			46.34	45.35	46.34
No76	500	24490	190.2	416.78	0.0300	5.32	0.45	7.94	38.40	46.34	0.01	0.01	0.01			46.35	45.36	46.35
No77	500	24990	190.2	435.79	0.0300	5.48	0.44	7.18	39.17	46.35	0.01	0.00	0.00			46.36	45.37	46.36
No78	500	25490	190.2	383.80	0.0300	5.12	0.50	6.44	39.92	46.36	0.01	0.01	0.01			46.37	45.38	46.37
No79	500	25990	190.2	501.64	0.0300	5.95	0.38	7.44	38.53	46.37	0.01	0.00	0.00			46.38	45.38	46.38
No80	293	26283	190.2	468.67	0.0300	5.31	0.41	6.74	39.64	46.38	0.01	0.00	0.00			46.39	45.39	46.38
No81	207	26490	190.2	455.88	0.0300	5.34	0.42	7.79	38.59	46.38	0.01	0.00	0.00			46.39	45.39	46.39

G-49

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 = 47.56 OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	190.2	425.66	0.0300	5.75	0.45	7.76	38.63	46.39	0.01	0.00	0.00			46.40	45.40	46.39
No83	500	27490	190.2	444.32	0.0300	6.12	0.43	8.32	38.08	46.40	0.01	0.00	0.00			46.41	45.41	46.40
B13	455	27945	190.2	329.83	0.0300	3.90	0.58	6.15	40.25	46.40	0.02		0.01	Bridge	0.01			46.41
				330.56	0.0300	3.91	0.58	6.16		46.41	0.02	0.00				46.43	45.43	
No84	45	27990	190.2	414.85	0.0300	5.60	0.45	7.71	38.71	46.42	0.01	0.00	0.00			46.43	45.44	46.43
No85	500	28490	190.2	400.22	0.0300	5.40	0.48	7.25	39.18	46.43	0.01	0.01	0.01			46.44	45.45	46.44
No86	500	28990	190.2	387.30	0.0300	4.97	0.49	6.09	40.35	46.44	0.01	0.01	0.01			46.45	45.46	46.45
No87	500	29490	190.2	362.58	0.0300	4.64	0.52	5.78	40.67	46.45	0.01	0.01	0.01			46.47	45.47	46.46
No88	500	29990	190.2	384.73	0.0300	4.97	0.49	6.12	40.35	46.47	0.01	0.01	0.01			46.48	45.49	46.47
No89	500	30490	190.2	403.09	0.0300	5.35	0.47	7.04	39.44	46.48	0.01	0.01	0.01			46.49	45.50	46.49
No90	500	30990	190.2	463.69	0.0300	5.80	0.41	7.99	38.50	46.49	0.01	0.00	0.00			46.50	45.51	46.50
No91	500	31490	190.2	414.81	0.0300	5.61	0.46	7.70	38.80	46.50	0.01	0.00	0.00			46.51	45.51	46.51
No92	500	31990	190.2	389.89	0.0300	5.27	0.49	6.67	39.84	46.51	0.01	0.01	0.01			46.52	45.53	46.51
No93	500	32490	190.2	358.87	0.0300	4.83	0.53	6.11	40.41	46.52	0.01	0.01	0.01			46.53	45.54	46.53
No94	500	32990	190.2	344.96	0.0300	4.51	0.55	6.54	40.00	46.54	0.02	0.00	0.01			46.55	45.55	46.54
B12	91	33081	190.2	276.94	0.0300	3.52	0.69	4.94	41.59	46.53	0.02		0.00	Bridge	0.01			46.55
				277.75	0.0300	3.52	0.68	4.95		46.54	0.02	0.02				46.57	45.58	
No95	409	33490	190.2	339.17	0.0300	4.79	0.56	6.48	40.09	46.57	0.02	0.01	0.01			46.59	45.60	46.58
B11_No	500	33990	190.2	298.82	0.0300	3.50	0.64	4.64	41.85	46.59	0.02		0.02	Bridge	0.01			46.60
				299.41	0.0300	3.51	0.64	4.65		46.60	0.02	0.02				46.62	45.64	
No97	500	34490	190.2	424.20	0.0300	4.89	0.45	6.57	40.06	46.63	0.01	0.01	0.01			46.64	45.65	46.64
No98	500	34990	190.2	383.54	0.0300	5.02	0.50	6.70	39.54	46.64	0.01	0.01	0.01			46.66	45.66	46.65
No99	500	35490	190.2	376.64	0.0300	5.17	0.50	6.70	39.56	46.66	0.01	0.01	0.01			46.67	45.68	46.66
No100	500	35990	190.2	348.56	0.0300	4.74	0.55	6.07	40.60	46.67	0.02	0.01	0.01			46.68	45.69	46.68
No101	500	36490	190.2	371.40	0.0300	4.96	0.51	6.30	40.39	46.69	0.01	0.01	0.01			46.70	45.71	46.69
No102	500	36990	190.4	410.68	0.0300	5.47	0.46	8.03	38.67	46.70	0.01	0.01	0.01			46.71	45.72	46.71
No103	500	37490	190.4	379.74	0.0300	4.93	0.50	6.11	40.60	46.71	0.01	0.01	0.01			46.72	45.73	46.72
No104	500	37990	190.4	348.71	0.0300	4.66	0.55	6.07	40.65	46.72	0.02	0.00	0.01			46.74	45.74	46.73
B10	170	38160	190.4	288.58	0.0300	3.75	0.66	4.77	41.85	46.72	0.02		0.01	Bridge	0.01			46.74
				289.32	0.0300	3.76	0.66	4.78		46.73	0.02	0.01				46.76	45.77	
No105	330	38490	190.4	374.33	0.0300	5.00	0.51	6.40	40.36	46.76	0.01	0.01	0.00			46.77	45.78	46.77
No106	500	38990	190.4	349.73	0.0300	4.90	0.54	6.14	40.63	46.77	0.02	0.01	0.01			46.79	45.80	46.78

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 = 47.56 OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	190.4	384.87	0.0300	5.14	0.49	6.37	40.42	46.79	0.01	0.01	0.01			46.80	45.81	46.80
No108	500	39990	190.4	349.15	0.0300	4.54	0.55	6.04	40.76	46.80	0.02	0.00	0.01			46.82	45.82	46.81
B9	77	40067	190.4	341.79	0.0300	4.38	0.55	5.89	40.51	46.80	0.02		0.00	Bridge	0.00			46.82
				342.19	0.0300	4.39	0.55	5.90		46.81	0.02	0.01				46.82	45.83	
No109	423	40490	190.4	397.27	0.0300	5.61	0.48	7.55	39.28	46.83	0.01	0.01	0.00			46.84	45.84	46.83
No110	500	40990	190.4	360.65	0.0300	5.18	0.53	6.54	40.29	46.83	0.01	0.01	0.01			46.85	45.86	46.84
No111	500	41490	190.4	396.37	0.0300	5.21	0.48	6.88	39.57	46.85	0.01	0.01	0.01			46.86	45.87	46.86
No112	500	41990	190.4	387.19	0.0300	5.30	0.49	6.88	39.58	46.86	0.01	0.01	0.01			46.87	45.88	46.87
No113	500	42490	190.4	382.63	0.0300	4.90	0.50	6.56	40.31	46.87	0.01	0.01	0.01			46.89	45.89	46.88
No114	500	42990	190.4	408.92	0.0300	5.36	0.47	6.88	40.01	46.89	0.01	0.01	0.01			46.90	45.90	46.89
No115	500	43490	190.4	370.70	0.0300	4.88	0.51	6.14	40.76	46.90	0.01	0.01	0.01			46.91	45.92	46.90
B8_No1	500	43990	190.4	367.01	0.0300	4.72	0.52	6.14	40.77	46.91	0.01		0.01	Bridge	0.01			46.92
				367.42	0.0300	4.73	0.52	6.15		46.92	0.01	0.01				46.93	45.94	
No117	500	44490	190.4	391.05	0.0300	5.04	0.49	6.67	40.26	46.93	0.01	0.01	0.01			46.94	45.95	46.94
No118	500	44990	190.4	386.74	0.0300	4.97	0.49	6.48	40.46	46.94	0.01	0.01	0.01			46.96	45.96	46.95
No119	500	45490	190.4	371.28	0.0300	4.62	0.51	5.89	41.07	46.96	0.01	0.01	0.01			46.97	45.98	46.96
No120	500	45990	190.4	349.52	0.0300	4.45	0.54	5.67	41.30	46.97	0.02	0.01	0.01			46.99	45.99	46.98
B7	386	46376	190.4	383.22	0.0300	4.47	0.50	5.57	41.42	46.99	0.01		0.01	Bridge	0.00			46.99
				383.57	0.0300	4.47	0.50	5.57		46.99	0.01	0.00				47.00	47.01	
No121	114	46490	190.4	375.36	0.0300	4.76	0.51	6.13	40.86	46.99	0.01	0.01	0.00			47.01	47.01	47.01
No122	500	46990	190.4	355.43	0.0300	4.66	0.54	5.93	41.08	47.01	0.01	0.01	0.01			47.02	47.03	47.01
No123	500	47490	190.4	355.97	0.0300	4.68	0.53	5.94	41.08	47.02	0.01	0.01	0.01			47.04	47.05	47.03
No124	500	47990	190.4	356.89	0.0300	4.80	0.53	6.22	40.82	47.04	0.01	0.01	0.01			47.06	47.06	47.05
No125	500	48490	190.4	360.48	0.0300	4.75	0.53	6.13	40.93	47.06	0.01	0.01	0.01			47.07	47.08	47.06
No125	500	48990	190.4	351.72	0.0300	4.68	0.54	5.70	41.37	47.07	0.01	0.01	0.01			47.09	47.10	47.08
No127	500	49490	190.4	353.22	0.0300	4.61	0.54	5.77	41.32	47.09	0.01	0.01	0.01			47.10	47.11	47.10
No128	500	49990	190.4	339.63	0.0300	4.62	0.56	5.65	41.46	47.11	0.02	0.01	0.01			47.12	47.13	47.11
No129	500	50490	190.4	333.82	0.0300	4.34	0.57	5.93	41.19	47.12	0.02	0.01	0.01			47.14	47.15	47.13
No130	500	50990	190.4	350.17	0.0300	4.13	0.54	5.53	41.62	47.15	0.02	0.01	0.01			47.16	47.17	47.15
No131	500	51490	190.4	375.45	0.0300	4.88	0.51	6.17	41.00	47.17	0.01	0.01	0.01			47.18	47.19	47.17
No132	500	51990	190.4	332.57	0.0300	4.15	0.57	5.29	41.89	47.18	0.02	0.01	0.01			47.20	47.21	47.19
No133	500	52490	190.4	312.12	0.0300	3.91	0.61	5.13	42.07	47.20	0.02	0.01	0.01			47.22	47.23	47.21

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 = 47.56 OK

n= 0.0300

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	190.4	267.70	0.0300	3.79	0.71	5.71	41.50	47.21	0.03	0.01	0.01	Bridge	0.01			47.23
B5	45	52806	190.4	268.43	0.0300	3.79	0.71	5.72	41.05	47.22	0.03	0.00					47.25	47.25
				325.20	0.0300	4.62	0.59	6.18	41.05	47.23	0.02	0.00	0.00	Bridge	0.01			47.25
No134	184	52990	190.4	335.03	0.0300	5.33	0.57	7.12	40.13	47.25	0.02	0.00	0.00				47.26	47.26
				343.10	0.0300	5.24	0.55	7.49	39.77	47.26	0.02	0.00	0.00	Bridge	0.00			47.27
B4	236	53226	190.4	343.36	0.0300	5.24	0.55	7.49	39.77	47.26	0.02	0.00					47.28	47.28
				319.72	0.0300	4.68	0.60	6.75	40.52	47.27	0.02	0.01	0.01				47.29	47.30
No135	500	53990	190.4	353.37	0.0300	4.67	0.54	6.34	40.55	47.29	0.01	0.01	0.01				47.31	47.31
No137	500	54490	190.4	403.52	0.0300	4.90	0.47	6.63	40.68	47.31	0.01	0.01	0.01				47.32	47.33
No138	500	54990	190.4	370.79	0.0300	4.75	0.51	6.57	40.75	47.32	0.01	0.01	0.01				47.33	47.34
No139	500	55490	190.4	339.96	0.0300	4.62	0.55	5.99	41.34	47.33	0.02	0.01	0.01				47.35	47.36
No140	500	55990	190.4	344.06	0.0300	4.87	0.55	6.49	40.86	47.35	0.02	0.01	0.01				47.37	47.38
No141	500	56490	190.4	310.07	0.0300	4.31	0.61	5.12	42.25	47.37	0.02	0.01	0.01				47.39	47.40
No142	516	57006	190.4	330.01	0.0300	4.85	0.58	6.27	41.12	47.39	0.02	0.00	0.01				47.41	47.41
No143	115	57121	190.4	324.30	0.0300	4.83	0.59	6.33	41.07	47.40	0.02	0.01	0.00				47.41	47.42
No144	369	57490	190.4	331.55	0.0300	5.12	0.57	6.42	40.99	47.41	0.02	0.01	0.01				47.43	47.44
No145	500	57990	190.4	344.36	0.0300	4.92	0.55	6.10	41.33	47.43	0.02	0.01	0.01				47.44	47.45
No146	500	58490	190.4	315.89	0.0300	4.09	0.60	5.14	42.31	47.45	0.02	0.01	0.01				47.46	47.48
No147	500	58990	190.4	329.41	0.0300	4.98	0.58	6.40	41.07	47.47	0.02	0.01	0.01				47.49	47.49
B3	443	59433	190.4	355.46	0.0300	5.24	0.54	7.27	40.22	47.49	0.01		0.01	Bridge	0.00			47.49
				355.79	0.0300	5.24	0.54	7.27	40.22	47.49	0.01	0.00					47.51	47.51
No148	57	59490	190.4	311.62	0.0300	3.71	0.61	5.24	42.25	47.49	0.02	0.00	0.00				47.51	47.51
B2	116	59606	190.4	297.29	0.0300	3.90	0.64	4.52	42.97	47.49	0.02		0.00	Bridge	0.02			47.51
				298.61	0.0300	3.91	0.64	4.54	42.97	47.51	0.02	0.01					47.53	47.54
No149	384	59990	190.4	340.71	0.0300	4.32	0.53	5.78	41.76	47.54	0.02	0.00	0.01				47.55	47.55
B1	152	60142	190.4	359.02	0.0300	4.82	0.53	6.54	41.00	47.54	0.01		0.00	Bridge	0.01			47.55
				359.54	0.0300	4.82	0.53	6.55	41.00	47.55	0.01	0.01					47.56	47.57
No150	333	60475	190.4	289.74	0.0300	3.15	0.65	4.06	43.50	47.56	0.02		0.01				47.58	47.57

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < 47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
No1		0	182.8	560.18	0.0305	3.24	0.33	4.38	41.12	45.50	0.01	0.00				45.51	45.51		
No2	50	50	182.8	383.69	0.0305	4.11	0.48	5.27	40.23	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No3	50	100	182.8	405.75	0.0305	4.73	0.45	5.71	39.79	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
No4	50	150	182.8	397.84	0.0305	4.85	0.46	6.24	39.26	45.50	0.01	0.00	0.00			45.51	45.51	45.51	
B21	18	168	182.8	369.85	0.0305	4.24	0.49	5.51	39.59	45.50	0.01	0.00	0.00	Bridge	0.00		45.51	45.51	45.51
				370.22	0.0305	4.24	0.49	5.51		45.50	0.01	0.00				45.51	45.51		
No5	32	200	182.8	387.13	0.0305	4.80	0.47	6.48	39.02	45.50	0.01	0.00	0.00			45.52	45.52	45.51	
No6	50	250	182.8	365.54	0.0305	5.19	0.50	6.89	38.61	45.50	0.01	0.00	0.00			45.52	45.52	45.52	
No7	50	300	182.8	411.80	0.0305	5.22	0.44	6.91	38.60	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No8	50	350	182.8	384.32	0.0305	5.11	0.48	7.31	38.20	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No9	50	400	182.8	376.71	0.0305	4.24	0.49	5.39	40.12	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No10	50	450	182.8	380.87	0.0305	4.08	0.48	5.16	40.35	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No11	50	500	182.8	378.55	0.0305	4.01	0.48	4.99	40.52	45.51	0.01	0.00	0.00			45.52	45.52	45.52	
No12	50	550	182.8	374.06	0.0305	3.93	0.49	5.03	40.48	45.51	0.01	0.00	0.00			45.52	45.53	45.52	
No13	50	600	182.8	371.54	0.0305	3.84	0.49	4.77	40.74	45.51	0.01	0.00	0.00			45.53	45.53	45.53	
No14	50	650	182.8	395.64	0.0305	4.01	0.46	4.92	40.60	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No15	50	700	182.8	369.91	0.0305	3.95	0.49	4.82	40.70	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No16	50	750	182.8	389.97	0.0305	3.86	0.47	4.52	41.00	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No17	50	800	183.3	368.04	0.0305	3.65	0.50	4.15	41.37	45.52	0.01	0.00	0.00			45.53	45.53	45.53	
No18	50	850	183.3	382.60	0.0305	3.78	0.48	4.41	41.11	45.52	0.01	0.00	0.00			45.54	45.54	45.53	
No19	50	900	183.3	385.31	0.0305	3.80	0.48	4.53	41.00	45.53	0.01	0.00	0.00			45.54	45.54	45.54	
No20	50	950	183.3	383.00	0.0305	3.66	0.48	4.30	41.23	45.53	0.01	0.00	0.00			45.54	45.54	45.54	
B20	40	990	183.3	384.77	0.0305	3.58	0.48	4.55	40.58	45.53	0.01	0.00	0.00	Bridge	0.00		45.54	45.54	45.54
				385.29	0.0305	3.59	0.48	4.55		45.53	0.01	0.00				45.55	45.55		
No21	10	1000	183.3	379.59	0.0305	3.52	0.48	4.16	41.37	45.53	0.01	0.00	0.00			45.55	45.55	45.55	
No22	50	1050	183.3	405.35	0.0305	3.64	0.45	4.31	41.23	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No23	50	1100	183.3	401.28	0.0305	3.72	0.46	4.43	41.11	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No24	50	1150	183.3	413.38	0.0305	3.85	0.44	4.61	40.93	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No25	50	1200	183.3	413.46	0.0305	3.63	0.44	4.54	41.00	45.54	0.01	0.00	0.00			45.55	45.55	45.55	
No26	50	1250	183.3	492.24	0.0305	3.39	0.37	4.49	41.06	45.55	0.01	0.00	0.00			45.55	45.55	45.55	
No27	50	1300	183.3	388.25	0.0305	3.95	0.47	4.77	40.77	45.54	0.01	0.00	0.00			45.55	45.56	45.55	
No28	50	1350	183.3	410.28	0.0305	4.19	0.45	5.20	40.35	45.55	0.01	0.00	0.00			45.56	45.56	45.56	

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < 47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	183.3	363.23	0.0305	4.06	0.50	5.23	40.31	45.54	0.01	0.00	0.00			45.56	45.56	45.56
No30	50	1450	183.3	356.48	0.0305	4.21	0.51	5.06	40.49	45.55	0.01	0.01	0.00			45.56	45.57	45.56
No31	540	1990	183.3	372.29	0.0305	4.33	0.49	5.26	40.31	45.57	0.01	0.01	0.01			45.58	45.59	45.57
No32	500	2490	183.3	362.22	0.0305	4.26	0.51	5.50	40.08	45.58	0.01	0.01	0.01			45.59	45.60	45.59
No33	500	2990	183.3	375.52	0.0305	4.28	0.49	5.37	40.23	45.60	0.01	0.01	0.01			45.61	45.62	45.60
No34	500	3490	183.5	369.42	0.0305	4.00	0.50	5.06	40.56	45.62	0.01	0.01	0.01			45.63	45.64	45.62
No35	500	3990	183.5	367.95	0.0305	3.99	0.50	4.99	40.64	45.63	0.01	0.01	0.01			45.65	45.66	45.64
No36	500	4490	183.6	361.55	0.0305	3.89	0.51	4.60	41.05	45.65	0.01	0.01	0.01			45.66	45.67	45.66
No37	500	4990	183.6	375.65	0.0305	4.41	0.49	5.40	40.27	45.67	0.01	0.01	0.01			45.68	45.69	45.67
No38	500	5490	183.8	391.75	0.0305	4.58	0.47	5.72	39.57	45.69	0.01	0.01	0.01			45.70	45.70	45.69
No39	500	5990	183.8	393.41	0.0305	4.23	0.47	5.01	40.69	45.70	0.01	0.01	0.01			45.71	45.72	45.70
No40	500	6490	183.8	454.45	0.0305	5.06	0.40	6.49	39.22	45.71	0.01	0.00	0.00			45.72	45.72	45.72
B19	55	6545	183.8	371.20	0.0305	4.53	0.50	5.51	40.20	45.71	0.01		0.00	Bridge	0.00			45.72
				371.56	0.0305	4.54	0.49	5.52		45.72	0.01	0.01				45.73	45.74	
No41	445	6990	183.8	373.64	0.0305	4.31	0.49	5.32	40.41	45.73	0.01	0.01	0.01			45.74	45.75	45.74
No42	500	7490	183.8	393.71	0.0305	4.44	0.47	5.51	40.24	45.75	0.01	0.01	0.01			45.76	45.76	45.75
No43	500	7990	184.0	377.34	0.0305	4.31	0.49	5.56	40.20	45.76	0.01	0.01	0.01			45.77	45.78	45.76
No44	500	8490	184.0	381.74	0.0305	4.28	0.48	5.40	40.38	45.78	0.01	0.01	0.01			45.79	45.80	45.78
No45	500	8990	184.0	372.88	0.0305	4.25	0.49	5.48	40.31	45.79	0.01	0.01	0.01			45.80	45.81	45.80
No46	500	9490	184.0	367.80	0.0305	4.03	0.50	4.73	41.08	45.81	0.01	0.01	0.01			45.82	45.83	45.81
No47	500	9990	184.0	376.47	0.0305	3.98	0.49	4.69	41.14	45.83	0.01	0.00	0.01			45.84	45.84	45.83
B18	280	10270	184.0	359.66	0.0305	3.97	0.51	4.80	41.04	45.84	0.01		0.01	Bridge	0.01			45.84
				360.15	0.0305	3.98	0.51	4.80		45.84	0.01	0.00				45.85	45.86	
No48	220	10490	184.0	368.55	0.0305	4.21	0.50	5.17	40.68	45.85	0.01	0.01	0.00			45.86	45.87	45.86
No49	500	10990	184.0	361.99	0.0305	4.01	0.51	4.73	41.14	45.87	0.01	0.01	0.01			45.88	45.89	45.87
No50	500	11490	184.0	347.18	0.0305	3.91	0.53	4.66	41.23	45.89	0.01	0.01	0.01			45.90	45.91	45.89
No51	500	11990	184.0	355.61	0.0305	4.05	0.52	5.01	40.90	45.91	0.01	0.01	0.01			45.92	45.93	45.91
No52	500	12490	184.0	348.31	0.0305	4.04	0.53	4.75	41.18	45.93	0.01	0.01	0.01			45.94	45.95	45.93
No53	500	12990	186.4	361.34	0.0305	4.17	0.52	5.07	40.88	45.95	0.01	0.01	0.01			45.96	45.97	45.95
B17	470	13460	186.4	386.32	0.0305	4.28	0.48	5.78	40.18	45.96	0.01		0.01	Bridge	0.00			45.97
				386.68	0.0305	4.29	0.48	5.79		45.97	0.01	0.00				45.98	45.98	
No54	30	13490	186.4	396.27	0.0305	4.55	0.47	6.14	39.83	45.97	0.01	0.00	0.00			45.98	45.98	45.98

G-54

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < -47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B16	94	13584	186.4	343.67	0.0305	4.20	0.54	5.17	40.80	45.97	0.02		0.00	Bridge	0.00			45.98
				343.91	0.0305	4.20	0.54	5.17	40.80	45.97	0.01	0.01				45.99	45.99	45.99
No55	406	13990	186.4	369.20	0.0305	4.00	0.50	5.10	40.89	45.99	0.01	0.01	0.01			46.00	45.01	45.99
No56	500	14490	186.4	383.08	0.0305	4.08	0.49	5.15	40.86	46.01	0.01	0.01	0.01			46.02	45.03	46.01
No57	500	14990	186.4	367.59	0.0305	3.96	0.51	4.44	41.58	46.02	0.01	0.01	0.01			46.04	45.05	46.03
No58	500	15490	187.3	352.45	0.0305	3.79	0.53	4.68	41.36	46.04	0.01	0.01	0.01			46.06	45.07	46.05
No59	500	15990	187.3	360.66	0.0305	3.80	0.52	5.06	41.01	46.07	0.01	0.01	0.01			46.08	45.09	46.07
No60	500	16490	187.9	351.44	0.0305	4.03	0.53	4.75	41.34	46.09	0.01	0.01	0.01			46.10	45.11	46.09
No61	500	16990	187.9	370.53	0.0305	4.00	0.51	4.65	41.46	46.11	0.01	0.01	0.01			46.12	45.13	46.11
No62	500	17490	187.9	353.08	0.0305	4.18	0.53	5.08	41.04	46.12	0.01	0.01	0.01			46.14	45.15	46.13
No63	500	17990	188.5	350.84	0.0305	3.90	0.54	5.00	41.15	46.15	0.01	0.01	0.01			46.16	45.17	46.15
B15	432	18422	188.5	311.14	0.0305	3.88	0.61	4.65	41.51	46.16	0.02		0.01	Bridge	0.01			46.17
				311.85	0.0305	3.89	0.60	4.66	41.51	46.17	0.02	0.00				46.19	45.19	46.19
No64	68	18490	188.5	339.05	0.0305	4.13	0.55	4.97	41.21	46.18	0.02	0.01	0.00			46.19	45.20	46.19
No65	500	18990	188.5	378.17	0.0305	4.17	0.50	5.19	41.01	46.20	0.01	0.01	0.01			46.21	45.22	46.20
No66	500	19490	188.5	357.82	0.0305	4.26	0.53	5.12	41.10	46.22	0.01	0.01	0.01			46.23	45.24	46.22
No67	500	19990	188.5	354.76	0.0305	4.62	0.53	5.94	40.29	46.23	0.01	0.01	0.01			46.25	45.26	46.24
No68	500	20490	188.5	393.42	0.0305	4.91	0.48	6.23	40.02	46.25	0.01	0.01	0.01			46.26	45.27	46.26
No69	500	20990	188.5	357.10	0.0305	4.78	0.53	6.00	40.26	46.26	0.01	0.01	0.01			46.28	45.29	46.27
No70	500	21490	188.5	361.36	0.0305	5.02	0.52	7.34	38.54	46.28	0.01	0.01	0.01			46.29	45.30	46.29
B14_No	500	21990	188.5	368.58	0.0305	4.33	0.51	6.11	40.19	46.30	0.01		0.01	Bridge	0.00			46.30
				368.99	0.0305	4.33	0.51	6.11	40.19	46.30	0.01	0.01				46.31	45.32	46.32
No72	500	22490	188.5	391.35	0.0305	5.28	0.48	6.99	39.33	46.32	0.01	0.01	0.01			46.33	45.33	46.32
No73	500	22990	189.6	394.52	0.0305	5.17	0.48	6.48	39.85	46.33	0.01	0.01	0.01			46.34	45.35	46.33
No74	500	23490	189.6	386.21	0.0305	5.56	0.49	7.54	38.80	46.34	0.01	0.01	0.01			46.35	45.36	46.35
No75	500	23990	189.6	405.26	0.0305	5.39	0.47	7.19	39.16	46.35	0.01	0.01	0.01			46.36	45.37	46.36
No76	500	24490	190.2	418.30	0.0305	5.33	0.45	7.96	38.40	46.36	0.01	0.01	0.01			46.37	45.38	46.37
No77	500	24990	190.2	437.33	0.0305	5.50	0.43	7.20	39.17	46.37	0.01	0.00	0.00			46.38	45.39	46.38
No78	500	25490	190.2	383.30	0.0305	5.13	0.49	6.46	39.92	46.38	0.01	0.01	0.01			46.39	45.40	46.39
No79	500	25990	190.2	503.31	0.0305	5.96	0.38	7.47	38.53	46.40	0.01	0.00	0.00			46.40	45.41	46.40
No80	293	26283	190.2	470.50	0.0305	5.33	0.40	6.76	39.64	46.40	0.01	0.00	0.00			46.41	45.41	46.40
No81	207	26490	190.2	457.62	0.0305	5.36	0.42	7.81	38.59	46.40	0.01	0.00	0.00			46.41	45.41	46.41

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < 47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	190.2	427.16	0.0305	5.76	0.45	7.78	38.63	46.41	0.01	0.00	0.00			46.42	45.42	46.41
No83	500	27490	190.2	445.79	0.0305	6.14	0.43	8.34	38.08	46.42	0.01	0.00	0.00			46.43	45.43	46.42
B13	455	27945	190.2	331.65	0.0305	3.92	0.57	6.18	40.25	46.43	0.02		0.01	Bridge	0.01			46.43
				332.37	0.0305	3.93	0.57	6.18		46.43	0.02	0.00				46.45	45.45	
No84	45	27990	190.2	416.38	0.0305	5.61	0.46	7.73	38.71	46.44	0.01	0.00	0.00			46.45	45.46	46.45
No85	500	28490	190.2	401.75	0.0305	5.42	0.47	7.27	39.18	46.45	0.01	0.01	0.01			46.46	45.47	46.46
No86	500	28990	190.2	388.98	0.0305	4.99	0.49	6.11	40.35	46.46	0.01	0.01	0.01			46.47	45.48	46.47
No87	500	29490	190.2	364.31	0.0305	4.65	0.52	5.81	40.67	46.48	0.01	0.01	0.01			46.49	45.50	46.48
No88	500	29990	190.2	386.43	0.0305	4.99	0.49	6.14	40.35	46.49	0.01	0.01	0.01			46.50	45.51	46.50
No89	500	30490	190.2	404.77	0.0305	5.37	0.47	7.06	39.44	46.50	0.01	0.01	0.01			46.52	45.52	46.51
No90	500	30990	190.2	465.46	0.0305	5.81	0.41	8.02	38.50	46.52	0.01	0.00	0.00			46.53	45.53	46.52
No91	500	31490	190.2	416.47	0.0305	5.62	0.46	7.72	38.80	46.52	0.01	0.00	0.00			46.53	45.54	46.53
No92	500	31990	190.2	391.54	0.0305	5.29	0.49	6.69	39.84	46.53	0.01	0.01	0.01			46.54	45.55	46.54
No93	500	32490	190.2	360.57	0.0305	4.85	0.53	6.13	40.41	46.54	0.01	0.01	0.01			46.56	45.57	46.55
No94	500	32990	190.2	346.77	0.0305	4.53	0.55	6.56	40.00	46.56	0.02	0.00	0.01			46.58	45.58	46.57
B12	91	33081	190.2	278.85	0.0305	3.53	0.68	4.97	41.59	46.56	0.02		0.00	Bridge	0.01			46.58
				279.65	0.0305	3.54	0.68	4.98		46.57	0.02	0.02				46.59	45.61	
No95	409	33490	190.2	340.84	0.0305	4.81	0.56	6.51	40.09	46.60	0.02	0.01	0.01			46.61	45.62	46.61
B11_No	500	33990	190.2	300.94	0.0305	3.52	0.63	4.67	41.85	46.62	0.02		0.02	Bridge	0.01			46.62
				301.53	0.0305	3.53	0.63	4.68		46.63	0.02	0.02				46.65	45.66	
No97	500	34490	190.2	426.35	0.0305	4.91	0.45	6.60	40.06	46.66	0.01	0.01	0.01			46.67	45.68	46.66
No98	500	34990	190.2	385.41	0.0305	5.04	0.49	6.73	39.54	46.67	0.01	0.01	0.01			46.68	45.69	46.68
No99	500	35490	190.2	378.42	0.0305	5.19	0.50	6.72	39.96	46.68	0.01	0.01	0.01			46.70	45.70	46.69
No100	500	35990	190.2	350.42	0.0305	4.76	0.54	6.10	40.60	46.70	0.02	0.01	0.01			46.71	45.72	46.70
No101	500	36490	190.2	373.28	0.0305	4.98	0.51	6.32	40.39	46.71	0.01	0.01	0.01			46.73	45.73	46.72
No102	500	36990	190.4	412.59	0.0305	5.49	0.46	8.06	38.67	46.73	0.01	0.01	0.01			46.74	45.74	46.73
No103	500	37490	190.4	381.71	0.0305	4.95	0.50	6.14	40.60	46.74	0.01	0.01	0.01			46.75	45.76	46.74
No104	500	37990	190.4	350.66	0.0305	4.68	0.54	6.10	40.65	46.75	0.02	0.00	0.01			46.77	45.77	46.76
B10	170	38160	190.4	290.62	0.0305	3.77	0.66	4.80	41.85	46.75	0.02		0.01	Bridge	0.01			46.77
				291.36	0.0305	3.78	0.65	4.81		46.76	0.02	0.01				46.78	45.80	
No105	330	38490	190.4	376.28	0.0305	5.02	0.51	6.43	40.36	46.79	0.01	0.01	0.00			46.80	45.81	46.80
No105	500	38990	190.4	351.54	0.0305	4.92	0.54	6.17	40.63	46.80	0.01	0.01	0.01			46.81	45.82	46.81

G-56

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < 47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	190.4	386.85	0.0305	5.16	0.49	6.40	40.42	46.82	0.01	0.01	0.01			46.83	45.84	46.82
No108	500	39990	190.4	351.23	0.0305	4.57	0.54	6.07	40.76	46.83	0.01	0.00	0.01			46.84	45.85	46.84
B9	77	40067	190.4	343.91	0.0305	4.40	0.55	5.92	40.51	46.83	0.02		0.00	Bridge	0.00			46.85
				344.31	0.0305	4.41	0.55	5.93		46.84	0.02	0.01				46.85	45.86	
No109	423	40490	190.4	399.09	0.0305	5.63	0.48	7.57	39.28	46.85	0.01	0.01	0.00			46.87	45.87	46.86
No110	500	40990	190.4	362.51	0.0305	5.20	0.53	6.57	40.29	46.86	0.01	0.01	0.01			46.88	45.88	46.87
No111	500	41490	190.4	398.44	0.0305	5.23	0.48	6.91	39.57	46.88	0.01	0.01	0.01			46.89	45.90	46.88
No112	500	41990	190.4	389.19	0.0305	5.32	0.49	6.91	39.58	46.89	0.01	0.01	0.01			46.90	45.91	46.90
No113	500	42490	190.4	384.75	0.0305	4.92	0.49	6.59	40.31	46.90	0.01	0.01	0.01			46.91	45.92	46.91
No114	500	42990	190.4	411.03	0.0305	5.39	0.46	6.91	40.01	46.92	0.01	0.01	0.01			46.93	45.93	46.92
No115	500	43490	190.4	372.84	0.0305	4.91	0.51	6.17	40.76	46.93	0.01	0.01	0.01			46.94	45.95	46.93
B8_No1	500	43990	190.4	369.20	0.0305	4.75	0.52	6.17	40.77	46.94	0.01		0.01	Bridge	0.00			46.95
				369.60	0.0305	4.75	0.52	6.18		46.95	0.01	0.01				46.96	45.97	
No117	500	44490	190.4	393.22	0.0305	5.06	0.48	6.70	40.26	46.96	0.01	0.01	0.01			46.97	45.98	46.97
No118	500	44990	190.4	388.95	0.0305	5.00	0.49	6.51	40.46	46.97	0.01	0.01	0.01			46.99	45.99	46.98
No119	500	45490	190.4	373.63	0.0305	4.64	0.51	5.92	41.07	46.99	0.01	0.01	0.01			47.00	47.01	46.99
No120	500	45990	190.4	351.84	0.0305	4.48	0.54	5.70	41.30	47.00	0.01	0.01	0.01			47.02	47.02	47.01
B7	386	46376	190.4	385.74	0.0305	4.50	0.49	5.60	41.42	47.02	0.01		0.01	Bridge	0.00			47.02
				386.09	0.0305	4.50	0.49	5.60		47.02	0.01	0.00				47.03	47.04	
No121	114	46490	190.4	377.64	0.0305	4.78	0.50	6.17	40.86	47.03	0.01	0.01	0.00			47.04	47.05	47.04
No122	500	46990	190.4	357.69	0.0305	4.68	0.53	5.96	41.08	47.04	0.01	0.01	0.01			47.05	47.06	47.05
No123	500	47490	190.4	358.23	0.0305	4.71	0.53	5.98	41.08	47.06	0.01	0.01	0.01			47.07	47.08	47.06
No124	500	47990	190.4	359.11	0.0305	4.82	0.53	6.25	40.82	47.07	0.01	0.01	0.01			47.09	47.09	47.08
No125	500	48490	190.4	362.75	0.0305	4.77	0.52	6.16	40.93	47.09	0.01	0.01	0.01			47.10	47.11	47.09
No125	500	48990	190.4	353.98	0.0305	4.70	0.54	5.73	41.37	47.10	0.01	0.01	0.01			47.12	47.13	47.11
No127	500	49490	190.4	355.57	0.0305	4.63	0.54	5.80	41.32	47.12	0.01	0.01	0.01			47.14	47.14	47.13
No128	500	49990	190.4	341.85	0.0305	4.65	0.56	5.68	41.46	47.14	0.02	0.01	0.01			47.15	47.16	47.14
No129	500	50490	190.4	336.25	0.0305	4.36	0.57	5.97	41.19	47.16	0.02	0.01	0.01			47.17	47.18	47.16
No130	500	50990	190.4	352.87	0.0305	4.16	0.54	5.56	41.62	47.18	0.01	0.01	0.01			47.19	47.20	47.18
No131	500	51490	190.4	377.89	0.0305	4.90	0.50	6.20	41.00	47.20	0.01	0.01	0.01			47.21	47.22	47.20
No132	500	51990	190.4	335.17	0.0305	4.18	0.57	5.32	41.89	47.21	0.02	0.01	0.01			47.23	47.24	47.22
No133	500	52490	190.4	314.75	0.0305	3.94	0.60	5.17	42.07	47.24	0.02	0.01	0.01			47.25	47.26	47.24

G-57

Non-uniform flow calculation table

Case: Ibrahimia_Canal_2012_190.4m³/s

Necessary water level: 47.56 < 47.60 NG

n= 0.0305

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B6	271	52761	190.4	270.04	0.0305	3.81	0.71	5.75	41.50	47.25	0.03	0.01	0.01	Bridge	0.01			47.26	
B5	45	52806	190.4	270.76	0.0305	3.81	0.70	5.76		47.26	0.03	0.00				47.28	47.28		
				326.89	0.0305	4.64	0.58	6.22	41.05	47.27	0.02	0.00	0.00	Bridge	0.01			47.28	
No134	184	52990	190.4	327.46	0.0305	4.65	0.58	6.23		47.28	0.02	0.00				47.29	47.30		
				336.99	0.0305	5.35	0.57	7.15	40.13	47.28	0.02	0.00	0.00			47.30	47.30	47.30	
B4	236	53226	190.4	345.14	0.0305	5.26	0.55	7.52		47.29	0.02	0.00	0.00	Bridge	0.00			47.30	
				345.40	0.0305	5.26	0.55	7.53	39.77	47.29	0.02	0.00	0.00	Bridge	0.00			47.30	
No135	264	53490	190.4	321.93	0.0305	4.70	0.59	6.78	40.52	47.30	0.02	0.01	0.01			47.31	47.32	47.32	
No135	500	53990	190.4	355.83	0.0305	4.70	0.54	6.38	40.55	47.33	0.01	0.01	0.01			47.32	47.33	47.32	
No137	500	54490	190.4	406.15	0.0305	4.93	0.47	6.66	40.68	47.34	0.01	0.01	0.01			47.34	47.35	47.33	
No138	500	54990	190.4	373.36	0.0305	4.77	0.51	6.60	40.75	47.35	0.01	0.01	0.01			47.35	47.36	47.35	
No139	500	55490	190.4	342.39	0.0305	4.65	0.56	6.03	41.34	47.37	0.02	0.01	0.01			47.37	47.38	47.36	
No140	500	55990	190.4	346.40	0.0305	4.89	0.55	6.53	40.86	47.39	0.02	0.01	0.01			47.38	47.39	47.38	
No141	500	56490	190.4	312.38	0.0305	4.33	0.61	5.15	42.25	47.40	0.02	0.01	0.01			47.40	47.41	47.39	
No142	516	57006	190.4	332.26	0.0305	4.87	0.57	6.31	41.12	47.43	0.02	0.00	0.01			47.42	47.44	47.41	
No143	115	57121	190.4	326.53	0.0305	4.86	0.58	6.36	41.07	47.43	0.02	0.01	0.00			47.44	47.45	47.44	
No144	369	57490	190.4	333.64	0.0305	5.15	0.57	6.46	40.99	47.45	0.02	0.01	0.01			47.45	47.46	47.45	
No145	500	57990	190.4	346.67	0.0305	4.95	0.55	6.13	41.33	47.46	0.02	0.01	0.01			47.46	47.47	47.46	
No146	500	58490	190.4	318.54	0.0305	4.12	0.60	5.17	42.31	47.48	0.02	0.01	0.01			47.48	47.49	47.47	
No147	500	58990	190.4	331.64	0.0305	5.01	0.57	6.43	41.07	47.50	0.02	0.01	0.01			47.50	47.51	47.49	
B3	443	59433	190.4	357.76	0.0305	5.26	0.58	7.30	40.22	47.52	0.01	0.01	0.01	Bridge	0.00		47.52	47.53	47.51
				358.09	0.0305	5.26	0.58	7.31	40.22	47.52	0.01	0.00	0.01	Bridge	0.00		47.52	47.53	
No148	57	59490	190.4	314.60	0.0305	3.73	0.61	5.27	42.25	47.52	0.02	0.00	0.00			47.54	47.54	47.54	
B2	116	59606	190.4	299.96	0.0305	3.93	0.63	4.56	42.97	47.53	0.02	0.01	0.00	Bridge	0.02		47.54	47.55	47.54
				301.25	0.0305	3.94	0.63	4.58		47.55	0.02	0.01	0.00	Bridge	0.02		47.55	47.55	
No149	384	59990	190.4	343.44	0.0305	4.35	0.55	5.81	41.76	47.57	0.02	0.00	0.01			47.57	47.58	47.54	
B1	152	60142	190.4	361.60	0.0305	4.84	0.53	6.58	41.00	47.58	0.01	0.01	0.00	Bridge	0.01		47.59	47.59	47.58
				362.11	0.0305	4.84	0.53	6.59		47.59	0.01	0.01	0.00	Bridge	0.01		47.59	47.59	
No150	333	60475	190.4	295.02	0.0305	3.18	0.65	4.10	43.50	47.60	0.02	0.01	0.01			47.60	47.60	47.58	
										47.60	0.02	0.01	0.01			47.62	47.60	47.60	

Case; Present

Non-uniform flow calculation table

Case: Ibrahimia_Canal_actualQ_474m³/s Present Ibrahimia Head Regulator water level: 50.16 n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL. difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	455.0	659.96	0.0256	3.79	0.69	4.98	41.12	46.10	0.02	0.00				46.12	45.13	
No2	50	50	455.0	437.02	0.0256	4.56	1.04	5.84	40.23	46.07	0.06	0.00	0.00			46.13	45.13	46.13
No3	50	100	455.0	454.05	0.0256	5.19	1.00	6.29	39.79	46.08	0.05	0.00	0.00			46.13	45.13	46.13
No4	50	150	455.0	444.34	0.0256	5.28	1.02	6.82	39.26	46.08	0.05	0.00	0.00			46.14	45.14	46.13
B21	18	168	455.0	419.23	0.0256	4.71	1.09	6.09	39.59	46.08	0.06		0.00	Bridge	0.02			46.14
				421.32	0.0256	4.73	1.08	6.11		46.10	0.06	0.00				46.16	45.16	
No5	32	200	455.0	434.64	0.0256	5.22	1.05	7.09	39.02	46.11	0.06	0.00	0.00			46.16	45.17	46.16
No6	50	250	455.0	405.73	0.0256	5.61	1.12	7.49	38.61	46.10	0.06	0.00	0.00			46.17	45.17	46.17
No7	50	300	455.0	458.77	0.0256	5.65	0.99	7.52	38.60	46.12	0.05	0.00	0.00			46.17	45.17	46.17
No8	50	350	455.0	427.99	0.0256	5.56	1.05	7.92	38.20	46.12	0.06	0.00	0.00			46.18	45.18	46.17
No9	50	400	455.0	430.65	0.0256	4.72	1.05	6.00	40.12	46.12	0.06	0.00	0.00			46.18	45.18	46.18
No10	50	450	455.0	437.77	0.0256	4.56	1.04	5.78	40.35	46.13	0.06	0.00	0.00			46.18	45.19	46.18
No11	50	500	455.0	436.38	0.0256	4.52	1.04	5.61	40.52	46.13	0.06	0.00	0.00			46.19	45.19	46.19
No12	50	550	455.0	433.15	0.0256	4.42	1.05	5.66	40.48	46.14	0.06	0.00	0.00			46.19	45.20	46.19
No13	50	600	455.0	432.23	0.0256	4.32	1.05	5.40	40.74	46.14	0.06	0.00	0.00			46.20	45.20	46.20
No14	50	650	455.0	457.81	0.0256	4.51	0.99	5.55	40.60	46.15	0.05	0.00	0.00			46.20	45.21	46.20
No15	50	700	455.0	428.99	0.0256	4.43	1.05	5.45	40.70	46.15	0.06	0.00	0.00			46.21	45.21	46.21
No16	50	750	455.0	454.00	0.0256	4.39	1.00	5.16	41.00	46.16	0.05	0.00	0.00			46.21	45.21	46.21
No17	50	800	456.2	432.05	0.0256	4.18	1.05	4.79	41.37	46.16	0.06	0.00	0.00			46.22	45.22	46.21
No18	50	850	456.2	447.75	0.0256	4.29	1.02	5.06	41.11	46.17	0.05	0.00	0.00			46.22	45.22	46.22
No19	50	900	456.2	450.49	0.0256	4.34	1.01	5.17	41.00	46.17	0.05	0.00	0.00			46.23	45.23	46.22
No20	50	950	456.2	451.23	0.0256	4.19	1.01	4.95	41.23	46.18	0.05	0.00	0.00			46.23	45.23	46.23
B20	40	990	456.2	455.19	0.0256	4.10	1.09	5.20	40.58	46.18	0.05		0.00	Bridge	0.02			46.23
				457.76	0.0256	4.11	1.00	5.23		46.21	0.05	0.00				46.26	45.26	
No21	10	1000	456.2	452.07	0.0256	4.08	1.01	4.84	41.37	46.21	0.05	0.00	0.00			46.26	45.26	46.26
No22	50	1050	456.2	480.98	0.0256	4.21	0.95	4.99	41.23	46.22	0.05	0.00	0.00			46.26	45.27	46.26
No23	50	1100	456.2	474.81	0.0256	4.28	0.95	5.11	41.11	46.22	0.05	0.00	0.00			46.27	45.27	46.27
No24	50	1150	456.2	487.49	0.0256	4.38	0.94	5.30	40.93	46.23	0.04	0.00	0.00			46.27	45.27	46.27
No25	50	1200	456.2	492.61	0.0256	4.18	0.93	5.23	41.00	46.23	0.04	0.00	0.00			46.28	45.28	46.27
No26	50	1250	456.2	592.88	0.0256	4.01	0.77	5.19	41.06	46.25	0.03	0.00	0.00			46.28	45.28	46.28
No27	50	1300	456.2	455.17	0.0256	4.51	1.00	5.46	40.77	46.23	0.05	0.00	0.00			46.28	45.29	46.28
No28	50	1350	456.2	478.33	0.0256	4.72	0.95	5.89	40.35	46.24	0.05	0.00	0.00			46.29	45.29	46.29

G-60

Non-uniform flow calculation table

Present

Case: Ibrahimia_Canal_actualQ_474m³/s

Ibrahimia Head Regulator water level:

50.16

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	456.2	425.07	0.0256	4.55	1.07	5.92	40.31	46.23	0.06	0.00	0.00			46.29	45.30	46.29
No30	50	1450	456.2	413.98	0.0256	4.72	1.10	5.75	40.49	46.24	0.06	0.03	0.00			46.30	45.32	46.30
No31	540	1990	456.2	435.91	0.0256	4.88	1.05	5.98	40.31	46.29	0.06	0.02	0.02			46.35	45.37	46.32
No32	500	2490	456.2	426.72	0.0256	4.74	1.07	6.26	40.08	46.34	0.06	0.02	0.02			46.39	45.42	46.37
No33	500	2990	456.2	443.34	0.0256	4.87	1.03	6.15	40.23	46.38	0.05	0.02	0.02			46.44	45.46	46.42
No34	500	3490	456.8	444.32	0.0256	4.58	1.03	5.87	40.56	46.43	0.05	0.02	0.02			46.48	45.50	46.46
No35	500	3990	456.8	445.98	0.0256	4.47	1.02	5.83	40.64	46.47	0.05	0.02	0.02			46.53	45.55	46.50
No36	500	4490	457.0	442.82	0.0256	3.96	1.03	5.47	41.05	46.52	0.05	0.03	0.03			46.58	45.61	46.55
No37	500	4990	457.0	451.43	0.0256	5.10	1.01	6.30	40.27	46.57	0.05	0.02	0.02			46.63	45.65	46.61
No38	500	5490	457.4	469.82	0.0256	5.23	0.97	6.64	39.57	46.61	0.05	0.02	0.02			46.66	45.68	46.65
No39	500	5990	457.4	480.04	0.0256	5.00	0.95	5.96	40.69	46.65	0.05	0.02	0.02			46.70	45.71	46.68
No40	500	6490	457.4	540.54	0.0256	5.79	0.85	7.47	39.22	46.69	0.04	0.00	0.01			46.73	45.73	46.71
B19	55	6545	457.4	446.97	0.0256	5.29	1.02	6.48	40.20	46.68	0.05		0.00	Bridge	0.02			46.73
				448.79	0.0256	5.30	1.02	6.50		46.70	0.05	0.02				46.75	45.77	
No41	445	6990	457.4	459.46	0.0256	5.07	1.01	6.32	40.41	46.73	0.05	0.02	0.02			46.78	45.80	46.77
No42	500	7490	457.4	483.78	0.0256	5.21	0.95	6.53	40.24	46.77	0.05	0.02	0.02			46.82	45.83	46.80
No43	500	7990	457.8	468.74	0.0256	5.07	0.93	6.60	40.20	46.80	0.05	0.02	0.02			46.85	45.87	46.83
No44	500	8490	457.8	475.73	0.0256	5.09	0.95	6.46	40.38	46.84	0.05	0.02	0.02			46.89	45.91	46.87
No45	500	8990	457.9	466.66	0.0256	5.07	0.98	6.56	40.31	46.87	0.05	0.02	0.02			46.92	45.94	46.91
No46	500	9490	457.9	468.38	0.0256	4.88	0.98	5.83	41.08	46.91	0.05	0.02	0.02			46.96	45.98	46.94
No47	500	9990	457.9	483.70	0.0256	4.77	0.95	5.81	41.14	46.95	0.05	0.01	0.02			47.00	47.01	46.98
B18	280	10270	458.0	462.94	0.0256	4.81	0.99	5.93	41.04	46.97	0.05		0.01	Bridge	0.05			47.01
				467.76	0.0256	4.84	0.98	5.98		47.02	0.05	0.01				47.07	47.08	
No48	220	10490	458.0	471.94	0.0256	5.10	0.97	6.36	40.68	47.04	0.05	0.02	0.01			47.08	47.10	47.08
No49	500	10990	458.0	471.05	0.0256	4.86	0.97	5.93	41.14	47.07	0.05	0.02	0.02			47.12	47.14	47.10
No50	500	11490	458.0	457.39	0.0256	4.75	1.00	5.88	41.23	47.11	0.05	0.02	0.02			47.16	47.18	47.14
No51	500	11990	458.0	466.98	0.0256	4.81	0.98	6.25	40.90	47.15	0.05	0.02	0.02			47.20	47.22	47.18
No52	500	12490	458.0	458.13	0.0256	4.24	1.00	6.01	41.18	47.19	0.05	0.02	0.02			47.24	47.27	47.22
No53	500	12990	463.9	473.87	0.0256	4.75	0.98	6.36	40.88	47.24	0.05	0.02	0.02			47.29	47.31	47.27
B17	470	13460	463.9	506.93	0.0256	5.20	0.92	7.10	40.18	47.28	0.04		0.01	Bridge	0.03			47.31
				510.00	0.0256	5.23	0.91	7.13		47.31	0.04	0.00				47.35	47.35	
No54	30	13490	463.9	513.35	0.0256	5.55	0.90	7.48	39.83	47.31	0.04	0.00	0.00			47.35	47.36	47.35

G-61

Non-uniform flow calculation table

Present

Case: Ibrahimia_Canal_actualQ_474m³/s

Ibrahimia Head Regulator water level: 50.16

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(m)
B16	94	13584	463.9	453.76	0.0256	4.97	1.02	6.51	40.80	47.31	0.05	0.00	0.01	Bridge	0.01			47.36	
				454.85	0.0256	4.98	1.02	6.52		47.32	0.05	0.02					47.37	47.39	
No55	406	13990	463.9	495.46	0.0256	5.08	0.94	6.47	40.89	47.36	0.04	0.02	0.01				47.40	47.42	47.39
No56	500	14490	463.9	508.96	0.0256	5.20	0.91	6.53	40.86	47.39	0.04	0.02	0.02				47.43	47.45	47.42
No57	500	14990	463.9	495.10	0.0256	5.09	0.94	6.84	41.58	47.42	0.04	0.02	0.02				47.46	47.48	47.45
No58	500	15490	466.1	481.46	0.0256	4.94	0.97	6.09	41.36	47.45	0.05	0.02	0.02				47.50	47.52	47.48
No59	500	15990	466.1	481.28	0.0256	4.81	0.97	6.48	41.01	47.49	0.05	0.02	0.02				47.54	47.55	47.52
No60	500	16490	467.7	475.96	0.0256	5.16	0.98	6.18	41.34	47.52	0.05	0.02	0.02				47.57	47.59	47.55
No61	500	16990	467.7	502.75	0.0256	5.14	0.93	6.10	41.46	47.56	0.04	0.02	0.02				47.61	47.62	47.59
No62	500	17490	467.7	473.36	0.0256	5.37	0.99	6.55	41.04	47.59	0.05	0.02	0.02				47.64	47.66	47.62
No63	500	17990	469.1	481.54	0.0256	5.14	0.97	6.48	41.15	47.63	0.05	0.02	0.02				47.67	47.69	47.66
B15	432	18422	469.1	433.37	0.0256	4.37	1.08	6.14	41.51	47.65	0.06	0.02	0.02	Bridge	0.03				47.69
				435.95	0.0256	4.39	1.08	6.17		47.68	0.06	0.00					47.74	47.74	
No64	68	18490	469.2	464.74	0.0256	5.18	1.01	6.48	41.21	47.69	0.05	0.02	0.00				47.74	47.76	47.74
No65	500	18990	469.2	525.90	0.0256	4.60	0.89	6.73	41.01	47.74	0.04	0.02	0.02				47.78	47.80	47.76
No66	500	19490	469.2	490.56	0.0256	4.60	0.96	6.67	41.10	47.77	0.05	0.02	0.02				47.82	47.84	47.80
No67	500	19990	469.2	470.53	0.0256	5.81	1.00	7.51	40.29	47.80	0.05	0.02	0.02				47.85	47.87	47.84
No68	500	20490	469.2	515.29	0.0256	6.11	0.91	7.82	40.02	47.84	0.04	0.01	0.01				47.88	47.89	47.87
No69	500	20990	469.2	472.81	0.0256	5.94	0.99	7.60	40.26	47.86	0.05	0.02	0.02				47.91	47.92	47.89
No70	500	21490	469.2	474.17	0.0256	6.11	0.99	8.95	38.54	47.89	0.05	0.01	0.01				47.94	47.95	47.92
B14_No	500	21990	469.2	511.18	0.0256	5.15	0.92	7.73	40.19	47.92	0.04	0.02	0.02	Bridge	0.02				47.95
				512.70	0.0256	5.15	0.92	7.75		47.94	0.04	0.02					47.98	48.00	
No72	500	22490	469.2	522.05	0.0256	5.03	0.90	8.64	39.33	47.97	0.04	0.02	0.02				48.01	48.03	48.00
No73	500	22990	471.9	521.64	0.0256	4.97	0.90	8.15	39.85	48.00	0.04	0.02	0.02				48.04	48.06	48.03
No74	500	23490	471.9	503.36	0.0256	5.08	0.94	9.23	38.80	48.03	0.04	0.02	0.02				48.07	48.09	48.06
No75	500	23990	471.9	536.14	0.0256	6.09	0.88	8.90	39.16	48.06	0.04	0.01	0.01				48.10	48.11	48.09
No76	500	24490	473.4	556.57	0.0256	5.89	0.85	9.69	38.40	48.09	0.04	0.01	0.01				48.13	48.14	48.11
No77	500	24990	473.4	569.43	0.0256	6.69	0.83	8.94	39.17	48.11	0.04	0.01	0.01				48.15	48.15	48.14
No78	500	25490	473.4	512.85	0.0256	6.36	0.92	8.20	39.92	48.12	0.04	0.01	0.01				48.17	48.18	48.15
No79	500	25990	473.4	643.80	0.0256	7.23	0.74	9.23	38.53	48.16	0.03	0.00	0.01				48.18	48.19	48.18
No80	293	26283	473.4	627.03	0.0256	6.52	0.75	8.52	39.64	48.16	0.03	0.00	0.00				48.19	48.20	48.19
No81	207	26490	473.4	605.30	0.0256	6.57	0.78	9.58	38.59	48.17	0.03	0.01	0.00				48.20	48.21	48.20

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_actualQ_474m³/s Present Ibrahimia Head Regulator water level: 50.16 n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c) (m)	(d) (m)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	473.4	563.27	0.0256	6.00	0.84	9.55	38.63	48.18	0.04	0.01	0.01			48.22	48.23	48.21
No83	500	27490	473.4	570.35	0.0256	7.23	0.83	10.12	38.08	48.20	0.04	0.01	0.01			48.24	48.24	48.23
B13	455	27945	473.4	483.55	0.0256	5.30	0.98	7.96	40.25	48.21	0.05		0.02	Bridge	0.03			48.24
				485.86	0.0256	5.32	0.97	7.99		48.24	0.05	0.00				48.28	48.29	
No84	45	27990	473.4	545.63	0.0256	6.82	0.87	9.54	38.71	48.25	0.04	0.01	0.00			48.29	48.30	48.29
No85	500	28490	473.4	541.05	0.0256	5.67	0.87	9.09	39.18	48.27	0.04	0.01	0.01			48.31	48.32	48.30
No86	500	28990	473.4	529.34	0.0256	6.30	0.89	7.94	40.35	48.29	0.04	0.01	0.01			48.33	48.34	48.32
No87	500	29490	473.4	510.19	0.0256	5.85	0.93	7.64	40.67	48.31	0.04	0.01	0.01			48.36	48.37	48.34
No88	500	29990	473.4	528.68	0.0256	5.47	0.90	7.99	40.35	48.34	0.04	0.01	0.01			48.38	48.40	48.37
No89	500	30490	473.4	546.51	0.0256	5.87	0.87	8.93	39.44	48.37	0.04	0.01	0.01			48.41	48.42	48.40
No90	500	30990	473.4	613.96	0.0256	6.41	0.77	9.90	38.50	48.40	0.03	0.01	0.01			48.43	48.44	48.42
No91	500	31490	473.4	555.32	0.0256	6.00	0.85	9.61	38.80	48.41	0.04	0.01	0.01			48.45	48.46	48.44
No92	500	31990	473.4	529.07	0.0256	5.79	0.89	8.59	39.84	48.43	0.04	0.01	0.01			48.47	48.48	48.46
No93	500	32490	473.4	499.10	0.0256	5.98	0.95	8.04	40.41	48.45	0.05	0.01	0.01			48.50	48.51	48.48
No94	500	32990	473.4	496.26	0.0256	5.62	0.95	8.48	40.00	48.48	0.05	0.00	0.01			48.53	48.53	48.51
B12	91	33081	473.4	436.92	0.0256	4.79	1.08	6.88	41.59	48.47	0.06		0.00	Bridge	0.05			48.53
				441.60	0.0256	4.81	1.07	6.94		48.53	0.06	0.02				48.58	48.60	
No95	409	33490	473.4	480.45	0.0256	5.74	0.99	8.48	40.09	48.57	0.05	0.02	0.01			48.62	48.63	48.60
B11_No	500	33990	473.4	473.48	0.0256	5.05	1.00	6.65	41.55	48.60	0.05		0.02	Bridge	0.02			48.63
				475.13	0.0256	5.06	1.00	6.67		48.62	0.05	0.02				48.67	48.69	
No97	500	34490	473.4	600.79	0.0256	6.44	0.79	8.60	40.06	48.66	0.03	0.01	0.01			48.70	48.70	48.69
No98	500	34990	473.4	535.76	0.0256	6.47	0.88	8.73	39.54	48.67	0.04	0.01	0.01			48.71	48.72	48.70
No99	500	35490	473.4	522.77	0.0256	6.30	0.91	8.73	39.56	48.69	0.04	0.01	0.01			48.74	48.75	48.72
No100	500	35990	473.4	501.76	0.0256	4.93	0.94	8.12	40.60	48.72	0.05	0.02	0.02			48.77	48.78	48.75
No101	500	36490	473.4	525.08	0.0256	5.62	0.90	8.36	40.39	48.75	0.04	0.01	0.01			48.80	48.81	48.78
No102	500	36990	474.0	563.85	0.0256	6.91	0.84	10.11	38.67	48.78	0.04	0.01	0.01			48.82	48.83	48.81
No103	500	37490	474.0	537.68	0.0256	5.32	0.88	8.20	40.60	48.80	0.04	0.01	0.01			48.84	48.85	48.83
No104	500	37990	474.0	506.92	0.0256	4.92	0.94	8.18	40.65	48.83	0.04	0.01	0.02			48.87	48.88	48.85
B10	170	38160	474.0	451.24	0.0256	5.32	1.05	6.88	41.55	48.83	0.06		0.01	Bridge	0.07			48.88
				456.69	0.0256	5.37	1.04	6.95		48.90	0.05	0.01				48.95	48.96	
No105	330	38490	474.0	541.66	0.0256	5.65	0.88	8.57	40.36	48.93	0.04	0.01	0.01			48.97	48.98	48.96
No106	500	38990	474.0	503.75	0.0256	5.39	0.94	8.32	40.63	48.95	0.05	0.02	0.02			49.00	49.01	48.98

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_actualQ_474m³/s Present Ibrahimia Head Regulator water level: 50.16 n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c)	DownStream Ψ (a)+(b)-(d)
No107	500	39490	474.0	546.40	0.0256	6.67	0.87	8.56	40.42	48.98	0.04	0.01	0.01			49.02	49.03	49.01
No108	500	39990	474.0	518.26	0.0256	5.96	0.91	8.24	40.76	49.00	0.04	0.00	0.01			49.05	49.05	49.03
B9	77	40067	474.0	515.45	0.0256	5.68	0.92	8.10	40.51	49.01	0.04		0.00	Bridge	0.01			49.05
				516.75	0.0256	5.67	0.92	8.11		49.02	0.04	0.01				49.06	49.08	
No109	423	40490	474.0	542.74	0.0256	5.75	0.87	9.77	39.28	49.05	0.04	0.01	0.01			49.09	49.10	49.08
No110	500	40990	474.0	512.84	0.0256	5.25	0.92	8.78	40.29	49.07	0.04	0.02	0.02			49.11	49.13	49.10
No111	500	41490	474.0	564.18	0.0256	6.02	0.84	9.13	39.57	49.10	0.04	0.01	0.01			49.14	49.15	49.13
No112	500	41990	474.0	565.17	0.0256	5.77	0.84	9.15	39.58	49.13	0.04	0.01	0.01			49.16	49.17	49.15
No113	500	42490	474.0	566.48	0.0256	5.62	0.84	8.84	40.31	49.15	0.04	0.01	0.01			49.18	49.20	49.17
No114	500	42990	474.0	583.31	0.0256	6.04	0.81	9.16	40.01	49.17	0.03	0.01	0.01			49.20	49.21	49.19
No115	500	43490	474.0	545.98	0.0256	5.68	0.87	8.43	40.76	49.19	0.04	0.01	0.01			49.23	49.24	49.21
B8_No1	500	43990	474.0	537.74	0.0256	6.50	0.88	8.44	40.77	49.21	0.04		0.01	Bridge	0.02			49.24
				539.12	0.0256	6.51	0.88	8.46		49.23	0.04	0.01				49.27	49.28	
No117	500	44490	474.0	561.78	0.0256	6.81	0.84	8.99	40.26	49.25	0.04	0.01	0.01			49.29	49.30	49.28
No118	500	44990	474.0	561.87	0.0256	6.72	0.84	8.81	40.46	49.27	0.04	0.01	0.01			49.31	49.31	49.30
No119	500	45490	474.0	557.17	0.0256	6.40	0.85	8.22	41.07	49.29	0.04	0.01	0.01			49.32	49.33	49.31
No120	500	45990	474.0	545.62	0.0256	5.38	0.87	8.01	41.30	49.31	0.04	0.01	0.01			49.35	49.36	49.33
B7	386	46376	474.0	586.27	0.0256	5.91	0.81	7.91	41.42	49.33	0.03		0.01	Bridge	0.01			49.36
				587.39	0.0256	5.92	0.81	7.92		49.34	0.03	0.00				49.38	49.38	
No121	114	46490	474.0	554.46	0.0256	6.49	0.85	8.48	40.86	49.34	0.04	0.01	0.00			49.38	49.39	49.38
No122	500	46990	474.0	534.71	0.0256	4.87	0.89	8.29	41.08	49.37	0.04	0.02	0.02			49.41	49.42	49.39
No123	500	47490	474.0	531.73	0.0256	6.46	0.89	8.31	41.08	49.39	0.04	0.01	0.01			49.43	49.44	49.42
No124	500	47990	474.0	535.91	0.0256	5.69	0.88	8.60	40.82	49.42	0.04	0.01	0.01			49.46	49.47	49.44
No125	500	48490	474.0	535.30	0.0256	6.56	0.89	8.51	40.93	49.44	0.04	0.01	0.01			49.48	49.49	49.47
No125	500	48990	474.0	552.24	0.0256	4.70	0.85	8.10	41.37	49.47	0.04	0.02	0.02			49.51	49.52	49.49
No127	500	49490	474.0	535.26	0.0256	6.38	0.89	8.17	41.32	49.49	0.04	0.01	0.01			49.53	49.54	49.52
No128	500	49990	474.0	520.86	0.0256	5.60	0.91	8.05	41.46	49.51	0.04	0.01	0.01			49.56	49.57	49.54
No129	500	50490	474.0	528.78	0.0256	5.80	0.99	8.35	41.19	49.54	0.04	0.01	0.01			49.58	49.59	49.57
No130	500	50990	474.0	558.91	0.0256	5.99	0.85	7.95	41.62	49.57	0.04	0.01	0.01			49.61	49.62	49.59
No131	500	51490	474.0	563.00	0.0256	6.61	0.84	8.59	41.00	49.59	0.04	0.01	0.01			49.63	49.63	49.62
No132	500	51990	474.0	534.19	0.0256	5.93	0.89	7.72	41.89	49.61	0.04	0.01	0.01			49.65	49.66	49.63
No133	500	52490	474.0	516.91	0.0256	5.56	0.92	7.56	42.07	49.63	0.04	0.01	0.01			49.67	49.68	49.66

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_actualQ_474m³/s Present Ibrahimia Head Regulator water level: 50.16 n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
B6	271	52761	474.0	450.98	0.0256	5.43	1.05	8.13	41.50	49.63	0.06	0.01	0.01	Bridge	0.02			49.68
				452.79	0.0256	5.44	1.05	8.16		49.66	0.06	0.00				49.71	49.71	49.71
B5	45	52806	474.0	498.52	0.0256	6.28	0.95	8.62	41.05	49.67	0.05	0.00	0.00	Bridge	0.02			49.71
				500.20	0.0256	6.29	0.95	8.64		49.69	0.05	0.00				49.74	49.74	49.74
No134	184	52990	474.0	486.96	0.0256	6.72	0.97	9.57	40.13	49.70	0.05	0.01	0.00			49.75	49.75	49.74
B4	236	53226	474.0	497.45	0.0256	6.93	0.95	9.94	39.77	49.71	0.05	0.01	0.01	Bridge	0.03			49.75
				499.25	0.0256	6.95	0.95	9.97		49.74	0.05	0.01				49.78	49.79	49.79
No135	264	53490	474.0	494.83	0.0256	6.27	0.95	9.23	40.52	49.75	0.05	0.01	0.01			49.80	49.81	49.79
No135	500	53990	474.0	544.44	0.0256	5.70	0.87	8.83	40.55	49.78	0.04	0.01	0.01			49.82	49.83	49.81
No137	500	54490	474.0	603.34	0.0256	6.20	0.79	9.13	40.68	49.81	0.03	0.01	0.01			49.84	49.85	49.83
No138	500	54990	474.0	571.41	0.0256	5.89	0.83	9.08	40.75	49.83	0.04	0.01	0.01			49.86	49.87	49.85
No139	500	55490	474.0	522.24	0.0256	6.53	0.91	8.50	41.34	49.84	0.04	0.01	0.01			49.88	49.90	49.87
No140	500	55990	474.0	524.29	0.0256	6.41	0.90	9.00	40.86	49.86	0.04	0.01	0.01			49.91	49.92	49.90
No141	500	56490	474.0	487.30	0.0256	5.04	0.97	7.64	42.25	49.89	0.05	0.02	0.02			49.94	49.95	49.92
No142	516	57006	474.0	496.68	0.0256	6.70	0.95	8.80	41.12	49.92	0.05	0.00	0.01			49.97	49.97	49.95
No143	115	57121	474.0	496.83	0.0256	5.67	0.95	8.86	41.07	49.93	0.05	0.01	0.00			49.97	49.98	49.97
No144	369	57490	474.0	486.79	0.0256	6.83	0.97	8.95	40.99	49.94	0.05	0.01	0.01			49.99	50.00	49.98
No145	500	57990	474.0	513.62	0.0256	6.77	0.92	8.64	41.33	49.97	0.04	0.01	0.01			50.01	50.03	50.00
No145	500	58490	474.0	509.39	0.0256	5.98	0.93	7.68	42.31	49.99	0.04	0.01	0.01			50.04	50.05	50.03
No147	500	58990	474.0	495.06	0.0256	6.64	0.95	8.95	41.07	50.02	0.05	0.01	0.01			50.06	50.07	50.05
B3	443	59433	474.0	529.97	0.0256	6.73	0.89	9.82	40.22	50.04	0.04	0.01	0.01	Bridge	0.01			50.07
				531.07	0.0256	6.74	0.89	9.84		50.06	0.04	0.00				50.10	50.10	50.10
No148	57	59490	474.0	539.59	0.0256	5.66	0.88	7.81	42.25	50.06	0.04	0.00	0.00			50.10	50.10	50.10
B2	116	59606	474.0	498.58	0.0256	5.65	0.95	7.09	42.97	50.06	0.05	0.01	0.00	Bridge	0.04			50.10
				501.62	0.0256	5.68	0.94	7.13		50.10	0.05	0.01				50.14	50.15	50.15
No149	384	59990	474.0	546.43	0.0256	6.19	0.87	8.36	41.76	50.12	0.04	0.00	0.01			50.16	50.17	50.15
B1	152	60142	474.0	563.29	0.0256	6.36	0.84	9.13	41.00	50.13	0.04	0.01	0.00	Bridge	0.02			50.17
				564.76	0.0256	6.37	0.84	9.15		50.15	0.04	0.01				50.19	50.19	50.19
No150	333	60475	474.0	541.93	0.0256	5.17	0.87	6.66	43.50	50.16	0.04	0.01	0.01			50.20		50.19

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Case; Plan

Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL. difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No1		0	455.0	693.22	0.0256	3.97	0.65	5.18	41.12	46.30	0.02	0.00				46.32	45.32	
No2	50	50	455.0	455.96	0.0256	4.72	1.00	6.04	40.23	46.27	0.05	0.00	0.00			46.33	45.33	46.32
No3	50	100	455.0	470.82	0.0256	5.35	0.97	6.49	39.79	46.28	0.05	0.00	0.00			46.33	45.33	46.33
No4	50	150	455.0	460.51	0.0256	5.42	0.99	7.02	39.26	46.28	0.05	0.00	0.00			46.33	45.33	46.33
B21	18	168	455.0	436.51	0.0256	4.87	1.04	6.29	39.59	46.28	0.06		0.00	Bridge	0.02			46.33
				438.43	0.0256	4.89	1.04	6.31		46.30	0.05	0.00				46.36	45.36	
No5	32	200	455.0	450.48	0.0256	5.36	1.01	7.29	39.02	46.31	0.05	0.00	0.00			46.36	45.36	46.36
No6	50	250	455.0	419.13	0.0256	5.75	1.09	7.69	38.61	46.30	0.06	0.00	0.00			46.36	45.36	46.36
No7	50	300	455.0	474.04	0.0256	5.79	0.98	7.72	38.60	46.32	0.05	0.00	0.00			46.36	45.37	46.36
No8	50	350	455.0	442.21	0.0256	5.70	1.03	8.11	38.20	46.31	0.05	0.00	0.00			46.37	45.37	46.37
No9	50	400	455.0	448.18	0.0256	4.87	1.02	6.20	40.12	46.32	0.05	0.00	0.00			46.37	45.37	46.37
No10	50	450	455.0	456.08	0.0256	4.71	1.00	5.97	40.35	46.32	0.05	0.00	0.00			46.38	45.38	46.37
No11	50	500	455.0	454.84	0.0256	4.67	1.00	5.81	40.52	46.33	0.05	0.00	0.00			46.38	45.38	46.38
No12	50	550	455.0	451.94	0.0256	4.58	1.01	5.85	40.48	46.33	0.05	0.00	0.00			46.38	45.39	46.38
No13	50	600	455.0	451.48	0.0256	4.47	1.01	5.60	40.74	46.34	0.05	0.00	0.00			46.39	45.39	46.39
No14	50	650	455.0	477.08	0.0256	4.66	0.95	5.75	40.60	46.35	0.05	0.00	0.00			46.39	45.39	46.39
No15	50	700	455.0	447.46	0.0256	4.56	1.02	5.64	40.70	46.34	0.05	0.00	0.00			46.40	45.40	46.39
No16	50	750	455.0	473.52	0.0256	4.54	0.95	5.35	41.00	46.35	0.05	0.00	0.00			46.40	45.40	46.40
No17	50	800	456.2	451.61	0.0256	4.33	1.01	4.98	41.37	46.35	0.05	0.00	0.00			46.41	45.41	46.40
No18	50	850	456.2	467.39	0.0256	4.44	0.98	5.25	41.11	46.36	0.05	0.00	0.00			46.41	45.41	46.41
No19	50	900	456.2	469.92	0.0256	4.49	0.97	5.37	41.00	46.37	0.05	0.00	0.00			46.41	45.42	46.41
No20	50	950	456.2	471.43	0.0256	4.34	0.97	5.14	41.23	46.37	0.05	0.00	0.00			46.42	45.42	46.42
B20	40	990	456.2	476.00	0.0256	4.24	0.95	5.39	40.58	46.37	0.05		0.00	Bridge	0.02			46.42
				478.35	0.0256	4.26	0.95	5.42		46.40	0.05	0.00				46.44	45.44	
No21	10	1000	456.2	472.54	0.0256	4.23	0.97	5.03	41.37	46.40	0.05	0.00	0.00			46.44	45.45	46.44
No22	50	1050	456.2	501.95	0.0256	4.37	0.91	5.18	41.23	46.41	0.04	0.00	0.00			46.45	45.45	46.45
No23	50	1100	456.2	495.12	0.0256	4.43	0.92	5.30	41.11	46.41	0.04	0.00	0.00			46.45	45.45	46.45
No24	50	1150	456.2	507.87	0.0256	4.52	0.90	5.48	40.93	46.41	0.04	0.00	0.00			46.45	45.46	46.45
No25	50	1200	456.2	514.19	0.0256	4.32	0.89	5.42	41.00	46.42	0.04	0.00	0.00			46.46	45.46	46.46
No26	50	1250	456.2	619.28	0.0256	4.17	0.74	5.37	41.06	46.43	0.03	0.00	0.00			46.46	45.46	46.46
No27	50	1300	456.2	473.31	0.0256	4.65	0.95	5.65	40.77	46.42	0.05	0.00	0.00			46.46	45.47	46.46
No28	50	1350	456.2	496.62	0.0256	4.85	0.92	6.08	40.35	46.43	0.04	0.00	0.00			46.47	45.47	46.47

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No29	50	1400	456.2	441.98	0.0256	4.67	1.03	6.11	40.31	46.42	0.05	0.00	0.00			46.47	45.47	46.47
No30	50	1450	456.2	429.67	0.0256	4.81	1.05	5.93	40.49	46.42	0.06	0.02	0.00			46.48	45.50	46.47
No31	540	1990	456.2	449.32	0.0256	4.99	1.02	6.16	40.31	46.47	0.05	0.02	0.02			46.52	45.54	46.50
No32	500	2490	456.2	442.12	0.0256	4.84	1.03	6.43	40.08	46.51	0.05	0.02	0.02			46.56	45.58	46.54
No33	500	2990	456.2	458.28	0.0256	4.98	1.00	6.32	40.23	46.55	0.05	0.02	0.02			46.60	45.62	46.58
No34	500	3490	456.8	460.07	0.0256	4.67	0.99	6.03	40.56	46.59	0.05	0.02	0.02			46.64	45.66	46.62
No35	500	3990	456.8	461.92	0.0256	4.51	0.99	6.00	40.64	46.64	0.05	0.02	0.02			46.69	45.71	46.66
No36	500	4490	457.0	460.22	0.0256	4.05	0.99	5.63	41.05	46.68	0.05	0.03	0.03			46.73	45.76	46.71
No37	500	4990	457.0	466.08	0.0256	4.57	0.98	6.46	40.27	46.73	0.05	0.02	0.02			46.78	45.80	46.76
No38	500	5490	457.4	483.35	0.0256	5.24	0.95	6.80	39.57	46.77	0.05	0.02	0.02			46.81	45.83	46.80
No39	500	5990	457.4	494.13	0.0256	5.12	0.93	6.11	40.69	46.80	0.04	0.02	0.02			46.85	45.86	46.83
No40	500	6490	457.4	554.02	0.0256	5.89	0.83	7.62	39.22	46.84	0.03	0.00	0.01			46.87	45.87	46.86
B19	55	6545	457.4	458.93	0.0256	5.40	1.00	6.63	40.20	46.83	0.05		0.00	Bridge	0.02			46.87
				460.65	0.0256	5.42	0.99	6.65		46.85	0.05	0.02				46.90	45.91	
No41	445	6990	457.4	472.25	0.0256	5.18	0.97	6.47	40.41	46.88	0.05	0.02	0.02			46.93	45.94	46.91
No42	500	7490	457.4	496.64	0.0256	5.31	0.92	6.68	40.24	46.92	0.04	0.02	0.02			46.96	45.97	46.94
No43	500	7990	457.8	481.43	0.0256	5.17	0.95	6.74	40.20	46.94	0.05	0.02	0.02			46.99	47.01	46.97
No44	500	8490	457.8	488.20	0.0256	5.19	0.94	6.60	40.38	46.98	0.04	0.02	0.02			47.02	47.04	47.01
No45	500	8990	457.9	478.66	0.0256	5.17	0.95	6.70	40.31	47.01	0.05	0.02	0.02			47.06	47.07	47.04
No46	500	9490	457.9	480.78	0.0256	4.98	0.95	5.96	41.08	47.04	0.05	0.02	0.02			47.09	47.11	47.07
No47	500	9990	457.9	496.63	0.0256	4.83	0.92	5.94	41.14	47.08	0.04	0.01	0.02			47.13	47.13	47.11
B18	280	10270	458.0	475.04	0.0256	4.90	0.95	6.06	41.04	47.10	0.05		0.01	Bridge	0.05			47.13
				479.61	0.0256	4.93	0.95	6.11		47.15	0.05	0.01				47.19	47.20	
No48	220	10490	458.0	483.07	0.0256	5.19	0.95	6.48	40.68	47.16	0.05	0.02	0.01			47.21	47.22	47.20
No49	500	10990	458.0	482.54	0.0256	4.94	0.95	6.06	41.14	47.20	0.05	0.02	0.02			47.24	47.26	47.22
No50	500	11490	458.0	468.66	0.0256	4.83	0.93	6.00	41.23	47.23	0.05	0.02	0.02			47.28	47.30	47.26
No51	500	11990	458.0	478.83	0.0256	4.49	0.95	6.37	40.90	47.27	0.05	0.02	0.02			47.32	47.34	47.30
No52	500	12490	458.0	470.51	0.0256	4.33	0.97	6.13	41.18	47.31	0.05	0.02	0.02			47.36	47.38	47.34
No53	500	12990	463.9	484.92	0.0256	4.83	0.95	6.47	40.88	47.35	0.05	0.02	0.02			47.40	47.42	47.38
B17	470	13460	463.9	517.58	0.0256	5.29	0.90	7.21	40.18	47.39	0.04		0.01	Bridge	0.03			47.42
				520.52	0.0256	5.32	0.89	7.24		47.42	0.04	0.00				47.46	47.46	
No54	30	13490	463.9	523.23	0.0256	5.63	0.89	7.59	39.83	47.42	0.04	0.00	0.00			47.46	47.46	47.46

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$		
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)	
																			(e)
B16	94	13584	463.9	463.56	0.0256	5.03	1.00	6.62	40.80	47.42	0.05	0.00	Bridge	0.01			47.46		
				464.60	0.0256	5.03	1.00	6.63		47.43	0.05	0.02					47.48	47.49	
No55	406	13990	463.9	505.68	0.0256	5.16	0.92	6.57	40.89	47.46	0.04	0.02	0.01				47.51	47.52	47.49
No56	500	14490	463.9	519.47	0.0256	4.46	0.89	6.64	40.86	47.50	0.04	0.02	0.02				47.54	47.56	47.52
No57	500	14990	463.9	505.48	0.0256	5.18	0.92	5.95	41.58	47.53	0.04	0.02	0.02				47.57	47.59	47.56
No58	500	15490	466.1	491.68	0.0256	5.03	0.95	6.20	41.36	47.56	0.05	0.02	0.02				47.61	47.62	47.59
No59	500	15990	466.1	490.61	0.0256	4.88	0.95	6.59	41.01	47.60	0.05	0.02	0.02				47.64	47.66	47.62
No60	500	16490	467.7	485.29	0.0256	5.23	0.96	6.29	41.34	47.63	0.05	0.02	0.02				47.68	47.69	47.66
No61	500	16990	467.7	512.31	0.0256	5.22	0.91	6.20	41.46	47.66	0.04	0.02	0.02				47.71	47.72	47.69
No62	500	17490	467.7	481.77	0.0256	5.45	0.97	6.65	41.04	47.69	0.05	0.02	0.02				47.74	47.75	47.72
No63	500	17990	469.1	490.47	0.0256	5.09	0.96	6.58	41.15	47.73	0.05	0.01	0.02				47.77	47.79	47.75
B15	432	18422	469.1	442.84	0.0256	4.45	1.06	6.24	41.51	47.75	0.06	0.00	0.02	Bridge	0.03				47.79
				445.31	0.0256	4.47	1.05	6.27		47.78	0.06	0.00					47.83	47.84	
No64	68	18490	469.2	473.10	0.0256	5.25	0.99	6.58	41.21	47.79	0.05	0.02	0.00				47.84	47.86	47.84
No65	500	18990	469.2	536.44	0.0256	4.67	0.87	6.82	41.01	47.83	0.04	0.02	0.02				47.87	47.89	47.86
No66	500	19490	469.2	499.84	0.0256	4.68	0.94	6.76	41.10	47.86	0.04	0.02	0.02				47.91	47.93	47.89
No67	500	19990	469.2	477.33	0.0256	5.88	0.98	7.60	40.29	47.89	0.05	0.01	0.01				47.94	47.96	47.93
No68	500	20490	469.2	522.24	0.0256	6.17	0.90	7.91	40.02	47.93	0.04	0.01	0.01				47.97	47.98	47.96
No69	500	20990	469.2	479.36	0.0256	6.00	0.98	7.68	40.26	47.94	0.05	0.01	0.01				47.99	48.01	47.98
No70	500	21490	469.2	480.46	0.0256	6.17	0.98	9.03	38.54	47.97	0.05	0.01	0.01				48.02	48.03	48.01
B14_No	500	21990	469.2	519.48	0.0256	5.17	0.90	7.82	40.19	48.01	0.04	0.00	0.01	Bridge	0.01				48.03
				520.95	0.0256	5.17	0.90	7.83		48.02	0.04	0.01					48.06	48.08	
No72	500	22490	469.2	530.51	0.0256	4.98	0.88	8.72	39.33	48.05	0.04	0.02	0.02				48.09	48.11	48.08
No73	500	22990	471.9	529.92	0.0256	5.02	0.89	8.23	39.85	48.08	0.04	0.02	0.02				48.12	48.14	48.11
No74	500	23490	471.9	511.94	0.0256	4.09	0.92	9.32	38.80	48.12	0.04	0.02	0.02				48.16	48.18	48.14
No75	500	23990	471.9	543.81	0.0256	6.12	0.87	8.99	39.16	48.15	0.04	0.01	0.01				48.19	48.20	48.18
No76	500	24490	473.4	564.69	0.0256	5.91	0.84	9.78	38.40	48.18	0.04	0.01	0.01				48.21	48.23	48.20
No77	500	24990	473.4	576.46	0.0256	6.75	0.82	9.03	39.17	48.20	0.03	0.01	0.01				48.23	48.24	48.23
No78	500	25490	473.4	519.59	0.0256	6.42	0.91	8.29	39.92	48.21	0.04	0.01	0.01				48.25	48.27	48.24
No79	500	25990	473.4	650.97	0.0256	7.29	0.73	9.31	38.53	48.24	0.03	0.00	0.01				48.27	48.28	48.27
No80	293	26283	473.4	635.16	0.0256	6.58	0.75	8.61	39.64	48.25	0.03	0.00	0.00				48.28	48.28	48.28
No81	207	26490	473.4	612.90	0.0256	6.63	0.77	9.67	38.59	48.26	0.03	0.01	0.00				48.29	48.29	48.28

Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c) (m)	(d) (m)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No82	500	26990	473.4	571.00	0.0256	6.01	0.83	9.64	38.63	48.27	0.04	0.01	0.01			48.30	48.31	48.29
No83	500	27490	473.4	576.62	0.0256	7.28	0.82	10.21	38.08	48.29	0.03	0.01	0.01			48.32	48.33	48.31
B13	455	27945	473.4	491.10	0.0256	5.37	0.95	8.05	40.25	48.30	0.05		0.01	Bridge	0.03			48.33
				493.34	0.0256	5.38	0.95	8.07		48.32	0.05	0.00				48.37	48.37	
No84	45	27990	473.4	552.25	0.0256	6.03	0.85	9.62	38.71	48.33	0.04	0.01	0.00			48.37	48.38	48.37
No85	500	28490	473.4	548.92	0.0256	5.45	0.85	9.18	39.18	48.36	0.04	0.01	0.01			48.39	48.41	48.38
No86	500	28990	473.4	536.22	0.0256	6.34	0.88	8.03	40.25	48.38	0.04	0.01	0.01			48.42	48.43	48.41
No87	500	29490	473.4	517.75	0.0256	5.57	0.91	7.73	40.67	48.40	0.04	0.01	0.01			48.44	48.46	48.43
No88	500	29990	473.4	536.83	0.0256	5.45	0.88	8.08	40.35	48.43	0.04	0.01	0.01			48.47	48.48	48.46
No89	500	30490	473.4	554.17	0.0256	5.94	0.85	9.02	39.44	48.46	0.04	0.01	0.01			48.49	48.51	48.48
No90	500	30990	473.4	621.63	0.0256	6.47	0.75	9.98	38.50	48.48	0.03	0.01	0.01			48.51	48.52	48.51
No91	500	31490	473.4	562.68	0.0256	6.06	0.84	9.70	38.80	48.50	0.04	0.01	0.01			48.53	48.54	48.52
No92	500	31990	473.4	536.19	0.0256	5.85	0.88	8.67	39.84	48.51	0.04	0.01	0.01			48.55	48.57	48.54
No93	500	32490	473.4	505.54	0.0256	6.00	0.94	8.12	40.41	48.53	0.04	0.01	0.01			48.58	48.59	48.57
No94	500	32990	473.4	503.22	0.0256	5.65	0.94	8.56	40.00	48.56	0.05	0.00	0.01			48.61	48.61	48.59
B12	91	33081	473.4	444.27	0.0256	4.82	1.07	6.97	41.59	48.56	0.06		0.00	Bridge	0.05			48.61
				448.76	0.0256	4.83	1.05	7.02		48.61	0.06	0.02				48.66	48.68	
No95	409	33490	473.4	487.51	0.0256	4.92	0.97	8.56	40.09	48.65	0.05	0.02	0.02			48.70	48.71	48.68
B11_No	500	33990	473.4	481.08	0.0256	5.11	0.93	6.73	41.55	48.68	0.05		0.02	Bridge	0.02			48.71
				482.68	0.0256	5.13	0.98	6.75		48.70	0.05	0.02				48.75	48.77	
No97	500	34490	473.4	608.04	0.0256	6.50	0.78	8.68	40.06	48.74	0.03	0.01	0.01			48.78	48.78	48.77
No98	500	34990	473.4	542.01	0.0256	6.41	0.87	8.82	39.54	48.76	0.04	0.01	0.01			48.79	48.80	48.78
No99	500	35490	473.4	529.05	0.0256	6.30	0.89	8.81	39.56	48.77	0.04	0.01	0.01			48.82	48.83	48.80
No100	500	35990	473.4	509.55	0.0256	4.99	0.93	8.20	40.60	48.80	0.04	0.02	0.02			48.84	48.86	48.83
No101	500	36490	473.4	531.90	0.0256	5.68	0.89	8.44	40.39	48.83	0.04	0.01	0.01			48.87	48.89	48.86
No102	500	36990	474.0	569.70	0.0256	6.96	0.83	10.19	38.67	48.86	0.04	0.01	0.01			48.89	48.90	48.89
No103	500	37490	474.0	544.94	0.0256	5.37	0.87	8.28	40.60	48.88	0.04	0.01	0.01			48.92	48.93	48.90
No104	500	37990	474.0	514.31	0.0256	4.98	0.92	8.25	40.65	48.90	0.04	0.01	0.02			48.95	48.95	48.93
B10	170	38160	474.0	457.29	0.0256	5.37	1.04	6.95	41.55	48.90	0.05		0.01	Bridge	0.07			48.95
				462.61	0.0256	5.42	1.02	7.02		48.97	0.05	0.01				49.02	49.03	
No105	330	38490	474.0	548.17	0.0256	5.70	0.85	8.64	40.36	49.00	0.04	0.01	0.01			49.04	49.05	49.03
No105	500	38990	474.0	509.76	0.0256	5.45	0.93	8.39	40.63	49.02	0.04	0.01	0.01			49.07	49.08	49.05

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss		Localized Head loss		Total head H_T (a)-(b) (m)	Total head at $\Delta x/2$	
												(c)	(d)	Type	Head or WL difference (m)		UpStream Φ (b)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)
No107	500	39490	474.0	551.76	0.0256	6.71	0.86	8.63	40.42	49.05	0.04	0.01	0.01			49.09	49.10	49.08
No108	500	39990	474.0	524.01	0.0256	5.98	0.90	8.31	40.76	49.07	0.04	0.00	0.01			49.11	49.12	49.10
B9	77	40067	474.0	521.54	0.0256	5.64	0.91	8.17	40.51	49.08	0.04		0.00	Bridge	0.01			49.12
				522.80	0.0256	5.63	0.91	8.18		49.09	0.04	0.01				49.13	49.14	
No109	423	40490	474.0	548.54	0.0256	5.79	0.86	9.84	39.28	49.12	0.04	0.01	0.01			49.15	49.17	49.14
No110	500	40990	474.0	519.02	0.0256	5.30	0.91	8.85	40.29	49.14	0.04	0.01	0.01			49.18	49.19	49.17
No111	500	41490	474.0	569.95	0.0256	6.07	0.83	9.20	39.57	49.17	0.04	0.01	0.01			49.20	49.22	49.19
No112	500	41990	474.0	571.20	0.0256	5.82	0.83	9.21	39.58	49.19	0.04	0.01	0.01			49.23	49.24	49.22
No113	500	42490	474.0	572.57	0.0256	5.67	0.83	8.90	40.31	49.21	0.03	0.01	0.01			49.25	49.26	49.24
No114	500	42990	474.0	589.09	0.0256	6.09	0.80	9.23	40.01	49.24	0.03	0.01	0.01			49.27	49.28	49.26
No115	500	43490	474.0	551.71	0.0256	5.73	0.86	8.49	40.76	49.25	0.04	0.01	0.01			49.29	49.30	49.28
B8_No1	500	43990	474.0	542.46	0.0256	6.54	0.87	8.50	40.77	49.27	0.04		0.01	Bridge	0.02			49.30
				543.82	0.0256	6.56	0.87	8.52		49.29	0.04	0.01				49.33	49.34	
No117	500	44490	474.0	566.39	0.0256	6.85	0.84	9.05	40.26	49.31	0.04	0.01	0.01			49.35	49.36	49.34
No118	500	44990	474.0	566.61	0.0256	6.77	0.84	8.87	40.46	49.33	0.04	0.01	0.01			49.37	49.37	49.36
No119	500	45490	474.0	562.18	0.0256	6.44	0.84	8.28	41.07	49.35	0.04	0.01	0.01			49.38	49.39	49.37
No120	500	45990	474.0	551.50	0.0256	5.43	0.86	8.07	41.30	49.37	0.04	0.01	0.01			49.41	49.42	49.39
B7	386	46376	474.0	591.89	0.0256	5.95	0.80	7.97	41.42	49.39	0.03		0.01	Bridge	0.01			49.42
				592.99	0.0256	5.96	0.80	7.98		49.40	0.03	0.00				49.44	49.44	
No121	114	46490	474.0	559.14	0.0256	6.52	0.85	8.54	40.86	49.40	0.04	0.01	0.00			49.44	49.45	49.44
No122	500	46990	474.0	540.85	0.0256	4.91	0.88	8.35	41.08	49.43	0.04	0.02	0.02			49.46	49.48	49.45
No123	500	47490	474.0	536.15	0.0256	6.49	0.88	8.37	41.08	49.45	0.04	0.01	0.01			49.49	49.50	49.48
No124	500	47990	474.0	541.00	0.0256	5.73	0.88	8.65	40.82	49.47	0.04	0.01	0.01			49.51	49.53	49.50
No125	500	48490	474.0	539.54	0.0256	6.60	0.88	8.57	40.93	49.50	0.04	0.01	0.01			49.54	49.55	49.53
No126	500	48990	474.0	558.46	0.0256	4.75	0.85	8.15	41.37	49.52	0.04	0.01	0.01			49.56	49.58	49.55
No127	500	49490	474.0	539.57	0.0256	6.42	0.88	8.23	41.32	49.55	0.04	0.01	0.01			49.59	49.60	49.57
No128	500	49990	474.0	525.54	0.0256	5.64	0.90	8.11	41.46	49.57	0.04	0.01	0.01			49.61	49.62	49.60
No129	500	50490	474.0	533.82	0.0256	5.42	0.89	8.41	41.19	49.60	0.04	0.01	0.01			49.64	49.65	49.62
No130	500	50990	474.0	563.88	0.0256	6.03	0.84	8.00	41.62	49.62	0.04	0.01	0.01			49.66	49.67	49.65
No131	500	51490	474.0	567.45	0.0256	6.65	0.84	8.64	41.00	49.64	0.04	0.01	0.01			49.68	49.69	49.67
No132	500	51990	474.0	538.95	0.0256	5.97	0.88	7.77	41.89	49.66	0.04	0.01	0.01			49.70	49.71	49.69
No133	500	52490	474.0	521.81	0.0256	5.59	0.91	7.61	42.07	49.68	0.04	0.01	0.01			49.73	49.73	49.71

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Non-uniform flow calculation table

Case: Ibrahimia_Canal_Design(0.474m³/s) PLAN

Ibrahimia Head Regulator water level: 50.21

n= 0.0256

Station name	Interval distance Δx (m)	Total distance Σx (m)	Quantity of flow Q (m ³ /s)	Area of water flow A (m ²)	Complex roughness coefficient n	Hydraulic Radius R (m)	Flow velocity U (m/s)	Water depth h (m)	Bed elevation Z_b (m)	Water level Z_b+h (a) (m)	Velocity head (b) (m)	Friction head loss (c) (d) (m)		Localized Head loss		Total head H_F (a)-(b) (m)	Total head at $\Delta x/2$	
												Type	Head or WL difference (m)	UpStream Φ (a)-(b)+(c) (m)	DownStream Ψ (a)+(b)-(d) (m)			
B6	271	52761	474.0	455.31	0.0256	5.47	1.04	8.19	41.50	49.69	0.06	0.01	0.01	Bridge	0.02		49.73	
				457.09	0.0256	5.48	1.04	8.21		49.71	0.05	0.00				49.76	49.77	
B5	45	52806	474.0	502.52	0.0256	6.31	0.94	8.67	41.05	49.72	0.05	0.00	0.00	Bridge	0.02			49.77
				504.17	0.0256	6.33	0.94	8.69		49.74	0.05	0.00				49.79	49.79	
No134	184	52990	474.0	490.46	0.0256	6.74	0.97	9.62	40.13	49.75	0.05	0.01	0.00			49.80	49.80	49.79
B4	236	53226	474.0	500.83	0.0256	6.96	0.95	9.99	39.77	49.76	0.05	0.01	0.01	Bridge	0.03			49.80
				502.60	0.0256	6.98	0.94	10.02		49.79	0.05	0.01				49.84	49.84	
No135	264	53490	474.0	498.69	0.0256	6.31	0.95	9.28	40.52	49.80	0.05	0.01	0.01			49.85	49.86	49.84
No135	500	53990	474.0	549.07	0.0256	5.74	0.85	8.88	40.55	49.83	0.04	0.01	0.01			49.87	49.88	49.86
No137	500	54490	474.0	607.86	0.0256	6.24	0.73	9.18	40.68	49.86	0.03	0.01	0.01			49.89	49.90	49.88
No138	500	54990	474.0	576.04	0.0256	5.93	0.82	9.13	40.75	49.88	0.03	0.01	0.01			49.91	49.92	49.90
No139	500	55490	474.0	525.93	0.0256	6.56	0.90	8.55	41.34	49.89	0.04	0.01	0.01			49.93	49.94	49.92
No140	500	55990	474.0	528.31	0.0256	5.92	0.90	9.06	40.86	49.92	0.04	0.01	0.01			49.96	49.97	49.94
No141	500	56490	474.0	491.79	0.0256	5.08	0.96	7.69	42.25	49.94	0.05	0.02	0.02			49.99	50.00	49.97
No142	516	57006	474.0	500.07	0.0256	6.74	0.95	8.85	41.12	49.97	0.05	0.00	0.01			50.02	50.02	50.00
No143	115	57121	474.0	500.95	0.0256	5.70	0.95	8.91	41.07	49.98	0.05	0.01	0.00			50.02	50.03	50.02
No144	369	57490	474.0	489.93	0.0256	6.86	0.97	9.00	40.99	49.99	0.05	0.01	0.01			50.04	50.05	50.03
No145	500	57990	474.0	516.96	0.0256	6.81	0.92	8.69	41.33	50.02	0.04	0.01	0.01			50.06	50.07	50.05
No146	500	58490	474.0	513.26	0.0256	6.00	0.92	7.73	42.31	50.04	0.04	0.01	0.01			50.09	50.10	50.07
No147	500	58990	474.0	498.37	0.0256	6.67	0.95	9.00	41.07	50.07	0.05	0.01	0.01			50.11	50.12	50.10
B3	443	59433	474.0	533.48	0.0256	6.75	0.89	9.87	40.22	50.09	0.04	0.01	0.01	Bridge	0.01			50.12
				534.57	0.0256	6.76	0.89	9.89		50.11	0.04	0.00				50.15	50.15	
No148	57	59490	474.0	543.98	0.0256	5.69	0.87	7.86	42.25	50.11	0.04	0.00	0.00			50.15	50.15	50.15
B2	116	59606	474.0	502.60	0.0256	5.68	0.94	7.14	42.97	50.11	0.05	0.01	0.00	Bridge	0.04			50.15
				505.59	0.0256	5.70	0.94	7.17		50.14	0.04	0.01				50.19	50.20	
No149	384	59990	474.0	550.31	0.0256	6.22	0.85	8.41	41.76	50.17	0.04	0.00	0.01			50.21	50.21	50.20
B1	152	60142	474.0	567.21	0.0256	6.39	0.84	9.18	41.00	50.18	0.04	0.01	0.00	Bridge	0.02			50.21
				568.66	0.0256	6.40	0.83	9.20		50.20	0.04	0.01				50.23	50.24	
No150	333	60475	474.0	546.61	0.0256	5.21	0.87	6.71	43.50	50.21	0.04	0.01	0.01			50.25		50.24

APPENDIX G-2

Cross-sectional Flow Velocity Table

Cross-sectional Flow Velocity Table

Table 1 Cross-sectional Flow Velocity at 30m D.S of Bahar Yusef Bahr-Yusef canal 30m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.66
1.96	1.32
3.90	1.27
7.82	0.87
8.77	0.68
10.74	1.04
11.86	1.25
16.77	0.81
17.72	0.83
18.70	1.03
19.68	1.25
24.56	0.80
25.54	0.68
27.48	1.25
33.39	0.62
33.39	0.62

Table 2 Cross-sectional Flow Velocity at 50m D.S of Bahar Yusef Bahr-Yusef canal 50m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.18
5.80	0.26
11.64	0.28
17.44	0.30
21.34	0.28
26.19	0.30
29.07	0.29
31.99	0.28
34.91	0.25
38.78	0.21
41.69	0.18
44.61	0.24
48.48	0.65
50.41	1.35
52.34	1.32
56.24	1.01
57.19	0.94
59.16	1.10
60.11	1.27
64.96	0.96
65.91	0.96
66.90	1.02
67.88	1.24
72.70	1.00
73.65	0.85
75.59	1.22
81.45	0.76
82.96	0.36
84.58	0.31

Table 3 Cross-sectional Flow Velocity at 100m D.S of Bahar Yusef Bahr-Yusef canal 100m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.01
5.41	0.12
8.96	0.27
13.55	0.45
16.20	0.57
18.96	0.70
21.59	0.80
25.27	0.94
27.93	1.04
30.69	1.12
34.21	1.17
36.07	1.21
37.77	1.19
41.48	1.25
42.27	1.22
44.13	1.19
45.03	1.24
49.51	1.22
50.41	1.23
51.34	1.23
52.27	1.22
56.75	1.17
57.65	1.20
59.48	1.22
64.81	1.12
65.84	0.98
66.99	0.91
69.04	0.69

Table 4 Cross-sectional Flow Velocity at 30m D.S of Ibrahimia Ibrahimia canal 30m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.61
1.80	1.21
3.75	1.62
5.06	1.19
5.71	1.11
7.02	0.87
7.72	0.59
9.67	0.79
10.33	1.03
11.64	1.11
12.34	1.12
13.65	1.13
15.60	1.03
16.25	0.85
17.56	0.83
18.26	1.05
19.57	1.22
21.52	1.29
23.47	1.19
24.18	1.37
25.48	0.80
26.79	0.81
27.44	0.91
28.78	0.97
29.44	1.17
31.44	1.15
32.09	1.24
32.77	0.62

Table 5 Cross-sectional Flow Velocity at 50m D.S of Ibrahimia Ibrahimia canal 50m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.73
1.83	1.04
3.75	0.99
5.06	0.92
5.76	0.85
7.07	0.77
7.72	0.75
9.67	0.82
10.35	0.91
11.65	0.97
12.31	1.05
13.62	1.09
15.57	1.05
16.24	0.99
17.55	0.98
18.20	1.00
19.51	1.09
21.46	1.16
23.46	1.17
24.09	1.18
25.39	1.16
26.70	1.17
27.36	1.13
28.66	1.09
29.36	1.09
31.32	1.12
31.94	1.03
32.64	0.89
33.95	0.70
34.58	0.53
35.28	0.22
37.23	0.18
38.54	0.19
39.16	0.19
41.80	0.23
43.11	0.24
45.06	0.25
47.03	0.26
48.99	0.28
50.94	0.27
52.94	0.26
54.86	0.27
56.82	0.27
58.82	0.27
60.74	0.28
62.69	0.27
64.69	0.17
66.65	0.14

Table 6 Cross-sectional Flow Velocity at 100m D.S of Ibrahimia Ibrahimia canal 100m Downstream from new regulator

Distance from left wall (m)	Flow velocity (m/s)
	Depth average
0.00	0.54
2.80	0.63
5.59	0.71
8.35	0.81
9.29	0.91
11.16	0.95
13.11	0.95
14.41	0.95
15.09	0.94
16.39	0.93
17.02	0.91
18.97	0.91
19.84	0.92
20.95	0.93
21.58	0.96
22.88	0.97
24.83	0.98
25.51	1.01
26.81	1.00
27.44	1.02
28.74	1.04
30.70	1.06
32.87	1.06
33.29	1.07
34.80	1.06
35.90	1.06
36.81	1.07
37.91	1.07
38.54	1.08
40.46	1.07
41.16	1.08
41.79	1.04
43.09	1.07
43.79	1.04
44.42	1.04
46.37	1.03
47.68	0.99
48.35	0.96
50.93	0.90
52.23	0.82
54.20	0.74
56.12	0.65
58.08	0.55
60.05	0.44
61.97	0.34
63.92	0.24
65.89	0.19
67.82	0.23
69.82	0.15
71.74	0.27