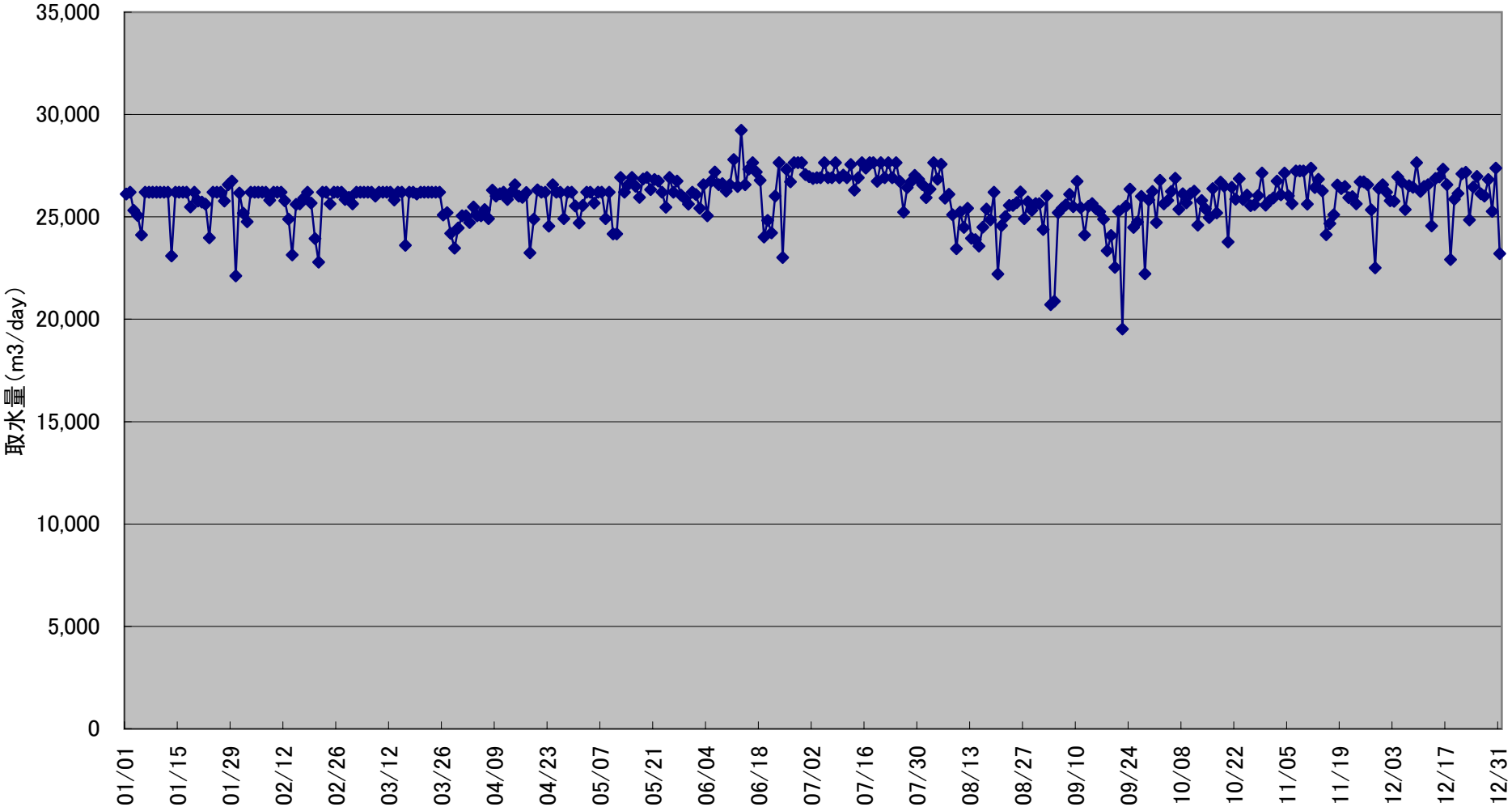
参考資料 ３

設計資料-２

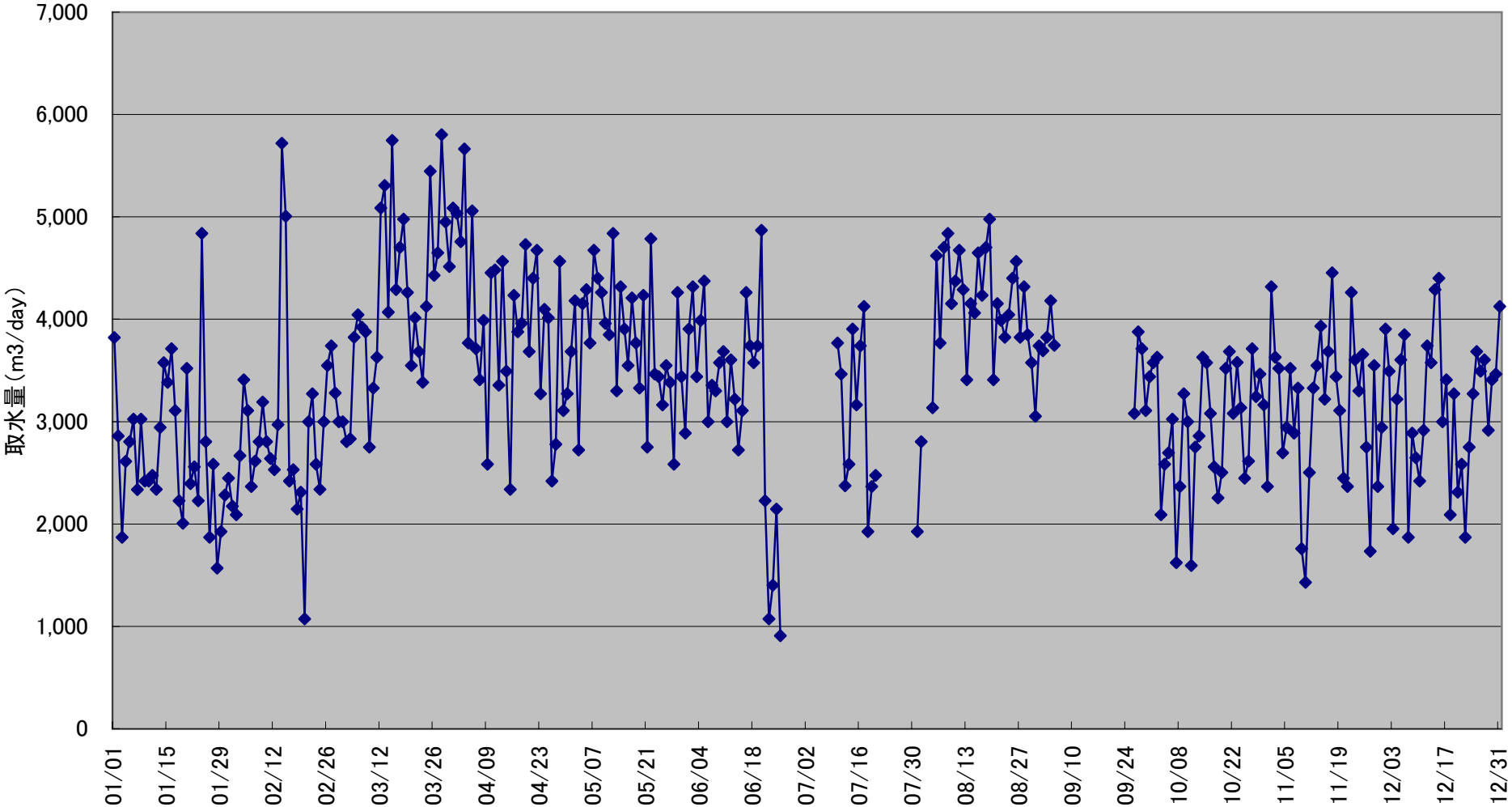
参考資料 ３.１

設計検討書

付図3．1
マリンバダ浄水場取水量の推移（2001年）



付図3．2
ナドゥガラ浄水場取水量の推移（2001年）



付表3．1 給水区域内人口

Table Existing Transmission Pipe Hydraulic Calculation (Existig Condition)

No.	Service Area	GN No.		Population			Area (ha)				
				1981	2001	Inclease Ratio		2005	2007	2010	2021
1	Malimboda WTP										
		402B	100		1,046			1,084	1,106	1,139	1,271
		402A	100		1,472			1,526	1,556	1,604	1,789
		402	100		765			793	809	833	930
		400B	40		567			587	599	617	689
		400	100		1,530			1,586	1,618	1,667	1,860
		356B	100		883			915	934	962	1,073
		356A	100		664			688	702	723	807
		356	100		852			883	901	928	1,035
		353B	100		727			754	769	792	884
		353A	100		1,602			1,660	1,694	1,745	1,947
		353	100		1,224			1,269	1,294	1,333	1,488
		351B	100		2,044			2,119	2,161	2,227	2,484
		351A	100		911			944	963	992	1,107
		351	100		1,524			1,580	1,611	1,660	1,852
		350A	100		764			792	808	832	929
		350	100		1,453			1,506	1,536	1,583	1,766
		Subtotal			18,028			18,686	19,061	19,639	21,910
2	Devinuwara Elevated Tank										
		436C	50		421			436	445	459	512
		435A	100		1,055			1,093	1,115	1,149	1,282
		435	30		224			232	236	243	272
		433H	100		1,238			1,283	1,309	1,349	1,505
		433G	100		1,225			1,270	1,295	1,334	1,489
		433F	100		1,300			1,347	1,375	1,416	1,580
		433E	50		599			620	633	652	727
		433D	100		1,459			1,512	1,543	1,589	1,773
		433C	100		514			533	543	560	625
		433B	100		952			987	1,007	1,037	1,157
		433A	100		776			804	820	845	943
		433	100		1,056			1,095	1,117	1,150	1,283
		432	100		2,359			2,445	2,494	2,570	2,867
		432A	100		949			984	1,003	1,034	1,153
		Subtotal			14,126			14,641	14,936	15,388	17,168
3	Gandara Ground Reservoir										
		438C	100		1,145			1,187	1,211	1,247	1,392
		438A	60		672			697	711	732	817
		437C	100		1,276			1,323	1,349	1,390	1,551
		437B	100		1,134			1,175	1,199	1,235	1,378
		437A	100		1,482			1,536	1,567	1,614	1,801
		437	40		698			724	738	761	849
		436C	50		421			436	445	459	512
		435	70		522			541	551	568	634
		433E	50		599			620	633	652	727
		Subtotal			7,948			8,238	8,404	8,659	9,660
4	Gandara Elevated Tank										
		438B	100		774			802	818	843	941
		438A	40		448			464	474	488	544
		438	100		1,283			1,330	1,357	1,398	1,559
		437	60		1,048			1,086	1,108	1,141	1,273
		436B	100		1,098			1,138	1,161	1,196	1,334
		436A	100		847			878	896	923	1,029
		436	100		2,767			2,868	2,926	3,014	3,363
		Subtotal			8,265			8,566	8,738	9,003	10,045
5	Kottegoda Elevated Tank										
		456A	30		188			195	199	205	228
		451E	50		478			495	505	521	581
		450D	10		130			135	138	142	158
		450C	80		694			719	733	756	843
		450B	100		989			1,025	1,046	1,077	1,202
		450A	70		551			571	582	600	670
		450	100		874			906	924	952	1,062
		445A	100		454			471	480	495	552
		445	100		445			461	471	485	541
		444C	100		980			1,016	1,036	1,068	1,191
		444B	100		1,065			1,104	1,126	1,160	1,294
		444A	100		1,480			1,534	1,565	1,612	1,799
		444	100		1,811			1,877	1,915	1,973	2,201
		442C	100		790			819	835	861	960
		442B	100		815			845	862	888	991
		442A	100		402			417	425	438	489
		442	100		802			831	848	874	975
		441C	100		790			819	835	861	960
		441B	100		669			693	707	729	813
		441A	100		841			872	889	916	1,022
		441	100		1,261			1,307	1,333	1,374	1,533
		440C	100		439			455	464	478	534
		440B	100		1,147			1,189	1,213	1,249	1,394
		440A	100		1,228			1,273	1,298	1,338	1,492
		440	100		920			954	973	1,002	1,118
		439	100		1,078			1,117	1,140	1,174	1,310
		Subtotal			21,321			22,099	22,543	23,226	25,912
6	Dickwella Elevated Tank										

No.	Service Area	GN No.		Population			Area (ha)				
				1981	2001	Inclease Ratio		2005	2007	2010	2021
		455C	100		796			825	842	867	967
		455B	100		491			509	519	535	597
		455A	100		750			777	793	817	912
		455	80		748			775	791	815	909
		454A	100		757			785	800	825	920
		454	50		683			708	722	744	830
		452F	100		1,387			1,438	1,467	1,511	1,686
		452E	90		1,370			1,420	1,448	1,492	1,665
		451E	50		478			495	505	521	581
		451D	100		1,674			1,735	1,770	1,824	2,035
		451C	100		1,427			1,479	1,509	1,555	1,734
		451B	100		1,654			1,714	1,749	1,802	2,010
		451A	60		631			654	667	688	767
		451	100		996			1,032	1,053	1,085	1,211
		450D	90		1,174			1,216	1,241	1,278	1,426
		450C	20		173			180	183	189	211
		450A	30		236			245	250	257	287
		Subtotal			15,425			15,988	16,309	16,803	18,747
7	Naigala Elevated Tank										
		455	20		187			194	198	204	227
		454	50		683			708	722	744	830
		453B	10		116			120	122	126	140
		453	10		106			110	112	115	128
		452E	10		152			158	161	166	185
		452D	100		1,076			1,115	1,138	1,172	1,308
		452C	100		822			852	869	895	999
		452B	100		1,504			1,559	1,590	1,638	1,828
		452A	100		993			1,029	1,050	1,082	1,207
		452	60		806			835	852	878	979
		451A	40		421			436	445	458	511
		Subtotal			6,865			7,116	7,259	7,479	8,344
8	Medagoda Elevated Tank										
		453D	100		1,853			1,921	1,959	2,019	2,252
		453C	100		1,165			1,208	1,232	1,269	1,416
		453B	90		1,040			1,078	1,100	1,133	1,264
		453A	100		1,493			1,547	1,579	1,626	1,815
		453	90		951			986	1,006	1,036	1,156
		452	40		537			557	568	585	653
		Subtotal			7,040			7,297	7,443	7,669	8,556
9	Brownshill Resetrvoir 1										
		430A	40		894			927	945	974	1,087
		429B	100		984			1,020	1,040	1,072	1,196
		429A	100		1,330			1,379	1,406	1,449	1,616
		427	100		1,675			1,736	1,771	1,825	2,036
		426C	100		1,087			1,127	1,149	1,184	1,321
		426B	100		2,504			2,595	2,648	2,728	3,043
		425C	100		1,428			1,480	1,510	1,556	1,736
		425B	100		1,903			1,972	2,012	2,073	2,313
		425A	100		1,120			1,161	1,184	1,220	1,361
		425	100		1,322			1,370	1,398	1,440	1,607
		417G	10		335			348	355	365	408
		417F	70		1,296			1,343	1,370	1,411	1,575
		417B	100		1,659			1,720	1,754	1,807	2,016
		417A	70		2,016			2,090	2,132	2,196	2,450
		416D	100		1,286			1,333	1,360	1,401	1,563
		416C	100		1,900			1,969	2,009	2,070	2,309
		416B	100		1,603			1,661	1,695	1,746	1,948
		416A	100		1,465			1,518	1,549	1,596	1,781
		416	100		1,273			1,319	1,346	1,387	1,547
		415	60		622			645	658	678	756
		Subtotal			27,702			28,713	29,290	30,178	33,668
10	Gabadaweediya Reservoir										
		420D	100		1,457			1,510	1,541	1,587	1,771
		420C	100		947			982	1,001	1,032	1,151
		420B	100		719			745	760	783	874
		420A	100		1,876			1,944	1,984	2,044	2,280
		420	100		1,166			1,209	1,233	1,270	1,417
		417H	100		2,076			2,152	2,195	2,262	2,523
		417G	90		3,018			3,128	3,191	3,287	3,668
		417F	30		555			576	587	605	675
		417E	100		3,125			3,239	3,304	3,404	3,798
		417D	100		2,461			2,551	2,602	2,681	2,991
		417C	100		2,251			2,333	2,380	2,452	2,736
		417A	30		864			896	914	941	1,050
		Subtotal			20,515			21,264	21,691	22,348	24,933
11	Nupe Reservoir										
		423B	100		1,032			1,070	1,091	1,124	1,254
		423A	100		2,123			2,200	2,245	2,313	2,580
		423	100		946			981	1,000	1,031	1,150
		419	100		1,857			1,925	1,963	2,023	2,257
		415A	100		1,447			1,500	1,530	1,576	1,759
		415	40		415			430	439	452	504
		414C	100		2,530			2,622	2,675	2,756	3,075
		414B	100		3,260			3,379	3,447	3,551	3,962
		414A	100		1,114			1,155	1,178	1,214	1,354
		414	100		3,302			3,422	3,491	3,597	4,013

No.	Service Area	GN No.		Population			Area (ha)				
				1981	2001	Inclease Ratio		2005	2007	2010	2021
		412B	100		2,526			2,618	2,671	2,752	3,070
		412A	100		2,148			2,226	2,271	2,340	2,611
		412	100		2,583			2,677	2,731	2,814	3,139
		411C	100		1,585			1,643	1,676	1,727	1,926
		411B	100		975			1,011	1,031	1,062	1,185
		411A	100		1,727			1,790	1,826	1,881	2,099
		409E	100		1,649			1,709	1,744	1,796	2,004
		409D	100		2,009			2,082	2,124	2,189	2,442
		409C	100		1,626			1,685	1,719	1,771	1,976
		409B	100		1,992			2,065	2,106	2,170	2,421
		409A	100		1,999			2,072	2,114	2,178	2,430
		Subtotal			38,845			40,262	41,071	42,316	47,211
12	Kanburugamuwa Reservoir, Mirissa Hiltop Reservoir										
		408D	100		718			744	759	782	873
		408C	100		1,184			1,227	1,252	1,290	1,439
		408B	100		962			997	1,017	1,048	1,169
		408A	100		734			761	776	800	892
		408	100		2,061			2,136	2,179	2,245	2,505
		407C	100		693			718	733	755	842
		407B	100		1,123			1,164	1,187	1,223	1,365
		407A	100		1,240			1,285	1,311	1,351	1,507
		407	100		1,345			1,394	1,422	1,465	1,635
		406	100		1,384			1,435	1,463	1,508	1,682
		405	100		1,036			1,074	1,095	1,129	1,259
		Subtotal			12,480			12,935	13,195	13,595	15,168
		Grand Total (1)			198,560			205,805	209,942	216,303	241,322
13	Diyagaha Reservoir										
		447D	100		2,483			2,574	2,625	2,705	3,018
		447C	100		710			736	751	773	863
		447B	100		1,264			1,310	1,336	1,377	1,536
		447A	100		1,821			1,887	1,925	1,984	2,213
		447	100		717			743	758	781	871
		446A	100		1,086			1,126	1,148	1,183	1,320
		446	100		1,190			1,233	1,258	1,296	1,446
		443C	100		1,000			1,036	1,057	1,089	1,215
		443B	100		709			735	750	772	862
		443A	100		1,620			1,679	1,713	1,765	1,969
		443	100		1,018			1,055	1,076	1,109	1,237
		430B	100		1,019			1,056	1,077	1,110	1,238
		430A	60		1,341			1,390	1,418	1,461	1,630
		430	100		730			757	772	795	887
		428B	100		907			940	959	988	1,102
		428A	100		1,648			1,708	1,742	1,795	2,003
		428	100		437			453	462	476	531
		419A	100		911			944	963	992	1,107
		Subtotal			20,611			21,363	21,792	22,453	25,050
14	Future Service Area in East of Diyagaha Reservoir										
14-1	Devinuwara										
		449	100		909			942	961	990	1,105
		449A	100		1,317			1,365	1,392	1,435	1,601
		449B	100		747			774	790	814	908
		449C	100		593			615	627	646	721
		449D	100		996			1,032	1,053	1,085	1,211
		448	100		1,694			1,756	1,791	1,845	2,059
		448A	100		1,339			1,388	1,416	1,459	1,627
		448B	100		807			836	853	879	981
		448C	100		605			627	640	659	735
14-2	Dikwella										
		457	100		903			936	955	984	1,097
		457A	100		516			535	546	562	627
		457B	100		779			807	824	849	947
		456	100		854			885	903	930	1,038
		456A	70		438			454	463	477	533
		456B	100		797			826	843	868	969
		456C	100		800			829	846	871	972
		Subtotal			14,094			14,608	14,902	15,354	17,130
		Grand Total (4)						119,917	122,327	126,034	140,612
		(GT(3) + East)									

Assumption of necessary Water Volume

Service Ratio = Population Served/Population in served GN = 95% (in 2001)
Per Capita Consumption = 175 Lpcd

付表3．2　2001年人口・住宅センサス

Census of Population and Housing – 2001　District Results

District	Population 1981	Population 2001	Growth rate per annum	Remarks
Colombo	1,699,241	2,234,289	1.38	
Gampaha	1,390,862	2,066,096	2.00	
Kalutara	829,704	1,060,800	1.24	
Kandy	1,048,317	1,272,463	0.97	
Matale	357,354	442,427	1.07	
Nuwara-Eliya	603,577	700,083	0.74	
Galle	814,531	990,539	0.98	
Matara	643,786	761,236	0.84	
Hambantota	424,344	525,370	1.07	
Jaffna	738,788	*	–	Not done
Mannar	106,235	*	–	Done in 1 DS partially out of 4 DSS
Vavuniya	95,428	*	–	Done in 3 DSS completely out of 4 DSS
Mullaitivu	77,189	*		Not done
Kilinochchi	91,764	*	–	Not done
Batticaloa	330,333	*	–	Done in 6 DSS completely & 2 DSS partially out of 12 DSS
Ampara	388,970	589,344	2.10	
Trincomalee	255,948	*	–	Done in 7 DSS completely & 2 DSS partially out of 11 DSS
Kucunegale	1,211,801	1,452,369	0.91	
Puttalam	492,533	705,342	1.81	
Anuradhapura	587,929	746,466	1.20	
Polonnaruwa	261,563	359,197	1.60	
Badulla	640,952	774,555	0.95	
Moneragala	273,570	396,173	1.87	
Ratnapura	797,087	1,008,164	1.18	
Kegalle	684,944	779,774	0.65	
Total	14,846,750	16,864,687		
18 districts	13,151,065	16,864,687	1.25	

＊　Incomplete

付表３．３　マータラ地区人口および住宅（2001年センサス）

Population and Housing Units according to D.S. Division and Sector: Matara District (2001 Census: Provisional)

D.S. Division and Sector	Total no. of persons	Sex		Age		Housing Units	Collective Living Quarters	Institutions	Non-housing Units	Total Number of Units	Per Housing Populatio
		Male	Female	Under 18 years	18 years and over						
Akuressa	49,752	24,363	25,389	16,882	32,870	13,164	15	74	1,774	15,027	3.8
Athuraliya	30,176	14,683	15,493	10,364	19,812	7,877	8	36	894	8,815	3.8
Devinuwara	44,132	20,749	23,383	15,116	29,016	10,822	13	61	1,162	12,058	4.1
Dickwella	50,952	23,912	27,040	17,842	33,110	12,453	25	51	1,722	14,251	4.1
Hakmana	30,272	14,359	15,913	11,137	19,135	7,799	13	47	902	8,761	3.9
Kamburupitiya	37,420	17,784	19,636	12,656	24,764	10,102	40	62	1,419	11,623	3.7
Kirinda Puhulwella	19,458	9,275	10,183	6,548	12,910	5,210	2	54	608	5,874	3.7
Kotapola	63,951	31,653	32,298	24,189	39,762	17,576	43	50	2,632	20,301	3.6
Malimbada	31,484	14,735	16,749	10,396	21,088	8,115	13	31	1,068	9,227	3.9
Matara Four Gravets	108,461	51,761	56,700	34,518	73,943	25,615	139	156	4,593	30,503	4.2
Mulatiyana	45,972	22,385	23,587	16,066	29,906	12,655	5	43	1,482	14,185	3.6
Pasgoda	56,188	28,214	27,974	20,650	35,538	16,660	22	75	2,270	19,027	3.4
Pitabeddara	49,313	24,534	24,779	17,625	31,688	13,784	55	42	2,025	15,906	3.6
Thihagoda	30,865	14,688	16,177	9,804	21,061	8,151	14	39	912	9,116	3.8
Weligama	66,528	32,345	34,183	22,716	43,812	15,874	88	98	2,316	18,376	4.2
Welipitiya	46,312	21,988	24,324	15,964	30,348	11,695	23	49	1,397	13,164	4.0
District Total	**761,236**	**367,428**	**393,808**	**262,473**	**498,763**	**197,552**	**518**	**968**	**27,176**	**226,214**	**3.9**
Study Area	332,422	158,190	174,232	110,392	222,030	81,030	292	436	11,773	93,531	4.1

付表 3.4　浄水水量及び有収水量

Year	Month												
1997	1	2	3	4	5	6	7	8	9	10	11	12	Average
Total Production (m^3/month)	433,150	462,602	443,051	569,122	642,230	609,080	596,148	601,855	572,614	601,417	589,766	632,985	562,835
Total Billing (m^3/month)	369,144	348,462	349,891	363,580	395,407	404,587	407,344	416,890	425,204	407,618	401,540	401,770	390,953
UFW (%)	14.78	24.67	21.03	36.12	38.43	33.57	31.67	30.73	25.74	32.22	31.92	36.53	30.54
1998													
Total Production (m^3/month)	648,033	608,664	668,518	655,796	687,796	677,060	709,126	706,231	687,260	737,607	633,198	684,406	675,308
Total Billing (m^3/month)	446,313	489,691	442,006	480,383	472,193	457,157	454,011	470,593	458,403	469,019	464,173	464,513	464,038
UFW (%)	31.13	19.55	33.88	26.75	31.35	32.48	35.98	33.37	33.30	36.41	26.69	32.13	31.08
1999													
Total Production (m^3/month)	713,500	693,420	807,658	772,783	701,318	650,900	705,121	745,828	853,107	734,895	729,601	748,013	738,012
Total Billing (m^3/month)	462,642	444,600	468,013	513,497	478,672	487,571	494,779	533,904	517,579	504,030	497,479	489,997	491,064
UFW (%)	35.16	35.88	42.05	33.55	31.75	25.09	29.83	28.41	39.33	31.41	31.81	34.49	33.46
2000													
Total Production (m^3/month)	768,289	708,670	773,205	798,446	878,553	795,836	744,563	778,748	789,199	806,524	805,255	821,917	789,100
Total Billing (m^3/month)	540,929	533,734	548,678	567,824	554,878	591,617	562,625	579,730	545,535	554,738	557,457	538,124	556,322
UFW (%)	29.59	24.69	29.04	28.88	36.84	25.66	24.44	25.56	30.87	31.22	30.77	34.53	29.34
2001													
Total Production (m^3/month)						857,443	855,051	883,723	766,841	841,682	839,389	865,620	844,250
Total Billing (m^3/month)						587,906	574,496	625,418	611,401	562,591	624,980	615,492	600,326
UFW (%)						31.43	32.81	29.23	20.27	33.16	25.54	28.90	28.89
2002													
Total Production (m^3/month)	876,382	816,855	813,826	868,354	898,332	884,583							859,722
Total Billing (m^3/month)	662,753	596,563	577,511	612,367	677,500	626,775							625,578
UFW (%)	24.38	26.97	29.04	29.48	24.58	29.14							27.23
											Total Average NRW		30.09

付表３．５　マータラ地区用途別給水栓数および使用水量

NO. OF CONNECTIONS

Category No./Application	No. of Connections					Monthly Consumption (m^3/mo)					Percentage (%)	
	Registered	Acctual	Assessed	Balance	In use	Registered	Acctual	Assessed	Balance	In use	No. of Conn.	Consump.
Domestic	36,269	33,050	2,839	380	33,402		561,090	41,485		602,575	95.3	83.0
Gov. quarters	25	21	3	1	21		340	13		353	0.1	0.0
Gov. school	113	90	21	2	107		13,679	1,309		14,988	0.3	2.0
Gov. quarters	174	115	16	43	110		2,419	139		2,558	0.3	0.0
Stand post	426	83	33	310	113		9,255	3,227		12,482	0.3	2.0
Gov. Inst.	298	219	21	58	207		34,043	541		34,584	0.6	5.0
61	5	2	1	2	2		616	0		616	0.0	0.0
62	10	7	0	3	7		2,254	0		2,254	0.0	0.0
63	20	11	2	7	13		14,706	229		14,935	0.0	2.0
Comm. Inst.	1,109	857	82	170	800		22,539	1,593		24,132	2.3	3.0
Tourist Hotel	35	28	5	2	32		1,779	696		2,475	0.1	0.0
Indust./Const.	53	23	5	25	23		3,456	1,245		4,701	0.1	1.0
Other Comm./Private Inst.	12	7	2	3	7		268	175		443	0.0	0.0
Relligious Inst.	218	181	32	5	186		9,452	632		10,084	0.5	1.0
82	19	13	2	4	13		581	71		652	0.0	0.0
	38,786	34,707	3,064	1,015	35,043		676,477	51,355		727,832	100.0	100.0

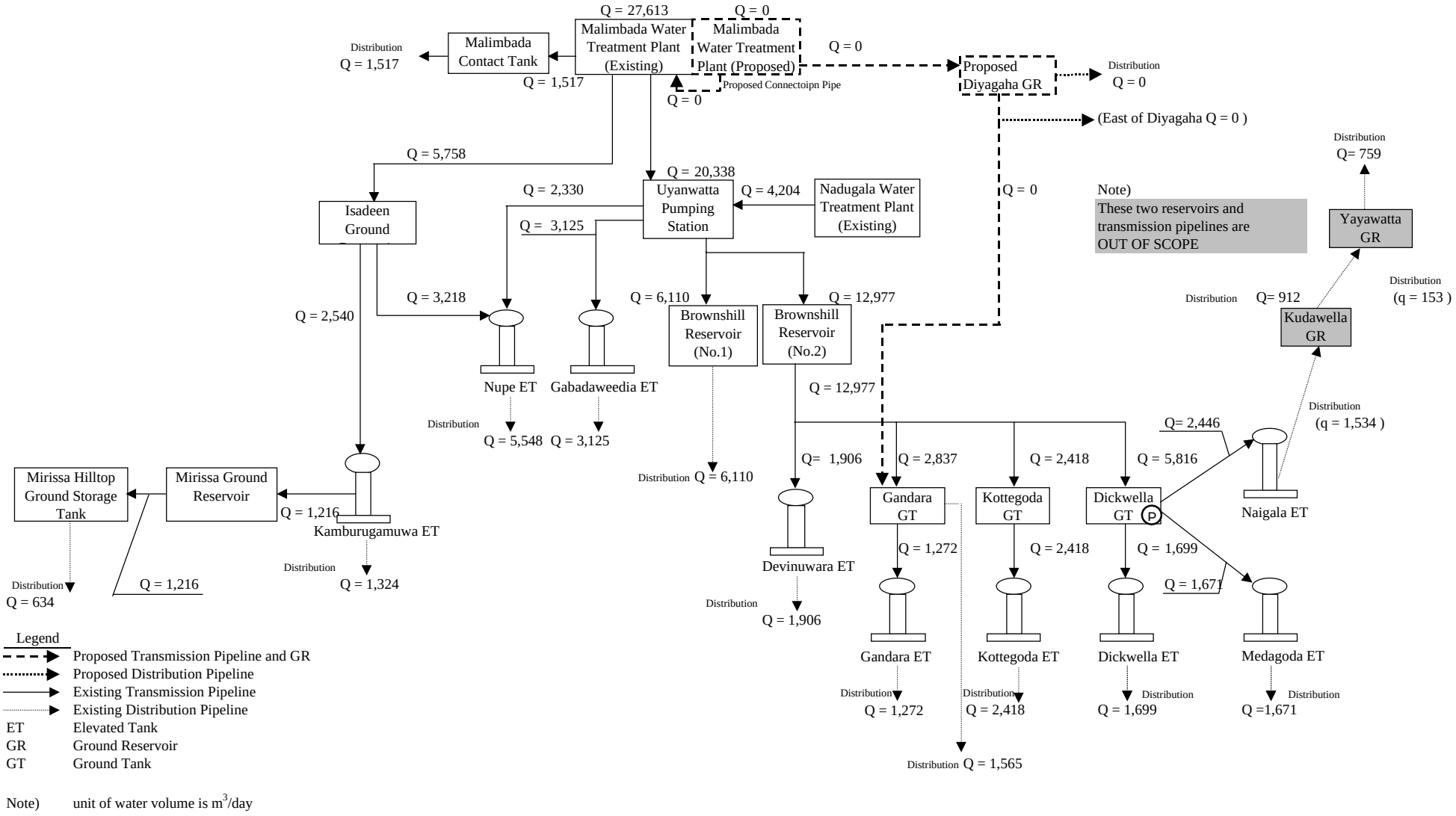
Domestic	36,468	33,186	2,858	424	33,533
Non-domestic	2,318	1,521	206	591	1,510

	Normal	Unmetered	Estimated	Disconnected	Total
Domestic	34,138	0	1,969	361	36,468
Non-domestic	1,593	0	266	459	2,318

付表3．６ 浄水場取水量と配水池配水量（2002年1～7月）

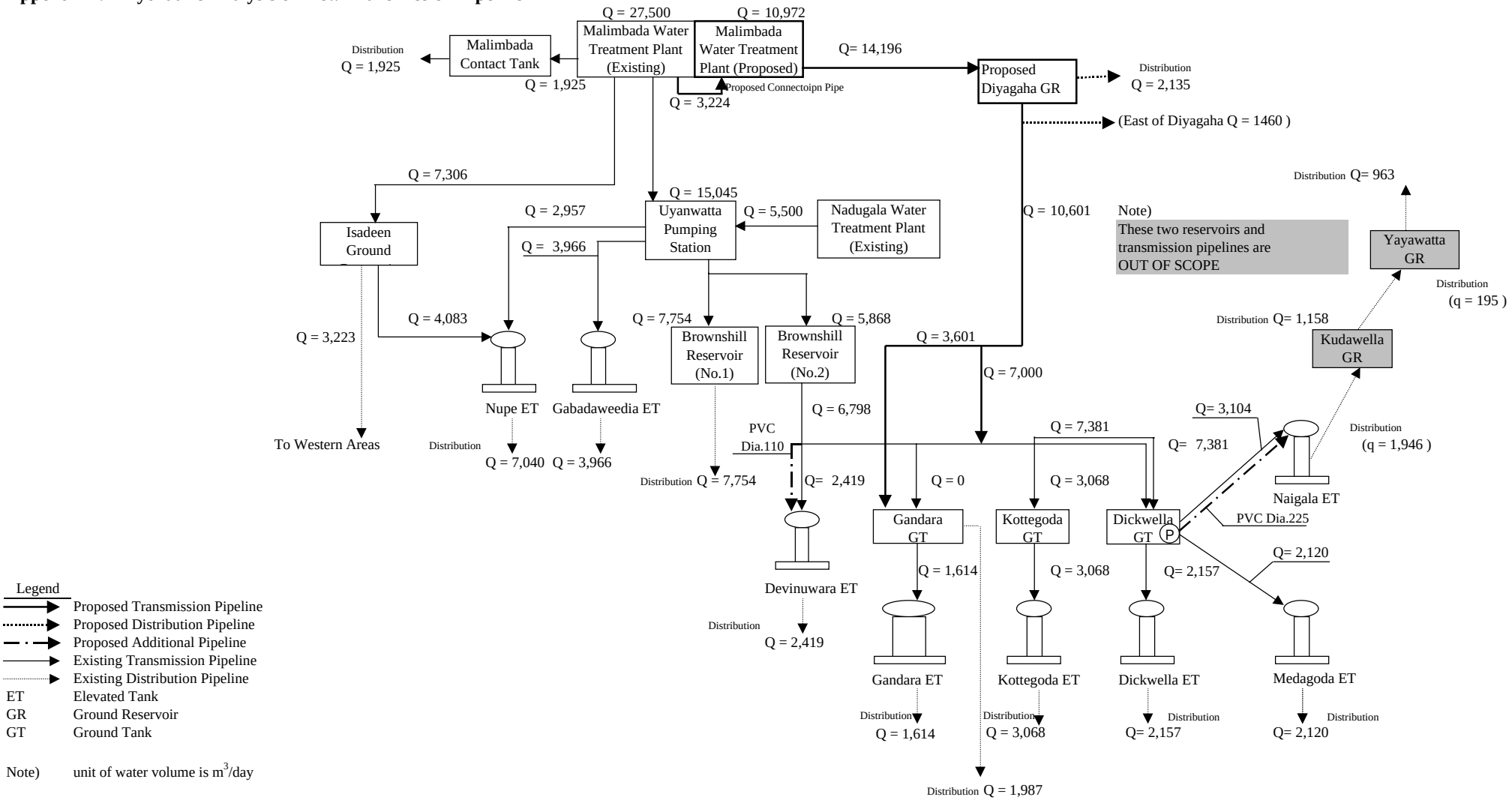
Average Daily Distribution/Transmission Quantites In Meter Cubes- 2002 (m3/day)

Location	January	February	March	April	May	June	July	Average	Total A (by S.R.)	Total B (WTP)	Remark
Malimbada to Uyanwatte	18,387	20,000	18,387	18,387	18,387	18,700	18,387	18,662		18,662	Treated
Nadugala to Uyanwatte	3,981	3,308	2,421	4,803	5,100	5,166	4,650	4,204		4,204	Treated
Malimbada to Isadeen	4,825	4,857	4,277	4,440	4,341	4,398	4,251	4,484		4,484	Treated
Brownshill II	8,461	7,800	8,062	8,348	8,975	8,364	8,433	8,349			included
Brownshill I	5,873	5,447	5,039	5,926	6,504	6,423	6,335	5,935	5,935		West
Nupe E.T.	5,752	5,326	5,119	5,430	5,456	5,280	5,366	5,390	5,390		West
Gabadaweediya E.T.	3,428	3,182	3,119	3,047	2,947	2,977	2,554	3,036	3,036		West
Kamburugamuwa E.T.	2,378	2,388	2,135	2,409	2,611	2,713	2,633	2,467	2,467		West
Mirissa Hill Top	1,163	1,318	1,190	1,230	1,190	1,230	1,190	1,216	1,216		West
Malimbada Distribution	859	1,014	1,167	1,313	1,149	1,221	1,297	1,146	1,146	1,146	West
Malimbada Dist: to Matara	217	357	322	360	347	359	337	328	328	328	West
Mirissa Hill Top (Weligama)	645	563	627	662	641	662	641	634	634		West
Devinuwara E.T.	1,310	1,359	1,357	1,376	1,434	1,279	1,359	1,353	1,353		East
Gandara G.R.	1,038	1,082	1,066	1,075	1,175	1,140	1,206	1,112	1,112		East
Gandara E.T.	951	903	755	859	1,026	931	897	903	903		East
Kottegoda E.T.	1,685	1,680	1,793	1,661	1,858	1,628	1,714	1,717	1,717		East
Dickwella G.R.	4,581	4,205	3,348	4,429	4,441	4,321	3,590	4,131	4,131		East
(Kudawella G.R.)	860	803	447	507	514	520	516	595	595		East
(Dickwella E. T.)	1,182	1,323	1,194	1,226	926	955	950	1,108	1,108		East
(Naigala E. T.)	1,611	1,797	1,487	1,596	1,478	1,600		1,367	1,367		East
(Yayawatta G. R.)	544	588	364	492	524	517	435	495	495		East
Total	29,880	28,824	27,037	29,777	30,779	30,164	29,119	29,369	29,369	28,825	

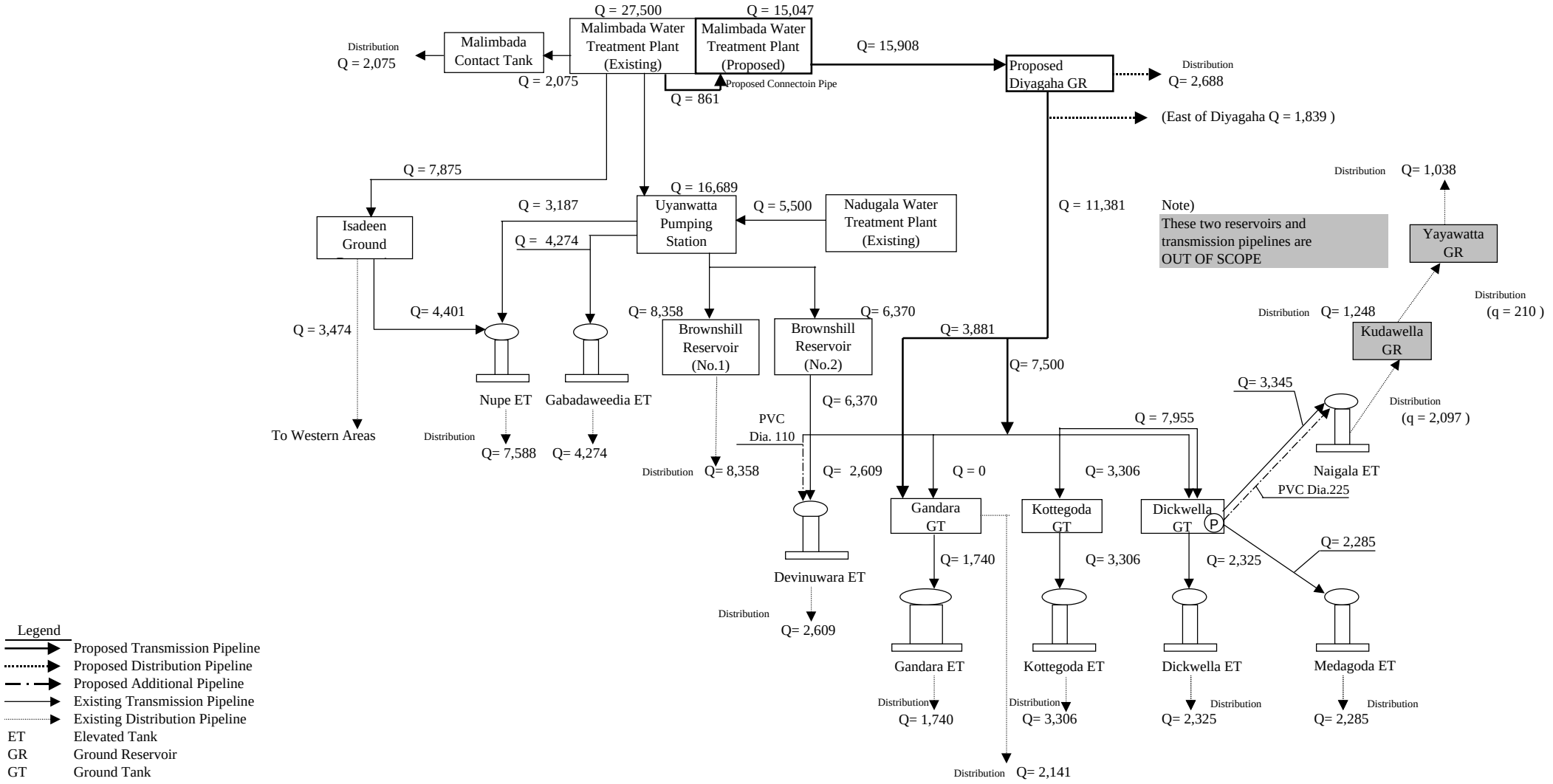


Appendix Figure 3.3.1 Water Supply Volume Diagram (Existing)

Appendix 2.1 Hydraulic Analysis on New Transmission Pipeline



Appendix Figure 3.3.2 Water Supply Volume Diagram (2007)



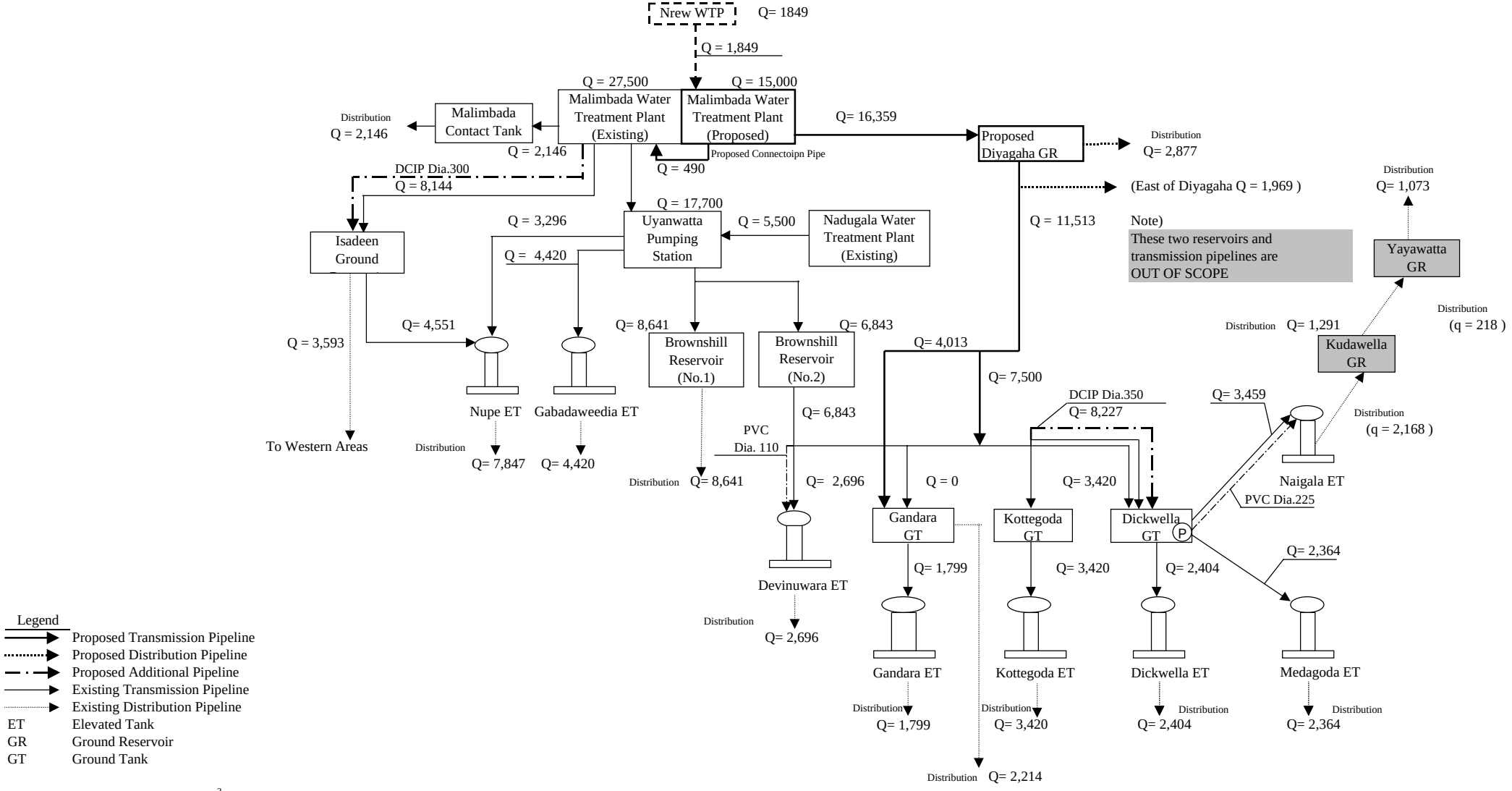
Legend

- Proposed Transmission Pipeline
- Proposed Distribution Pipeline
- Proposed Additional Pipeline
- Existing Transmission Pipeline
- Existing Distribution Pipeline

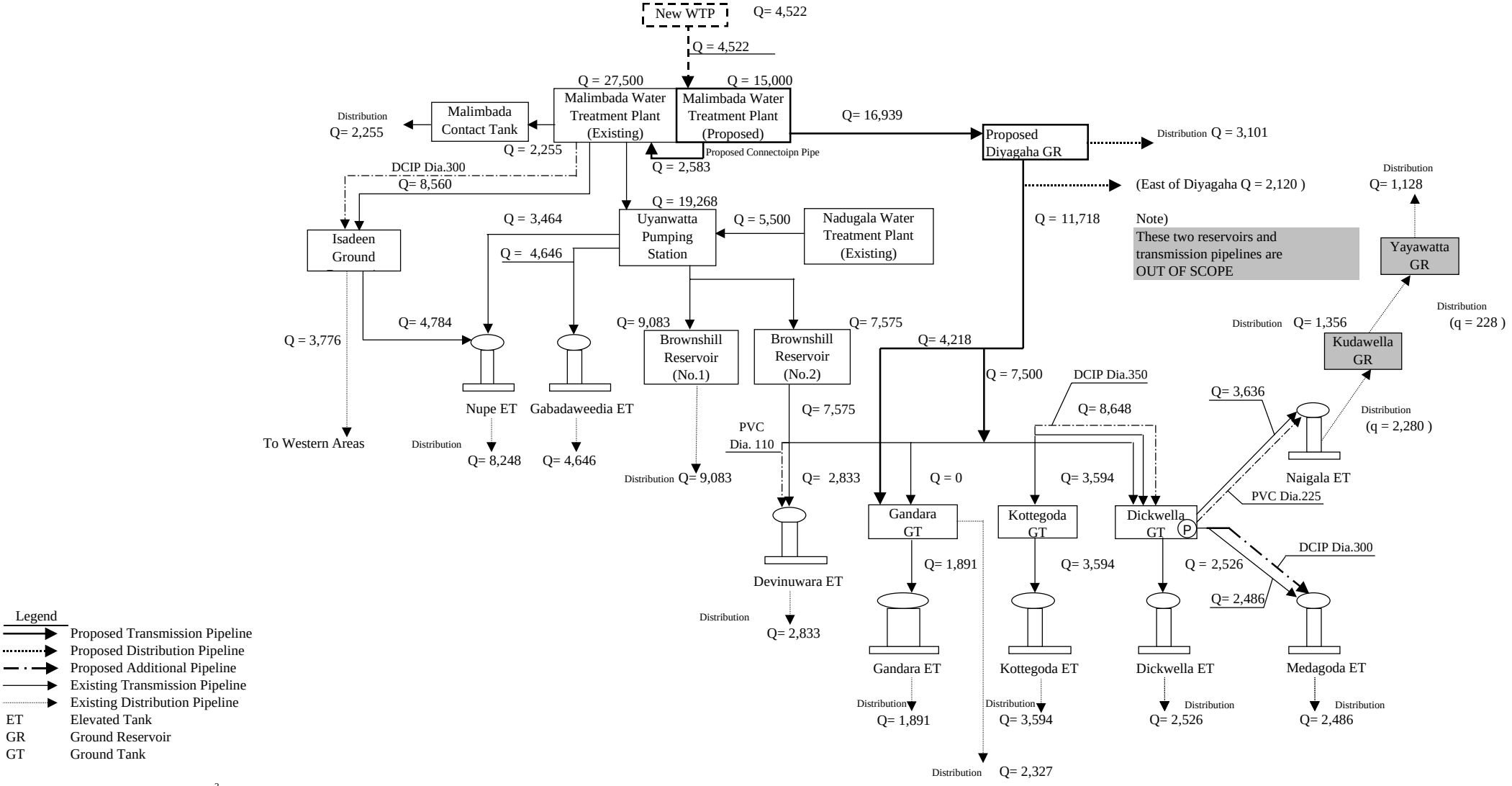
ET Elevated Tank
GR Ground Reservoir
GT Ground Tank

Note) unit of water volume is m^3/day

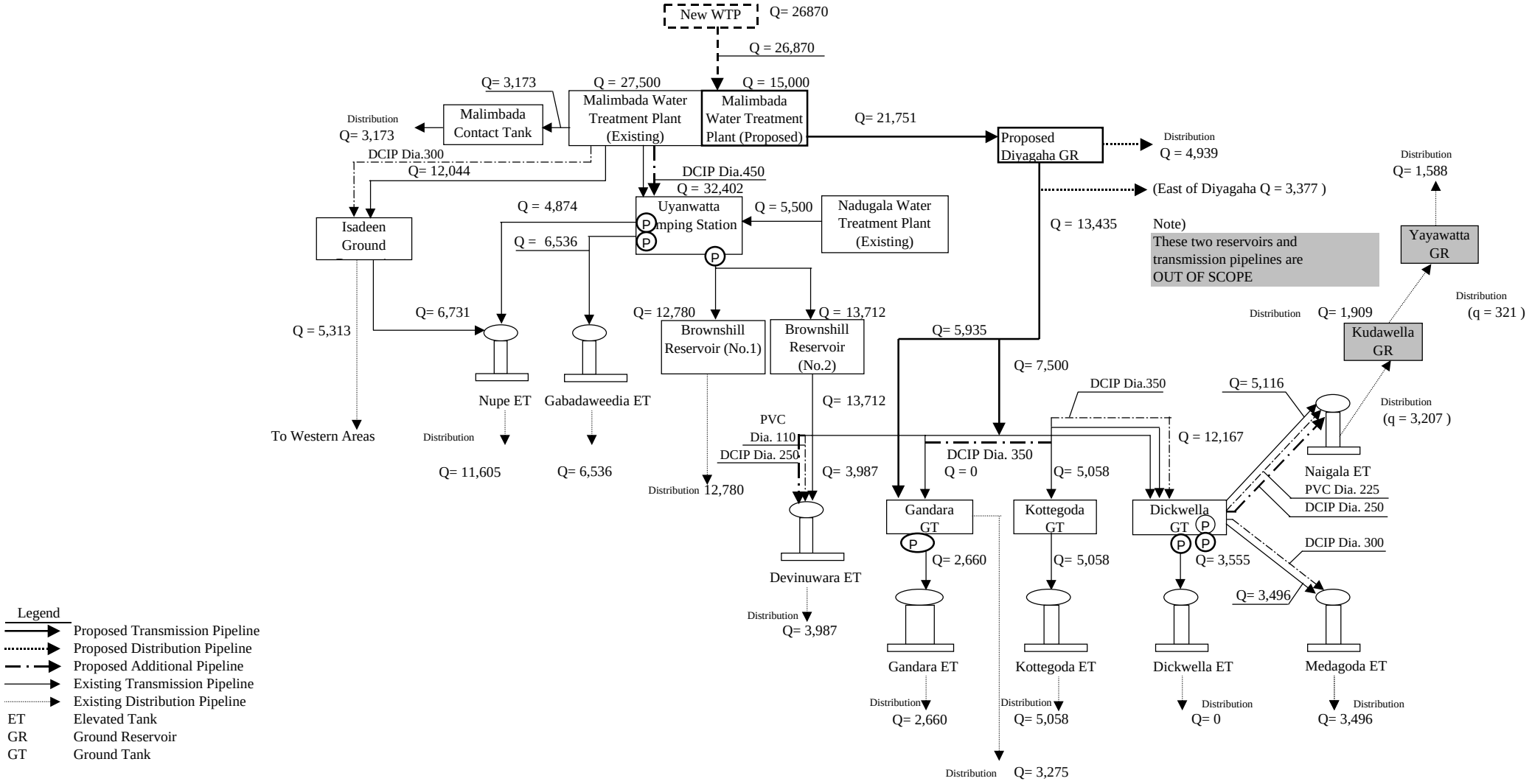
Appendix Figure 3.3.3 Water Supply Volume Diagram (2009)



Appendix Figure 3.3.4 Water Supply Volume Diagram (2010)



Appendix Figure 3.3.5 Water Supply Volume Diagram (2011)



Appendix Figure 3.3.6 Water Supply Volume Diagram (2021)

Table . Existing and Expansion Pipe Diameter and Length at Existing Pipe Seaside Route (No. 1) Case 1 PVC

No	from	to	Capacity Limit	Hydraulic Gradient	Existing	Expansion																													
					2002	2007						2009					2010					2011					2021									
					Pipe Dia and Length	Flow		Pipe Dia and Length				Flow		Pipe Dia and Length			Flow		Pipe Dia and Length			Flow		Pipe Dia and Length			Flow		Pipe Dia and Length						
			m3/d	‰	mm	m	m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m						
1	Malimbada WTP	Uyanwatta PS	21,000	3.2	DIP 500 × 10,040	15,045 OK	1.8	DIP	500 ×	10,040		16,689 OK	2.1	DIP	500 ×	10,040	17,700 OK	2.4	DIP	500 ×	10,040	19,268 OK	2.8	DIP	500 ×	10,040	32,402 NO	7.2	DIP	500 ×	10,040					
		(Additional Pipe)																											DIP	450 ×	10,040					
		(Conbine Pipe)				15,045	1.8		500 ×	10,040		16,689	2.1		500 ×	10,040	17,700	2.4		500 ×	10,040	19,268	2.8		500 ×	10,040	32,402	2.5		620 ×	10,040					
2	Devinuwara Junction	Devinuwara ET	—	14.7	CIP 150 × 400	2,419 NO	20.9	CIP	150 ×	400		2,609 NO	24.1	CIP	150 ×	400	2,696 NO	25.6	CIP	150 ×	400	2,833 NO	28.1	CIP	150 ×	400	3,987 NO	52.8	CIP	150 ×	400					
		(Additional Pipe)						PVC	97 ×	400				PVC	97 ×	400			PVC	97 ×	400			PVC	97 ×	400			PVC	97 ×	400					
																													DIP	250 ×	400					
		(Conbine Pipe)				2,419	12.6		167 ×	400		2,609	14.5		167 ×	400	2,696	15.4		167 ×	400	2,833	16.8		167 ×	400	3,987	2.5		280 ×	400					
3	Gandara Junction	Kottegoda Junction	—	4.5	ACP 400 × 4,960	10,449 OK	2.6	ACP	400 ×	4,960		11,261 OK	3.0	ACP	400 ×	4,960	11,647 OK	3.2	ACP	400 ×	4,960	12,242 OK	3.5	ACP	400 ×	4,960	17,225 NO	6.7	ACP	400 ×	4,960					
		(Additional Pipe)																											DIP	350 ×	4,960					
		(Conbine Pipe)				10,449	2.6		400 ×	4,960		11,261	3.0		400 ×	4,960	11,647	3.2		400 ×	4,960	12,242	3.5		400 ×	4,960	17,225	2.5		490 ×	4,960					
4	Kottegoda Junction	Dickwella GR	—	3.3	ACP 300 × 5,190	7,381 NO	5.6	ACP	300 ×	5,190		7,955 NO	6.5	ACP	300 ×	5,190	8,227 NO	6.9	ACP	300 ×	5,190	8,648 NO	7.6	ACP	300 ×	5,190	12,167 NO	14.2	ACP	300 ×	5,190					
					PVC 198 × 5,190			PVC	198 ×	5,190				PVC	198 ×	5,190			PVC	198 ×	5,190			PVC	198 ×	5,190			PVC	198 ×	5,190					
		(Additional Pipe)																	DIP	350 ×	5,190			DIP	350 ×	5,190			DIP	350 ×	5,190					
		(Conbine Pipe)				7,381	3.3		335 ×	5,190		7,955	3.8		335 ×	5,190	8,227	1.0		446 ×	5,190	8,648	1.1		446 ×	5,190	12,167	2.1		446 ×	5,190					
5	Dickwella GR	Naigala	—	2.1	ACP 200 × 2,256	3,104 NO	8.2	ACP	200 ×	2,256		3,345 NO	9.4	ACP	200 ×	2,256	3,459 NO	10.0	ACP	200 ×	2,256	3,636 NO	11.0	ACP	200 ×	2,256	5,116 NO	20.6	ACP	200 ×	2,256					
		(Additional Pipe)						PVC	198 ×	2,256				PVC	198 ×	2,256			PVC	198 ×	2,256			PVC	198 ×	2,256			PVC	198 ×	2,256					
																								DIP	250 ×	2,256			DIP	250 ×	2,256					
		(Conbine Pipe)				3,104	2.3		259 ×	2,256		3,345	2.7		259 ×	2,256	3,459	2.8		259 ×	2,256	3,636	0.9		331 ×	2,256	5,116	1.8		331 ×	2,256					
6	Dickwella GR	Medagoda ET	—	5.9	PVC 200 × 4,000	2,120 OK	4.0	PVC	200 ×	4,000		2,285 OK	4.6	PVC	200 ×	4,000	2,364 OK	4.9	PVC	200 ×	4,000	2,486 OK	5.4	PVC	200 ×	4,000	3,496 NO	10.2	PVC	200 ×	4,000					
		(Additional Pipe)																						DIP	300 ×	4,000			DIP	300 ×	4,000					
		(Conbine Pipe)				2,120	4.0		200 ×	4,000		2,285	4.6		200 ×	4,000	2,364	4.9		200 ×	4,000	2,486	0.4		336 ×	4,000	3,496	0.8		336 ×	4,000					
7	Malimbada WTP	Isadeen GR	—	3.1	DIP 350 × 8,800	7,306 OK	2.6	DIP	350 ×	8,800		7,875 OK	3.0	DIP	350 ×	8,800	8,144 NO	3.2	DIP	350 ×	8,800	8,560 NO	3.5	DIP	350 ×	8,800	12,044 NO	6.6	DIP	350 ×	8,800					
		(Additional Pipe)																	DIP	300 ×	8,800			DIP	300 ×	8,800			DIP	300 ×	8,800					
		(Conbine Pipe)				7,306	2.6	DIP	350 ×	8,800		7,875	3.0	DIP	350 ×	8,800	8,144	1.2		425 ×	8,800	8,560	1.4		425 ×	8,800	12,044	2.6		425 ×	8,800					

C= 120

Table . Existing and Expansion Pipe Diameter and Length at Existing Pipe Seaside Route (No. 2) Alternative Additional Pipe Plan Case 1 PVC

No	from	to	Capacity Limit	Hydraulic Gradient	Existing	Expansion																													
					2002	2007						2009					2010					2011					2021									
					Pipe Dia and Length	Flow		Pipe Dia and Length				Flow		Pipe Dia and Length			Flow		Pipe Dia and Length			Flow		Pipe Dia and Length			Flow		Pipe Dia and Length						
			m3/d	‰	mm	m	m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m		m3/d	‰	mm	m						
4	Kottegoda Junction	Dickwella GR	—	3.3	ACP 300 × 5,190	7,381 NO	5.6	ACP	300 ×	5,190		7,955 NO	6.5	ACP	300 ×	5,190	8,227 NO	6.9	ACP	300 ×	5,190	8,648 NO	7.6	ACP	300 ×	5,190	12,167 NO	14.2	ACP	300 ×	5,190					
								PVC	198 ×	5,190				PVC	198 ×	5,190			PVC	198 ×	5,190			PVC	198 ×	5,190			PVC	198 ×	5,190					
		(Additional Pipe)																											DIP	300 ×	5,190					
		(Conbine Pipe)				7,381	3.3		335 ×	5,190		7,955	3.8		335 ×	5,190	8,227	4.0		335 ×	5,190	8,648	4.4		335 ×	5,190	12,167	3.0		414 ×	5,190					
5	Dickwella GR	Naigala	—	2.1	ACP 200 × 2,256	3,104 NO	8.2	ACP	200 ×	2,256		3,345 NO	9.4	ACP	200 ×	2,256	3,459 NO	10.0	ACP	200 ×	2,256	3,636 NO	11.0	ACP	200 ×	2,256	5,116 NO	20.6	ACP	200 ×	2,256					
		(Additional Pipe)						DIP	300 ×	2,256				DIP	300 ×	2,256			DIP	300 ×	2,256			DIP	300 ×	2,256			DIP	300 ×	2,256					
																													DIP	200 ×	2,256					
		(Conbine Pipe)				3,104	0.7		336 ×	2,256		3,345	0.8		336 ×	2,256	3,459	0.8		336 ×	2,256	3,636	0.9		336 ×	2,256	5,116	1.1		366 ×	2,256					

C= 120

Table . Expansion Pipe Diameter and Length at Expansion Pipe Inland Route (No.1) Case 1 PVC

No	from	to	Capacity Limit	Hydraulic Gradient	Existing	Expansion																							
					2002	2007				2009				2010				2011				2021							
					Pipe Dia and Length	Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length					
			m3/d	‰	mm m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m				
1	Malimbada WTP	Diagaha GR	—	2.7	DIP 450 × 14,007	14,196 OK	2.6	DIP 450 ×	14,007	15,908 NO	3.2	DIP 450 ×	14,007	16,359 NO	3.4	DIP 450 ×	14,007	16,939 NO	3.6	DIP 450 ×	14,007	21,751 NO	5.8	DIP 450 ×	14,007				
		(Additional Pipe)														DIP 400 ×	1,400			DIP 400 ×	2,500			DIP 400 ×	9,900				
		(Conbine Pipe)												16,359	3.1	460 ×	14,007	16,939	3.0	469 ×	14,007	21,751	2.8	524 ×	14,007				
2	Diagaha GR	Gandara GR	—	5.5	DIP 400 × 6,750	10,601 OK	2.7	DIP 400 ×	6,750	11,381 OK	3.1	DIP 400 ×	6,750	11,513 OK	3.2	DIP 400 ×	6,750	11,718 OK	3.3	DIP 400 ×	6,750	13,435 OK	4.2	DIP 400 ×	6,750				

Table . Expansion Pipe Diameter and Length at Expansion Pipe Inland Route (No.2) Alternative Additional Pipe Plan Case 1 PVC

No	from	to	Capacity Limit	Hydraulic Gradient	Existing	Expansion																							
					2002	2007				2009				2010				2011				2021							
					Pipe Dia and Length	Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length		Flow		Pipe Dia and Length					
			m3/d	‰	mm m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m	m3/d	‰	mm	m				
1	Malimbada WTP	Diagaha GR	—	2.7	DIP 450 × 14,007	14,196 OK	2.6	DIP 450 ×	14,007	15,908 NO	3.2	DIP 450 ×	14,007	16,359 NO	3.4	DIP 450 ×	14,007	16,939 NO	3.6	DIP 450 ×	14,007	21,751 NO	5.8	DIP 450 ×	14,007				
		(Additional Pipe)														DIP 450 ×	1,200			DIP 450 ×	2,200			DIP 450 ×	8,700				
		(Conbine Pipe)												16,359	3.0	462 ×	14,007	16,939	2.9	471 ×	14,007	21,751	2.5	534 ×	14,007				
2	Diagaha GR	Gandara GR	—	5.5	DIP 400 × 6,750	10,601 OK	2.7	DIP 400 ×	6,750	11,381 OK	3.1	DIP 400 ×	6,750	11,513 OK	3.2	DIP 400 ×	6,750	11,718 OK	3.3	DIP 400 ×	6,750	13,435 OK	4.2	DIP 400 ×	6,750				

Table . Maximum Capacity of Existing Pump and Required Pump Capacity Case 1 PVC

No	Pump Station	Pump to		Unit		Capacity	Head	Operation	Flow Rate (m3/d)		Pump Flow Rate and Pump Head							
				Duty	Stand by			Time	Existing	Maximum	2007		2009		2011		2021	
						M^3/Hr	m	Hr.	M^3/d	M^3/d	m3/d	m	m3/d	m	m3/d	m	m3/d	m
1	Uyanwatta	Nupe Elevated Tank	Existing	1	0	250	33	20	5000	6000	2,957 OK	33 OK	3,187 OK	33 OK	3,464 OK	36 NO	4,874 OK	36 NO
	Pumping	Gabadaweediya Elevated Tank		1	0	250	33	20	5000	6000	3,966 OK	33 OK	4,274 OK	33 OK	4,646 OK	33 OK	6,536 NO	36 NO
	Station	Brownshill G.R. 1 & 2		2	1	525	60	24	25200	25200	13,622 OK	60 OK	14,728 OK	60 OK	18,158 OK	60 OK	26,492 NO	60 OK
2	Gandara Pumping Station	Gandara Elevated Tank		1	1	126	31	12	1512	3024	2,130 OK	31 OK	2,323 OK	31 OK	2,556 OK	31 OK	3,682 NO	35 NO
3	Dickwella Pumping Station	Dickwella Elevated Tank		1	1	135	36.1	12	1620	3240	2,157 OK	36 OK	2,325 OK	36 OK	2,526 OK	36 OK	3,555 NO	36 OK
	Dickwella Pumping Station	Medagoda Elevated Tank		1	1	68.4	61	12	821	1642	2,120 NO	78 NO	2,285 NO	78 NO	2,486 NO	78 NO	3,496 NO	78 NO
1	Uyanwatta	Nupe Elevated Tank	Proposed	1	1	250	36	24	-	6000					6,000 OK	36 OK	6,000 OK	36 OK
	Pumping	Gabadaweediya Elevated Tank		1	1	350	36	24	-	8400							8,400 OK	36 OK
	Station	Brownshill G.R. 1 & 2		2	1	650	60	24	-	31200							31,200 OK	60 OK
2	Gandara Pumping Station	Gandara Elevated Tank		1	1	200	35	24	-	4800							4,800 OK	35 OK
3	Dickwella	Dickwella Elevated Tank		1	1	200	36	24	-	4800							4,800 OK	36 OK
	Pumping	Medagoda Elevated Tank		1	1	140	78	24	-	3360	3,360 OK	78 OK	3,360 OK	78 OK	3,360 OK	78 OK	3,360 OK	78 OK
	Station			1	1	70	78	24	-	1680							1,680	78

（注）

1 既存ポンプ揚程はポンプ回り配管ロスを3mとみなし、ポンプ本体仕様に示される揚程から3mを引いたものをポンプ揚程とした。

2 既存ポンプ能力は揚水量と揚程により決まる。従って、ポンプの交換時期は揚水量または揚程が満たない場合にポンプの追加又は交換を行うものとした。

3 既存ポンプにおいて二重枠で囲まれている部分はポンプ能力（ポンプ揚水量又は揚程）が不足していることを示し、その年度までにポンプの交換を必要とする。

4 交換するポンプの仕様及び交換を必要とする年度を計画(Proposed)内に示す。

Case 6 Existing Transmission Line Hydraulic Calculation (2007) without Gandara Case 1 C= 120 PVC

Total Q= 43,972 m3/d (= 27,500 + 5,500 + 10,972 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level		Check the Water Pressure	Remark		
1	Malimboda WTP	24,276						LWL	36.40		Clear Water Re.		
2	Uyanwatta PS	15,045	500	10040	1.8	18.1	18.3	HWL	2.90	OK	Gravity Flow		
201	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
3	Gabadaweediya Elevated Tank	3,966	300	500	1.8	0.9	29.0	HWL	27.65	OK	from 201		
202	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
4	Nupe Elevated Tank	2,957	300	2000	1.0	2.0	27.90	HWL	27.29	OK	from 202	LWL	24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
5	Brownshill Reservoir 1	7,754	500	2000	0.5	1.0	55.9	HWL	47.3	OK	from 204		
205	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
6	Brownshill Reservoir 2	5,868	500	2000	0.3	0.6	56.3	HWL	47.3	OK	from 205	LWL	43.90 m
7	Devinuwara Bulk Meter	5,868	500	3320	0.3	1.0	42.9						
8	Devinuwara Junction	5,868	450	900	0.5	0.5	42.5						
9	Devinuwara Elevated Tank	2,419	167	400	12.6	5.0	37.4	HWL	31.95	OK		LWL	26.68 m
												150	Add + 97
10	Gandara Junction	3,449	450	4090	0.2	0.8	41.64				from 8+from proposed Re		7000 m3/d
11	Gandara Ground Reservoir	0	225	400	0.0	0.0	41.64	HWL	30.53	OK			
11	Gandara Ground Reservoir							WL	54.31		Pump Head 31 m	LWL	26.31 m
12	Gandara Elevated Tank	0	150	80	0.0	0.0	54.31	HWL	54.00	OK	from 11		
13	Kottegoda Junction	10,449	400	4960	2.6	12.9	28.7				from 10		
14	Kottegoda Ground Sump	3,068	400	80	0.3	0.0	28.72	HWL	14.20	OK			
14	Kottegoda Ground Sump							WL	39.20		Pump Head 31 m	LWL	11.20 m
15	Kottegoda Elevated Tank	3,068	300	29	1.1	0.0	39.2	HWL	35.50	OK	from 14		
16	Dickwella Ground Reservoir	7,381	335	5190	3.1	16.1	12.7	HWL	5.05	OK	from 13	300	Add + 198
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36.1 m	LWL	1.25 m
17	Dickwella Elevated Tank	2,157	200	80	4.2	0.3	34.0	HWL	32.00	OK	from 16		
												LWL	1.25 m
16	Dickwella Ground Reservoir							WL	68.45		Pump Head 70.2 m	LWL	54.50 m
18	Naigala Elevated Tank	3,104	259	2256	2.2	5.0	63.5	HWL	60.00	OK		200	Add + 198
19	Kudawella Ground Reservoir	1,158	160	6000	3.9	23.4	40.1	HWL	−	−	No data		
20	Yayawatta Ground Reservoir	963	160	4400	2.8	12.3	27.8	HWL	−	−	No data		
16	Dickwella Ground Reservoir							HWL	76.25		Pump Head 61 m→ 78 m	LWL	1.25 m
21	Medagoda Elevated Tank	2,120	200	4000	4.0	16.0	60.25	HWL	52.75	OK			34.95 m
22	Isadeen Ground Reservoir	7,306	350	8800	2.6	22.9	13.5	HWL	5.8	OK	from 1	LWL	2.10 m
23	Malimboda contact Tank	1,925	200	20	3.4	0.1	36.3	HWL	36	OK	from 1		
24	Nadugara WTP							WL	34.00		Pump Head 25 m	LWL	12.00 m
2	Uyanwatta PS	5,500	350	5000	1.5	7.5	26.5	HWL	2.90	OK			

Note C= 120 (C= 125)

The Quantity rate of Nupe ET from Uyanwatta is 42 %.

Pump (Uyanwatta-Nupe ET 135 m3/h 18 h = 2430 m3/d

Nupe E.T. 5752 m3/d

Water demand increase rate 16469 / 12977 1.269

Existing demand 12977 m3/d

2007year demand 16469 m3/d

Proposed transmission line flow rate (Tot 10601 m3/d

East side from Existing Gandara 7000 m3/d

Gandara Ground Reservoir 1987 m3/d

Gandara Elevated Tank 1614 m3/d

Isadeen Flow rate

Nupe E.T.*0.58 4083 m3/d (2007)

Kamburuganuwa ET 3223 m3/d (2007)

Total 7306 m3/d (2007)

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	66.00			HWL	72.00 m
		10,601	400	5500	2.7	14.9	51.15				Total Length		
10	Gandara Junction	10,601	400	1250	2.7	3.4	47.78	HWL	41.64	OK	6750 m		

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	66.00			HWL	72.00 m
		10,601	400	5650	2.7	15.3	50.75				Total Length		
10	Gandara Junction	10,601	350	1100	5.2	5.7	45.03	HWL	41.64	OK	6750 m		

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level		Check the Water Pressure	Remark		
								HWL	112.00		Total Length 14007 m	LWL	36.00 m
100	Proposed Diyagaha Reservoir	14,196	450	11307	2.6	29.4	82.60						
100	Proposed Diyagaha Reservoir	14,196	450	2700	2.6	7.0	75.58	HWL	72.00	OK	Pump Head 79 m	HWL	72.00 m

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level		Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
100	Proposed Diyagaha Reservoir	14,196	450	10007	2.6	26.0	93.98						
100	Proposed Diyagaha Reservoir	14,196	400	4000	4.7	18.8	75.18	HWL	72.00	OK	Pump Head 87 m	HWL	72.00 m

Note: Flow rate (Total) 14196 m3/d = 0.16431 m3/s Diyagaha East of Diyagaha

Diyagaha Distribution rate 3595 m3/d (2135 + 1460 = 3595 m3/d)

Transmission flow rate 10601 m3/d

Case 7　Existing Transmission Line Hydraulic Calculation (2009)　without Gandara　Case 1　C= 120　PVC

Total Q= 48,047 m3/d　(= 27,500 + 5,500 + 15,047 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
1	Malimboda WTP	26,639						LWL	36.40		Clear Water Re.		
2	Uyanwatta PS	16,689	500	10040	2.1	21.1	15.3	HWL	2.90	OK	Gravity Flow	500	Add + 0
201	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
3	Gabadaweediya Elevated Tank	4,274	300	500	2.1	1.1	28.9	HWL	27.65	OK	from 201		
202	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
4	Nupe Elevated Tank	3,187	300	2000	1.2	2.4	27.5	HWL	27.29	OK	from 202	LWL	24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
5	Brownshill Reservoir 1	8,358	500	2000	0.6	1.2	55.7	HWL	47.3	OK	from 204		
205	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
6	Brownshill Reservoir 2	6,370	500	2000	0.4	0.8	56.1	HWL	47.3	OK	from 205	LWL	43.90 m
7	Devinuwara Bulk Meter	6,370	500	3320	0.4	1.3	42.6						
8	Devinuwara Junction	6,370	450	900	0.6	0.5	42.0						
9	Devinuwara Elevated Tank	2,609	167	400	14.5	5.8	36.23	HWL	31.95	OK		LWL	26.68 m
												150	Add + 97
10	Gandara Junction	3,761	450	4090	0.2	0.8	41.21				from 8+from proposed Re		7500 m3/d
11	Gandara Ground Reservoir	0	225	400	0.0	0.0	41.21	HWL	30.53	OK			
11	Gandara Ground Reservoir							WL	54.31		Pump Head 31 m	LWL	26.31 m
12	Gandara Elevated Tank	0	150	80	0.0	0.0	54.31	HWL	54.00	OK	from 11		
13	Kottegoda Junction	11,261	400	4960	3.0	14.9	26.3				from 10		
14	Kottegoda Ground Sump	3,306	400	80	0.3	0.0	26.31	HWL	14.20	OK			
14	Kottegoda Ground Sump							WL	39.20		Pump Head 31 m	LWL	11.20 m
15	Kottegoda Elevated Tank	3,306	300	29	1.3	0.0	39.2	HWL	35.50	OK	from 14		
16	Dickwella Ground Reservoir	7,955	335	5190	3.5	18.2	8.17	HWL	5.05	OK	from 13	300	Add + 198
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36.1 m	LWL	1.25 m
17	Dickwella Elevated Tank	2,325	200	80	4.8	0.4	34.0	HWL	32.00	OK	from 16		
												LWL	1.25 m
16	Dickwella Ground Reservoir							WL	68.45		Pump Head 70.2 m	LWL	54.50 m
18	Naigala Elevated Tank	3,345	259	2256	2.5	5.6	62.81	HWL	60.00	OK		200	Add + 198
19	Kudawella Ground Reservoir	1,248	160	6000	4.5	27.0	35.8	HWL	−	−	No data		
20	Yayawatta Ground Reservoir	1,038	160	4400	3.2	14.1	21.7	HWL	−	−	No data		
16	Dickwella Ground Reservoir							HWL	76.25		Pump Head 61 m→ 78 m	LWL	1.25 m
21	Medagoda Elevated Tank	2,285	200	4000	4.6	18.4	57.85	HWL	52.75	OK			34.95 m
22	Isadeen Ground Reservoir	7,875	350	8800	3.0	26.4	10.0	HWL	5.8	OK	from 1	LWL	2.10 m
												Dia. 350	Add + 0
23	Malimboda contact Tank	2,075	200	20	3.9	0.1	36.3	HWL	36	OK	from 1		
24	Nadugara WTP							WL	34.00		Pump Head 25 m	LWL	12.00 m
2	Uyanwatta PS	5,500	350	5000	1.5	7.5	26.5	HWL	2.90	OK			

Note　C= 120 (C= 125)

The Quantity rate of Nupe ET from Uyanwatta is 42 %.

Pump (Uyanwatta-Nupe ET　135 m3/h　18 h　= 2430 m3/d

Nupe E.T.　5752 m3/d

Water demand increase rate　17751 /　12977　= 1.368

Existing demand　12977 m3/d

2007year demand　17751 m3/d

Proposed transmission line flow rate (Tot　11381 m3/d

East side from Existing Gandara　7500 m3/d

Gandara Ground Reservoir　2141 m3/d

Gandara Elevated Tank　1740 m3/d

Isadeen Flow rate

Nupe E.T.*0.58　4401 m3/d

Kamburuganuwa ET　3474 m3/d

Total　7875 m3/d

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,381	400	3000	3.1	9.3	58.70				Total Length		
10	Gandara Junction	11,381	400	3750	3.1	11.6	47.08	HWL	41.21	OK	6750 m	400	Add + 0

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,381	400	6000	3.1	18.6	49.40				Total Length		
10	Gandara Junction	11,381	350	750	5.9	4.4	44.98	HWL	41.21	OK	6750 m		

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
		15,908	450	9000	3.2	28.8	91.20				Pump Head 87 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	15,908	450	5007	3.2	16.0	75.18	HWL	72.00	OK		450	Add + 0

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
								HWL	112.00		Total Length 14007 m	LWL	36.00 m
		15,908	450	10507	3.2	33.6	78.38				Pump Head 79 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	15,908	586	3500	0.9	3.2	75.23	HWL	72.00	OK		450	Add + 450

Note: Flow rate (Total)　15908 m3/d =　0.18412　m3/s　Diyagaha　East of Diyagaha

Diyagaha Distribution rate　4527 m3/d　(2688 +　1839)=　4527 m3/d)

Transmission flow rate　11381 m3/d

Case 8 Existing Transmission Line Hydraulic Calculation (2010) without Gandara Case 1 C= 120 PVC

Total Q= 49,849 m3/d (= 27,500 + 5,500 + 16,849 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark		
1	Malimboda WTP	27,990						LWL	36.40		Clear Water Re.		
2	Uyanwatta PS	17,700	500	10040	2.4	24.1	12.3	HWL	2.90	OK	Gravity Flow	500	Add + 0
201	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
3	Gabadaweediya Elevated Tank	4,420	300	500	2.2	1.1	28.8	HWL	27.65	OK	from 201		
202	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
4	Nupe Elevated Tank	3,296	300	2000	1.3	2.6	27.30	HWL	27.29	OK	from 202	LWL	24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
5	Brownshill Reservoir 1	8,641	500	2000	0.6	1.2	55.7	HWL	47.3	OK	from 204		
205	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
6	Brownshill Reservoir 2	6,843	500	2000	0.4	0.8	56.1	HWL	47.3	OK	from 205	LWL	43.90 m
7	Devinuwara Bulk Meter	6,843	500	3320	0.4	1.3	42.6						
8	Devinuwara Junction	6,843	450	900	0.7	0.6	41.9						
9	Devinuwara Elevated Tank	2,696	167	400	15.4	6.2	35.8	HWL	31.95	OK		LWL	26.68 m
												150	Add + 97
10	Gandara Junction	4,147	450	4090	0.3	1.2	40.72				from 8+from proposed Re		7500 m3/d
11	Gandara Ground Reservoir	0	225	400	0.0	0.0	40.72	HWL	30.53	OK			
11	Gandara Ground Reservoir							WL	54.31		Pump Head 31 m	LWL	26.31 m
12	Gandara Elevated Tank	0	150	80	0.0	0.0	54.31	HWL	54.00	OK	from 11		
13	Kottegoda Junction	11,647	400	4960	3.2	15.9	24.8				from 10		
14	Kottegoda Ground Sump	3,420	400	80	0.3	0.0	24.82	HWL	14.20	OK			
14	Kottegoda Ground Sump	8,227						WL	39.20		Pump Head 31 m	LWL	11.20 m
15	Kottegoda Elevated Tank	3,420	300	29	1.4	0.0	39.2	HWL	35.50	OK	from 14		
												ACP	
16	Dickwella Ground Reservoir	8,227	446	5190	1.0	5.2	19.7	HWL	5.05	OK	from 13	300 198	Add + 350
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36.1 m	LWL	1.25 m
17	Dickwella Elevated Tank	2,404	200	80	5.1	0.4	33.9	HWL	32.00	OK	from 16		
												LWL	1.25 m
16	Dickwella Ground Reservoir							WL	68.45		Pump Head 70.2 m	LWL	54.50 m
18	Naigala Elevated Tank	3,459	259	2256	2.6	5.9	62.6	HWL	60.00	OK		200	Add + 198
19	Kudawella Ground Reservoir	1,291	160	6000	4.8	28.8	33.8	HWL	−	−	No data		
20	Yayawatta Ground Reservoir	1,073	160	4400	3.4	15.0	18.8	HWL	−	−	No data		
16	Dickwella Ground Reservoir							HWL	76.25		Pump Head 61 m→ 78 m	LWL	1.25 m
21	Medagoda Elevated Tank	2,364	200	4000	4.9	19.6	56.65	HWL	52.75	OK			34.95 m
22	Isadeen Ground Reservoir	8,144	425	8800	1.2	10.6	25.8	HWL	5.8	OK	from 1	LWL	2.10 m
												Dia. 350	Add + 300
23	Malimboda contact Tank	2,146	200	20	4.1	0.1	36.3	HWL	36	OK	from 1		
24	Nadugara WTP							WL	34.00		Pump Head 25 m	LWL	12.00 m
2	Uyanwatta PS	5,500	350	5000	1.5	7.5	26.5	HWL	2.90	OK			

Note C= 120 (C= 123) (C= 125)

The Quantity rate of Nupe ET from Uyanwatta is 42 %.

Pump (Uyanwatta-Nupe ET 135 m3/h 18 h = 2430 m3/d

Nupe E.T. 5752 m3/d

Water demand increase rate 18356 / 12977 = 1.415

Existing demand 12977 m3/d

2007year demand 18356 m3/d

Proposed transmission line flow rate (Tot 11513 m3/d

East side from Existing Gandara 7500 m3/d

Gandara Ground Reservoir 2214 m3/d

Gandara Elevated Tank 1799 m3/d

Isadeen Flow rate

Nupe E.T.*0.58 4551 m3/d

Kamburuganuwa ET 3593 m3/d

Total 8144 m3/d

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,513	400	2000	3.2	6.4	61.60				Total Length		
10	Gandara Junction	11,513	400	4750	3.2	15.2	46.40	HWL	40.72	OK	6750 m	400	Add + 0

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,513	400	6000	3.2	19.2	48.80				Total Length		
10	Gandara Junction	11,513	350	750	6.1	4.6	44.23	HWL	40.72	OK	6750 m	400	Add + 0

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
		16,359	450	12807	3.4	43.5	76.46				Pump Head 87 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	16,359	586	1200	0.9	1.1	75.38	HWL	72.00	OK		450	Add + 450

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
		16,359	450	12607	3.4	42.9	77.14				Pump Head 87 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	16,359	555	1400	1.2	1.7	75.46	HWL	72.00	OK		450	Add + 400

Note: Flow rate (Total) 16358.99 m3/d = 0.18934 m3/s Diyagaha East of Diyagaha

Diyagaha Distribution rate 4845.988 m3/d (2877 + 1969 = 4845.988 m3/d)

Transmission flow rate 11513 m3/d

Case 9 Existing Transmission Line Hydraulic Calculation (2011) without Gandara Case 1 C= 120 PVC

Total Q= 52,522 m3/d (= 27,500 + 5,500 + 19,522 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
1	Malimboda WTP	30,083						LWL	36.40		Clear Water Re.		
2	Uyanwatta PS	19,268	500	10040	2.8	28.1	8.3	HWL	2.90	OK	Gravity Flow	500	Add + 0
201	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	−0.10 m
3	Gabadaweediya Elevated Tank	4,646	300	500	2.4	1.2	28.7	HWL	27.65	OK	from 201		
202	Uyanwatta PS							WL	32.90		Pump Head 33 m→ 36 m	LWL	−0.10 m
4	Nupe Elevated Tank	3,464	300	2000	1.4	2.8	30.1	HWL	27.29	OK	from 202	LWL	24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
5	Brownshill Reservoir 1	9,083	500	2000	0.7	1.4	55.5	HWL	47.3	OK	from 204		
205	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	−0.10 m
6	Brownshill Reservoir 2	7,575	500	2000	0.5	1.0	55.9	HWL	47.3	OK	from 205	LWL	43.90 m
7	Devinuwara Bulk Meter	7,575	500	3320	0.5	1.7	42.2						
8	Devinuwara Junction	7,575	450	900	0.8	0.7	41.5						
9	Devinuwara Elevated Tank	2,833	167	400	16.8	6.7	34.80	HWL	31.95	OK		LWL	26.68 m
												150	Add + 97
10	Gandara Junction	4,742	450	4090	0.3	1.2	40.29				from 8+from proposed Re		7500 m3/d
11	Gandara Ground Reservoir	0	225	400	0.0	0.0	40.29	HWL	30.53	OK			
11	Gandara Ground Reservoir							WL	54.31		Pump Head 31 m	LWL	26.31 m
12	Gandara Elevated Tank	0	150	80	0.0	0.0	54.31	HWL	54.00	OK	from 11		
13	Kottegoda Junction	12,242	400	4960	3.5	17.4	22.9				from 10		
14	Kottegoda Ground Sump	3,594	400	80	0.4	0.0	22.90	HWL	14.20	OK			
14	Kottegoda Ground Sump	8,648						WL	39.20		Pump Head 31 m	LWL	11.20 m
15	Kottegoda Elevated Tank	3,594	300	29	1.5	0.0	39.2	HWL	35.50	OK	from 14		
												ACP	
16	Dickwella Ground Reservoir	8,648	446	5190	1.0	5.2	17.7	HWL	5.05	OK	from 13	300 198	Add + 350
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36.1 m	LWL	1.25 m
17	Dickwella Elevated Tank	2,526	200	80	5.6	0.4	33.9	HWL	32.00	OK	from 16		
												LWL	1.25 m
16	Dickwella Ground Reservoir							WL	68.45		Pump Head 70.2 m	LWL	54.50 m
18	Naigala Elevated Tank	3,636	295	2256	1.6	3.6	64.8	HWL	60.00	OK		200 198	Add + 250
19	Kudawella Ground Reservoir	1,356	235	6000	0.8	4.8	60.0	HWL	−	−	No data	160	Add + 198
20	Yayawatta Ground Reservoir	1,128	235	4400	0.6	2.6	57.4	HWL	−	−	No data	160	Add + 198
16	Dickwella Ground Reservoir							HWL	76.25		Pump Head 61 m→ 78 m	LWL	1.25 m
21	Medagoda Elevated Tank	2,486	220	4000	3.4	13.6	62.7	HWL	52.75	OK			34.95 m
												200	Add + 123
22	Isadeen Ground Reservoir	8,560	425	8800	1.4	12.3	24.1	HWL	5.8	OK	from 1	LWL	2.10 m
												Dia. 350	Add + 300
23	Malimboda contact Tank	2,255	200	20	4.5	0.1	36.3	HWL	36	OK	from 1		
24	Nadugara WTP							WL	34.00		Pump Head 25 m	LWL	12.00 m
2	Uyanwatta PS	5,500	350	5000	1.5	7.5	26.5	HWL	2.90	OK			

Note C= 120 (C= 123) (C= 125)

The Quantity rate of Nupe ET from Uyanwatta is 42 %.

Pump (Uyanwatta-Nupe ET 135 m3/h 18 h = 2430 m3/d

Nupe E.T. 5752 m3/d

Water demand increase rate 19293 / 12977 = 1.487

Existing demand 12977 m3/d

2007year demand 19293 m3/d

Proposed transmission line flow rate (Tot 11718 m3/d

East side from Existing Gandara 7500 m3/d

Gandara Ground Reservoir 2327 m3/d

Gandara Elevated Tank 1891 m3/d

Isadeen Flow rate

Nupe E.T.*0.58 4784 m3/d

Kamburuganuwa ET 3776 m3/d

Total 8560 m3/d

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,718	400	3000	3.3	9.9	58.10				Total Length		
10	Gandara Junction	11,718	400	3750	3.3	12.4	45.73	HWL	40.29	OK	6750 m	400	Add + 0

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
	Proposed Diyagaha Reservoir							LWL	68.00			HWL	72.00 m
		11,718	400	6000	3.3	19.8	48.20				Total Length		
10	Gandara Junction	11,718	350	750	6.3	4.7	43.48	HWL	40.29	OK	6750 m		

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
		16,939	450	11807	3.6	42.5	77.49				Pump Head 87 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	16,939	586	2200	1.0	2.2	75.29	HWL	72.00	OK		450	Add + 450

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Check the Water Pressure	Remark		
								HWL	120.00		Total Length 14007 m	LWL	36.00 m
		16,939	450	11507	3.6	41.4	78.57				Pump Head 87 m	HWL	72.00 m
100	Proposed Diyagaha Reservoir	16,939	555	2500	1.3	3.3	75.32	HWL	72.00	OK		450	Add + 400

Note: Flow rate (Total) 16939 m3/d = 0.19606 m3/s Diyagaha East of Diyagaha

Diyagaha Distribution rate 5221 m3/d (3101 + 2120 = 5221 m3/d)

Transmission flow rate 11718 m3/d

Case 10 Existing Transmission Pipe Line Hydraulic Calculation (2021) without Gandara Case 1 C= 120 PVC

Total Q= 74,870 m3/d (= 27,500 + 5,500 + 15,000 m3/d + 26,870 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark
1	Malimboda WTP	47,619						LWL	36.40		Clear Water Re.
2	Uyanwatta PS	32,402	620	10040	2.5	25.1	11.3	HWL	2.90	OK	Gravity Flow 500 Add + 450 mm
201	Uyanwatta PS							WL	32.90		Pump Head 33 m→ 36 m LWL −0.10 m
3	Gabadaweediya Elevated Tank	6,536	300	500	4.5	2.3	30.7	HWL	27.65	OK	from 201
202	Uyanwatta PS							WL	32.90		Pump Head 33 m→ 36 m LWL −0.10 m
4	Nupe Elevated Tank	4,874	300	2000	2.6	5.2	27.7	HWL	27.29	OK	from 202 LWL 24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m LWL −0.10 m
5	Brownshill Reservoir 1	12,780	500	2000	1.3	2.6	54.3	HWL	47.3	OK	from 204
205	Uyanwatta PS							WL	56.90		Pump Head 60 m LWL −0.10 m
6	Brownshill Reservoir 2	13,712	500	2000	1.5	3.0	53.9	HWL	47.3	OK	from 205 LWL 43.90 m
7	Devinuwara Bulk Meter	13,712	500	3320	1.5	5.0	38.9				
8	Devinuwara Junction	13,712	450	900	2.5	2.3	36.7				
9	Devinuwara Elevated Tank	3,987	280	400	2.5	1.0	35.7	HWL	31.95	OK	LWL 26.68 m
											150 97 Add + 250
10	Gandara Junction	9,725	450	4090	1.3	5.3	31.4				from 8+from proposed Re 7500 m3/d
11	Gandara Ground Reservoir	0	225	400	0.0	0.0	31.35	HWL	30.53	OK	Distribution from New Transmission Pipe
11	Gandara Ground Reservoir							WL	58.31		Pump Head 31 m→ 35 m LWL 26.31 m
12	Gandara Elevated Tank	0	150	80	0.0	0.0	58.31	HWL	54.00	OK	from 11
13	Kottegoda Junction	17,225	490	4960	2.5	12.4	19.0				from 10 400 Add + 350
14	Kottegoda Ground Sump	5,058	400	80	0.7	0.1	18.90	HWL	14.20	OK	
14	Kottegoda Ground Sump							WL	39.20		Pump Head 31 m LWL 11.20 m
15	Kottegoda Elevated Tank	5,058	300	29	2.8	0.1	39.1	HWL	35.50	OK	from 14
16	Dickwella Ground Reservoir	12,167	446	5190	2.0	10.4	8.6	HWL	5.05	OK	from 13 300 198 Add + 350
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36.1 m LWL 1.25 m
17	Dickwella Elevated Tank	3,555	200	80	10.5	0.8	33.5	HWL	32.00	OK	from 16
											Pump Head 70.2 m LWL 1.25 m
16	Dickwella Ground Reservoir							WL	68.45		LWL 54.50 m
18	Naigala Elevated Tank	5,116	295	2256	3.0	6.8	61.7	HWL	60.00	OK	200 198 Add + 250
19	Kudawella Ground Reservoir	1,909	235	6000	1.5	9.0	52.7	HWL	−	−	No data 160 Add + 198
20	Yayawatta Ground Reservoir	1,588	235	4400	1.1	4.8	47.8	HWL	−	−	No data 160 Add + 198
16	Dickwella Ground Reservoir							HWL	59.25		Pump Head 61 m→ 78 m LWL 1.25 m
21	Medagoda Elevated Tank	3,496	336	4000	0.8	3.2	56.1	HWL	52.75	OK	200 Add + 300
											LWL 2.10 m
22	Isadeen Ground Reservoir	12,044	425	8800	2.6	22.9	13.5	HWL	5.8	OK	from 1 350 Add + 300
23	Malimboda contact Tank	3,173	200	20	8.5	0.2	36.2	HWL	36	OK	from 1
24	Nadugara WTP							WL	34.00		Pump Head 25 m LWL 12.00 m
2	Uyanwatta PS	5,500	350	5000	1.5	7.5	26.5	HWL	2.90	OK	

Note C= 120 (C= 123)

The Quantity rate of Nupe ET from Uyanwatta is 42 %.

Pump (Uyanwatta-Nupe ET 135 m3/h 18 h = 2430 m3/d

Nupe E.T. 5752 m3/d

Water demand increase rate 27147 / 12977 = 2.092

Existing demand 12977 m3/d

2007year demand 27147 m3/d

Proposed transmission line flow rate (Total) 13435 m3/d

East side from Existing Gandara 7500 m3/d

Gandara Ground Reservoir 3275 m3/d

Gandara Elevated Tank 2660 m3/d

Isadeen Flow rate

Nupe E.T.*0.58 6731 m3/d (2021)

Kamburuganuwa ET 5313 m3/d (2021)

Total 12044 m3/d (2021)

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark
	Proposed Diyagaha Reservoir							LWL	68.00		HWL 72.00 m
		13,435	400	6500	4.2	27.3	40.70				Total Length
10	Gandara Junction	13,435	400	250	4.2	1.1	39.65	HWL	31.35	OK	6750 m

Proposed Transmission Line (from Diyagaha Ground Reservoir to Gandara Junction 20+437)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark
	Proposed Diyagaha Reservoir							LWL	68.00		HWL 72.00 m
		13,435	400	5500	4.2	23.1	44.90				Total Length
10	Gandara Junction	13,435	350	1250	8.1	10.1	34.78	HWL	31.35	OK	6750 m

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark
	Malimboda WTP							HWL	120.00		Total Length 14007 m LWL 36.00 m
		21,751	450	5307	5.8	30.8	89.22				Pump Head 87 m HWL 72.00 m
100	Proposed Diyagaha Reservoir	21,751	586	8700	1.6	13.9	75.30	HWL	72.00	OK	450 Add + 450

Proposed Transmission Line (from Malimboda WTP to Diyagaha Ground Reservoir)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level	m	Check the Water Pressure	Remark
	Malimboda WTP							HWL	120.00		Total Length 14007 m LWL 36.00 m
		21,751	450	4107	5.8	23.8	96.18				Pump Head 87 m HWL 72.00 m
100	Proposed Diyagaha Reservoir	21,751	555	9900	2.1	20.8	75.39	HWL	72.00	OK	450 Add + 400

Note: Flow rate (Total) 21751 m3/d = 0.25174 m3/s Diyagaha East of Diyagaha

Diyagaha Distribution rate 8316 m3/d (4939 + 3377 = 8316 m3/d)

Transmission flow rate 13435 m3/d

Table3.4.1 Existing Transmission Pipe Hydraulic Calculation (Existig Capacity) C= 120 Max

Total Q= 39,000 m3/d (= 30,000 + 9,000 m3/d)

No.	Reservoir & Elevated Tank	Water Flow m3/d	Pipe Dia. mm	Length m	Hydraulic Gradient ‰	Pipe Friction Loss (m)	Receiving Water Level (m)	Water Level m		Ground L. m	Remark		
1	Malimboda WTP	30,000						LWL	36.40		Clear Water Re.		
2	Uyanwatta PS	21,000	500	10040	3.2	32.1	4.3	HWL	2.90	OK	Gravity Flow		
201	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	-0.10 m
3	Gabadaweediya Elevated Tank	4,000	300	500	1.8	0.9	29.0	HWL	27.65	OK	from 201		
202	Uyanwatta PS							WL	29.90		Pump Head 33 m	LWL	-0.10 m
4	Nupe Elevated Tank	2,200	300	2000	0.6	1.2	28.7	HWL	27.29	OK	from 202	LWL	24.29 m
204	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	-0.10 m
5	Brownshill Reservoir 1	13,700	500	2000	1.5	3.0	53.9	HWL	47.3	OK	from 204		
205	Uyanwatta PS							WL	56.90		Pump Head 60 m	LWL	-0.10 m
6	Brownshill Reservoir 2	13,700	500	2000	1.5	3.0	53.9	HWL	47.3	OK	from 205	LWL	43.90 m
7	Devinuwara Bulk Meter	13,700	500	3320	1.5	5.0	38.9						
8	Devinuwara Junction	13,700	150	400	518.0	207.2	-168.3						
9	Devinuwara Elevated Tank	1,300	450	4090	0.0	0.0	-168.28	HWL	31.95	NO		LWL	26.68 m
10	Gandara Junction	9,700	225	400	38.0	15.2	-183.5				from 8		
11	Gandara Ground Reservoir	800	150	80	2.7	0.2	-183.70	HWL	30.53	NO			
11	Gandara Ground Reservoir							WL	54.31		Pump Head 31 m	LWL	26.31 m
12	Gandara Elevated Tank	500	150	80	1.1	0.1	54.22	HWL	54.00	OK	from 11		
13	Kottegoda Junction	11,500	400	80	3.2	0.3	-183.7				from 10		
14	Kottegoda Ground Sump	11,500	300	29	12.8	0.4	-184.11	HWL	14.20	NO			
14	Kottegoda Ground Sump							WL	39.20		Pump Head 31 m	LWL	11.20 m
15	Kottegoda Elevated Tank	5,000	300	29	2.7	0.1	39.1	HWL	35.50	OK	from 14		
16	Dickwella Ground Reservoir	4,200	300	200	2.0	0.4	-184.1	HWL	5.05	NO	from 13		
16	Dickwella Ground Reservoir							WL	34.35		Pump Head 36 m	LWL	1.25 m
17	Dickwella Elevated Tank	3,600	200	2256	10.8	24.4	10.0	HWL	32.00	NO	from 16		
16	Dickwella Ground Reservoir							WL	68.45		Pump Head 70 m	LWL	1.25 m
18	Naigala Elevated Tank	1,800	200	4000	3.0	12.0	56.5	HWL	60.00	NO		LWL	54.50 m
19	Kudawella Ground Reservoir	700	160	4400	1.5	6.6	49.9	HWL	-	-			
20	Yayawatta Ground Reservoir	600	160	4400	1.2	5.3	44.6	HWL	-	-			
16	Dickwella Ground Reservoir							HWL	59.25		Pump Head 61 m	LWL	1.25 m
21	Medagoda Elevated Tank	900	200	4000	0.8	3.2	56.1	HWL	52.75	OK			34.95 m
22	Isadeen Ground Reservoir	8,000	350	8800	3.1	27.3	9.1	HWL	5.8	OK	from 1	LWL	2.10 m
23	Malimboda contact Tank	2,000	200	20	3.6	0.1	36.3	HWL	36	OK	from 1		
24	Nadugara WTP							WL	34.00		Pump Head 25 m	LWL	12.00 m
2	Uyanwatta PS	9,000	350	5000	3.8	19.0	15.0	HWL	2.90	OK			

Note C= 120

4. EXISTING SERVICE RESERVIOR AND ELEVATED TANK

No	Reservior/Tank	Abstract from	Feed to	Volume M^3	T.W.L. M MSL	B.W.L. M MSL	Type
1	Nadugala Ground Sump	Nadugala W.T.P.	Uyanwatta G.R.	225	15.0	12.0	Rectangular G.R.
2	Malimbada Clear Water Tank	Malimbada W.T.P	Isadeen G.R. & Isadeen G.R	1025	40.0	36.4	Circular G.R.
3	Uyanwatta Ground Reservior	Malimbada & Nadugala W.T.P.	Nupe,Gabadaweediya E.T. Brownsill G.R.- R1 & R2	1850	2.9	-0.1	Rectangular G.R.
4	Nupe Elevated Tank	Uyanwatta G.R. & Isadeen G.R.	Matara Town	900	27.29	24.29	Circular E.T.
5	Gabadaweediya Elevated Tank	Uyanwatta G.R.	Matara Town	900	27.65	24.65	Circular E.T.
6	Brownsill Ground Rservior 1	Uyanwatta G.R.	Matara Town	1800	47.3	43.9	Circular G.R.
7	Brownsill Ground Rservior 2	Uyanwatta G.R.	Devinuwara to Kudawella reserviors	1170	47.3	43.9	Rectangular G.R.
8	Devinuwara Elevated Tank	Brownsill Ground Rservior 2	Devinuwara Distribution	682	31.95	26.68	Circular E.T.
9	Gandara Break Pressure Tank	Brownsill Ground Rservior 2	Gandar Elevated Tank & Gandara Distribution	318	30.53	26.31	Circular G.R.
10	Gandara Elevated Tank	Gandara Break Pressure Tank	Gandara Distribution	455	54.00	50.5	Circular E.T.
11	Kottegoda Ground Sump	Brownsill Ground Rservior 2	Kottegoda Elevated Tank	225	14.20	11.20	Rectangular G.R.
12	Kottegoda Elevated Tank	Kottegoda Ground Sump	Kottegoda Distribution	450	35.50	32.00	Circular E.T.
13	Dickwella Ground Reservior	Brownsill Ground Rservior 2	Batheegama, Naigala, Medagoda Reserviors	1200	5.05	1.25	Circular G.R.
14	Dickwella Elevated Tank	Dickwella Ground Reservior	Dickwella Distribution	675	32.00	28.5	Circular E.T.
15	Naigala Elevated Tank	Dickwella Ground Reservior	Dickwella Distribution	450	60	54.5	Circular E.T.
16	Medagoda Elevated Tank	Dickwella Ground Reservior	Dickwella Distribution	180	52.75	34.95	Circular E.T.
17	Kudawella Ground Reservior	Naigala Elevated Tank	Kudawella Distribution	225			Rectangular G.R.
18	Yayawatta Ground Reservior	Kudawella Ground Reservior	Kudawella Distribution	112.5			Rectangular G.R.
19	Malimbada Distribution contact Tank	Malimbada Clear Water Tank	Malimbada Distribution	50	32.4	32.2	Square G.R.
20	Isadeen Ground Reservior	Malimbada Clear Water Tank	Kaburugamuwa Elevated Tank & Nupe Tank	1250	5.8	2.1	Rectangular G.R.
21	Kaburugamuwa Elevated Tank	Isadeen Ground Reservior	Kaburugamuwa Distribution & Mirissa Ground Reservior	450	-	-	Circular E.T.
22	Mirissa Ground Storage Tank	Kaburugamuwa Elevated Tank	Mirissa Hill Top Ground Reservior	125	4.15	2	Rectangular G.R.
23	Mirissa Hill top Reservior	Mirissa Hill Top Ground Storage Tank	Mirissa Distribution & Weligama Polwatta area	250	29.4	27.2	Rectangular G.R.

5. EXISTING PUMP STATION

No	Pump Station	Pump to	Type	Unit		Capacity		Head m	KW	Speed (rpm)	Operation Time (Hr.)	Year Installed
				Duty	Stand	M^3/Hr	L/S					
	Nadugala W.T.P.											
1	Intake Low Level	Nadugala W.T.P.	Vertical Turbine Pump	1	1	400	112	15	45	1470	24	1994
2	Treatment Plant High Level	Uyanwatta G.R.	Centrifugal Split Casing	1	1	375	104	25	37	1470	24	1985
	Malimbada W.T.P.											
3	Balakawala Intake	Malimbada W.T.P.	Vertical Turbine Pump	2	1	335	93	96	132	1450	24	1997
4	Kadduwa Intake	Malimbada W.T.P.	Vertical Turbine Pump	2	2	335	93	55	75	1470	24	1985,1995 1997
	Matara Group W.S.S.											
5	Uyanwatta Pumping Station	Nupe Elevated Tank	Centrifugal Split Casing	1	0	250	70	33	30	1475	20	1985
		Gabadaweediya Elevated Tank	Centrifugal Split Casing	1	0	250	70	33	30	1475	20	1985
		Brownshill G.R. 1 & 2	Centrifugal Split Casing	2	1	525	146	60	125	1485	24	2002
6	Isadeen Pumping Station	Nupe Elevated Tank	Centrifugal Split Casing	1	1	135	37.5	60	37	1472	20	1995
		Kaburugamuwa E.T.	Centrifugal Split Casing	1	1	135	37.5	41	22	1472	20	1995
7	Kaburugamuwa Pumping Station	Mirissa Hill Top Ground Storage Tank	Centrifugal Split Casing	1	1	20	5.6	45	11	2900	16	1995
8	Gandara Pumping Station	Gandara Elevated Tank	Centrifugal Split Casing	1	1	126	35	31	18.5	1460	12	1985
9	Kottegoda Pumping Station	Kottegoda Elevated Tank	Centrifugal Split Casing	1	1				15	2910		2001
10	Dickwella Pumping Station	Dickwella Elevated Tank	Centrifugal Split Casing	1	1	135	37.5	36.1	22	1470	12	1985
		Naigala Elevated Tank	Centrifugal Split Casing	1	1	83	23	70.2	30	1450	12	1985
		Medagoda Elevated Tank	Centrifugal Split Casing	1	1	68.4	19	61	18.5	1450	12	1995
11	Kudawella Ground Reservior	Yayawawtta Ground reservior	Centrifugal Split Casing	1	1	36.4	10.1	80	11	2900	6	

Table . Maximum Capacity of Existing Pump and Required Pump Capacity Case 1 PVC

No	Pump Station	Pump to		Unit		Capacity	Head	Operation	Flow Rate (m3/d)		Pump Flow Rate and Pump Head							
				Duty	Stand			Time	Existing	Maximum	2007		2009		2011		2021	
					by	M^3/Hr	m	Hr.	M^3/d	M^3/d	m3/d	m	m3/d	m	m3/d	m	m3/d	m
1	Uyanwatta	Nupe Elevated Tank	Existing	1	0	250	33	20	5000	6000	2,957 OK	33 OK	3,187 OK	33 OK	3,464 OK	36 NO	4,874 OK	36 NO
	Pumping	Gabadaweediya Elevated Tank		1	0	250	33	20	5000	6000	3,966 OK	33 OK	4,274 OK	33 OK	4,646 OK	33 OK	6,536 NO	36 NO
	Station	Brownshill G.R. 1 & 2		2	1	525	60	24	25200	25200	13,622 OK	60 OK	14,728 OK	60 OK	18,158 OK	60 OK	26,492 NO	60 OK
2	Gandara Pumping Station	Gandara Elevated Tank		1	1	126	31	12	1512	3024	2,130 OK	31 OK	2,323 OK	31 OK	2,556 OK	31 OK	3,682 NO	35 NO
3	Dickwella Pumping Station	Dickwella Elevated Tank		1	1	135	36.1	12	1620	3240	2,157 OK	36 OK	2,325 OK	36 OK	2,526 OK	36 OK	3,555 NO	36 OK
	Dickwella Pumping Station	Medagoda Elevated Tank		1	1	68.4	61	12	821	1642	2,120 NO	78 NO	2,285 NO	78 NO	2,486 NO	78 NO	3,496 NO	78 NO
1	Uyanwatta	Nupe Elevated Tank	Proposed	1	1	250	36	24	-	6000					6,000 OK	36 OK	6,000 OK	36 OK
	Pumping	Gabadaweediya Elevated Tank		1	1	350	36	24	-	8400							8,400 OK	36 OK
	Station	Brownshill G.R. 1 & 2		2	1	650	60	24	-	31200							31,200 OK	60 OK
2	Gandara Pumping Station	Gandara Elevated Tank		1	1	200	35	24	-	4800							4,800 OK	35 OK
3	Dickwella	Dickwella Elevated Tank		1	1	200	36	24	-	4800							4,800 OK	36 OK
	Pumping	Medagoda Elevated Tank		1	1	140	78	24	-	3360	3,360 OK	78 OK	3,360 OK	78 OK	3,360 OK	78 OK	3,360 OK	78 OK
	Station			1	1	70	78	24	-	1680							1,680	78

(Note)

1 Provided that pump loss is 3 m, pump head above was calculated deducting 3 m from their nominal pump head.

2 Capacity of the existing pumps were determined by pump flow and head. Therefore, timing of pump replacement was determined by their deficiency in pump flow and/or head.

3 Column with double line shows deficiency in pump capacity (pump flow and head) and needs pump replacement.

4 The specifications of proposed pumps are shown in "Proposed" column.

6. EXISTING TRANSMISSION PIPE SYSTEM - MATARA GROUP W.S.S.

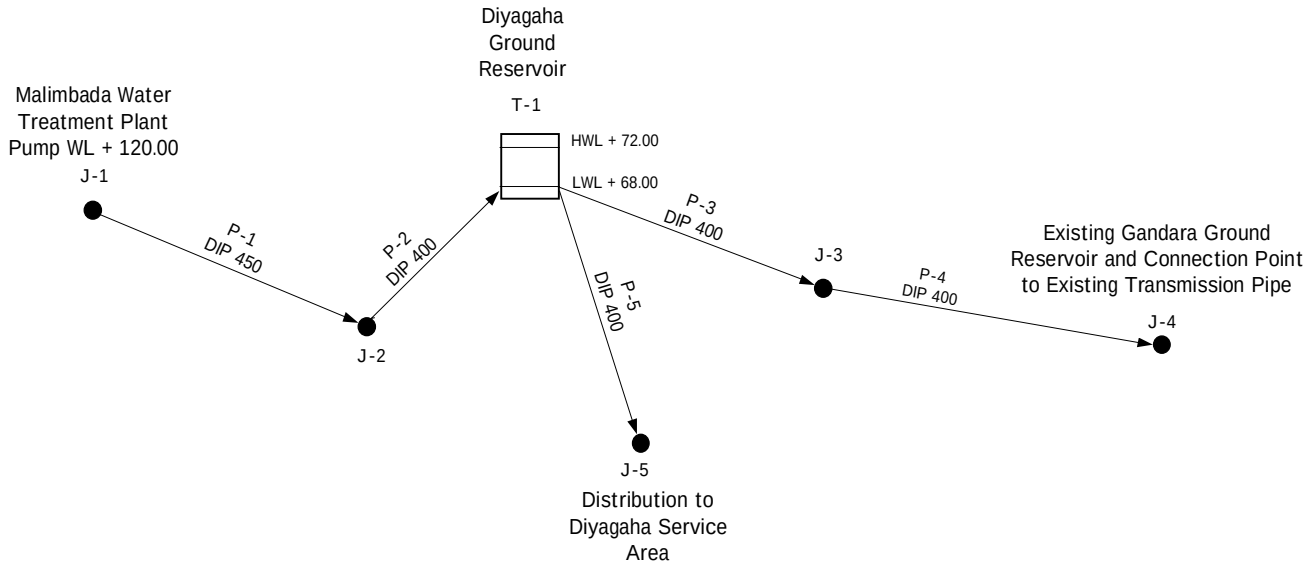
No	Pipe Line	From	To	Diameter mm	Length M	Material	Water Flow Capacity (m^3/d)
	Nadugala W.T.P.						
1	Raw water pumping transmission	Intake	W.T.P.	350	130	C.I.P.	-
2	Treated water pumping transmission	Nadugala G.R.	Uyanwatte G.R.	350	5,000	C.I.P.	9,000
	Maimbada W.T.P.						
3	Raw water pumping transmission	Balakawala Intake	Kadduwa Junction	400	6,630	D.I.P.	-
4	Raw water pumping transmission	Kadduwa Intake	Kadduwa Junction	400	20	D.I.P.	-
5	Raw water pumping transmission	Kadduwa Junction	Malimbada W.T.P.	600	2,960	D.I.P.	-
6	Treated water Gravity transmission	Malimbada Clear Water Tank	Uyanwatte G.R.	500	10,040	D.I.P.	21,000
7	Treated water Gravity transmission	Malimbada Clear Water Tank	Isadeen G.R.	350	8,800	D.I.P.	8,000
	Uyanwatte W.S.S.						
8	Treated water pumping transmission	Uyanwatte G.R.	Nupe E.T.	300	2,000	D.I.P.	2,200
9	Treated water pumping transmission	Uyanwatte G.R.	Gabadaweediya E.T.	300	500	D.I.P.	4,000
10	Treated water pumping transmission	Uyanwatte G.R.	Brownsill G.R. 1	500	2,000	D.I.P.	13,700
	Treated water pumping transmission	Uyanwatte G.R.	Brownsill G.R. 2	500	2,000	D.I.P.	13,700
11	Treated water pumping transmission	Isadeen G.R.	Nupe E.T.	200	2,820	D.I.P.	-
12	Treated water pumping transmission	Isadeen G.R.	Kaburugamuwa G.R.	200	4,270	D.I.P.	-
13	Treated water Gravity Transmission	Brownsill G.R. 2	Devinuwara Bulk Meter	500	3,320	D.I.P.	13,700
	Devinuwara & Gandara W.S.S.						
14	Treated water Gravity Transmission	Devinuwara Bulk Meter	Devinuwara Junction	450	900	C.I.P.	13,700
15	Treated water Gravity Transmission	Devinuwara Junction	Devinuwara E.T.	150	400	C.I.P.	1,300
16	Treated water Gravity Transmission	Devinuwara Junction	Gandara Junction	450	4,090	A.C.P.	9,700
17	Treated water Gravity Transmission	Gandara Junction	Gandara B.P.T.(g.r.)	225	400	A.C.P.	800
18	Treated water pumping transmission	Gandara B.P.T.	Gandara E.T.	150	80	C.I.P.	500
	Kottegoda W.S.S.						
19	Treated water Gravity Transmission	Gandara Junction	Kottegoda G.R. Tee	400	4,960	A.C.P.	11,500
20	Treated water Gravity Transmission	Kottegoda G.R. Tee	Kottegoda G.R.	400	80	D.I.P.	11,500
21	Treated water pumping transmission	Kottegoda G.R.	Kottegoda E.T.	300	29	D.I.P.	5,000
	Dicwella W.S.S.						
22	Treated water Gravity Transmission	Kottegoda E.T.	Kottegoda Junction	300	121	A.C.P.	5,000
23	Treated water Gravity Transmission	Kottegoda Junction	Dickwella Junction	300	5,070	A.C.P.	4,200
24	Treated water Gravity Transmission	Dickwella Junction	Dickwella G.R.	300	120	A.C.P.	4,200
25	Treated water pumping transmission	Dickwella G.R.	Batheegama E.T.	200	80	A.C.P.	-
26	Treated water pumping transmission	Dickwella G.R.	Naigala E.T.	200	2,256	A.C.P.	1,800
27	Treated water pumping transmission	Dickwella G.R.	Medagoda E.T.	200	4,000	UPVC	900
	Kudawella W.S.S.						
28	Treated water Gravity Transmission	Naigala E.T.	Kudawella G.R.	160	6,000	UPVC	700
29	Treated water pumping transmission	Kudawella G.R.	Yayawatta G.R.	160	4,400	UPVC	600

参考資料 ３.２

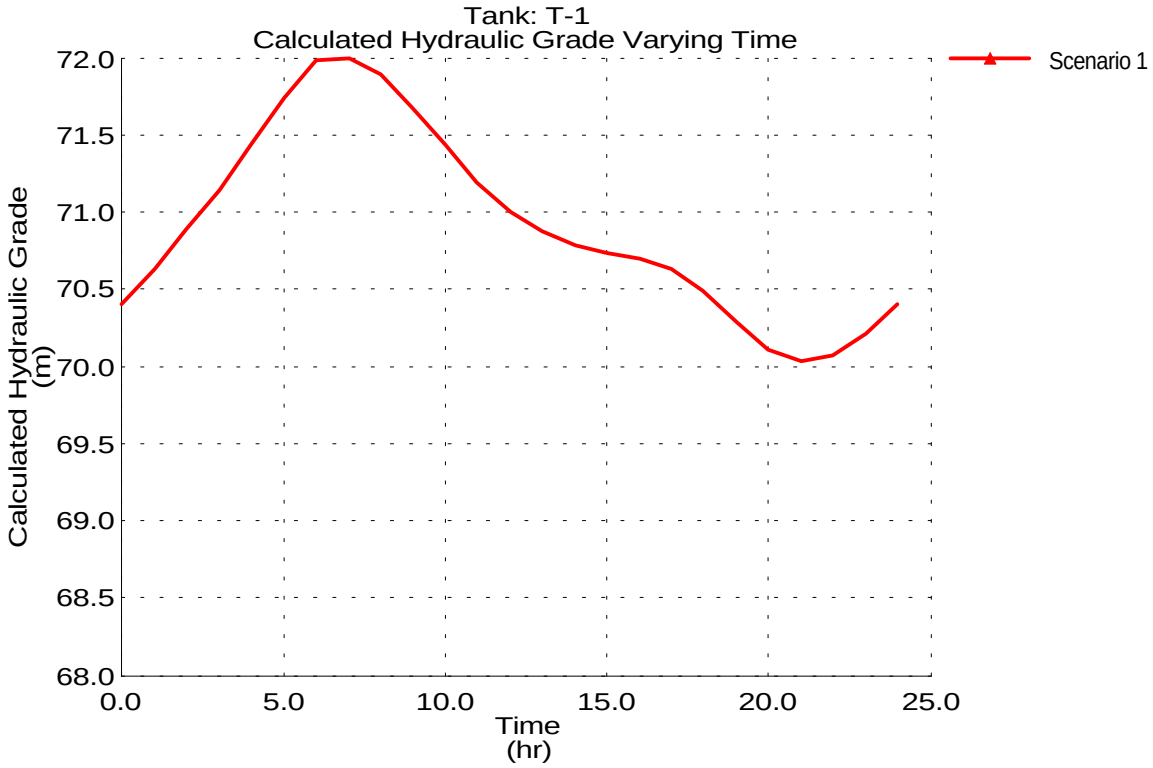
ディヤガハ配水池及び送水管容量計算書

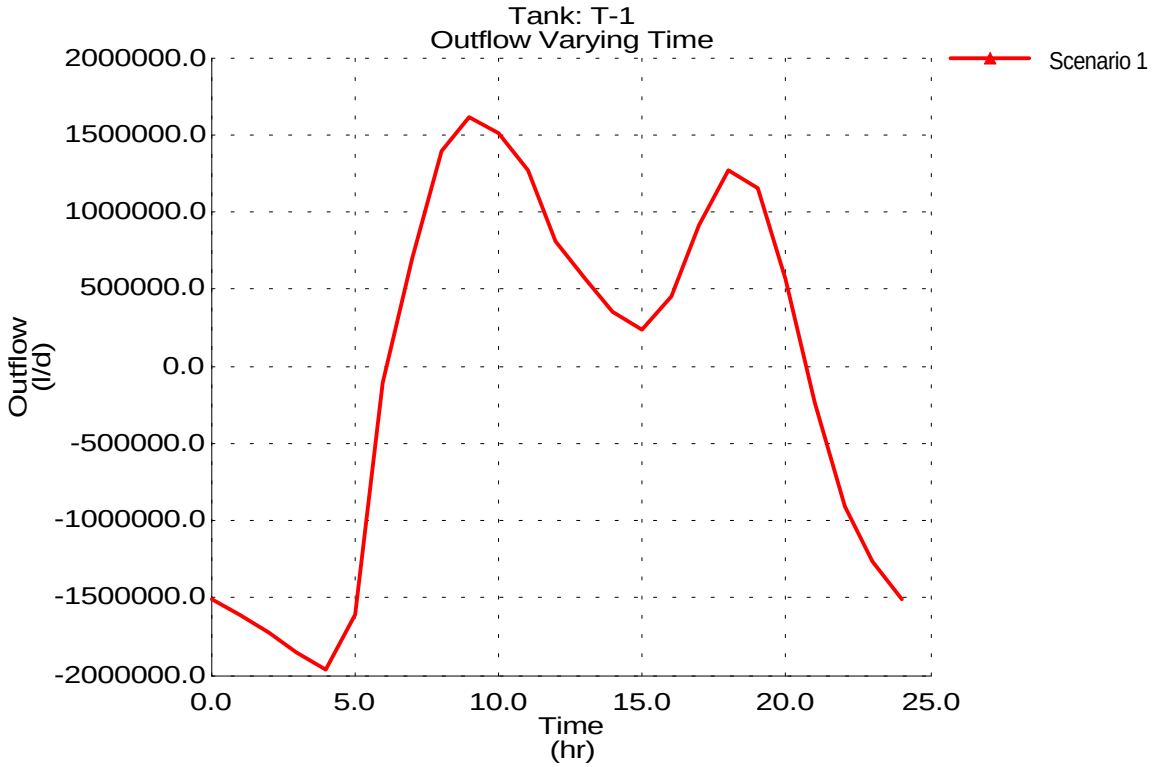
Scenario: Scenario 1

Appendix 2.2 Study of Reservoir Volume and Transmission pipe Capacity



Scenario: Scenario 1





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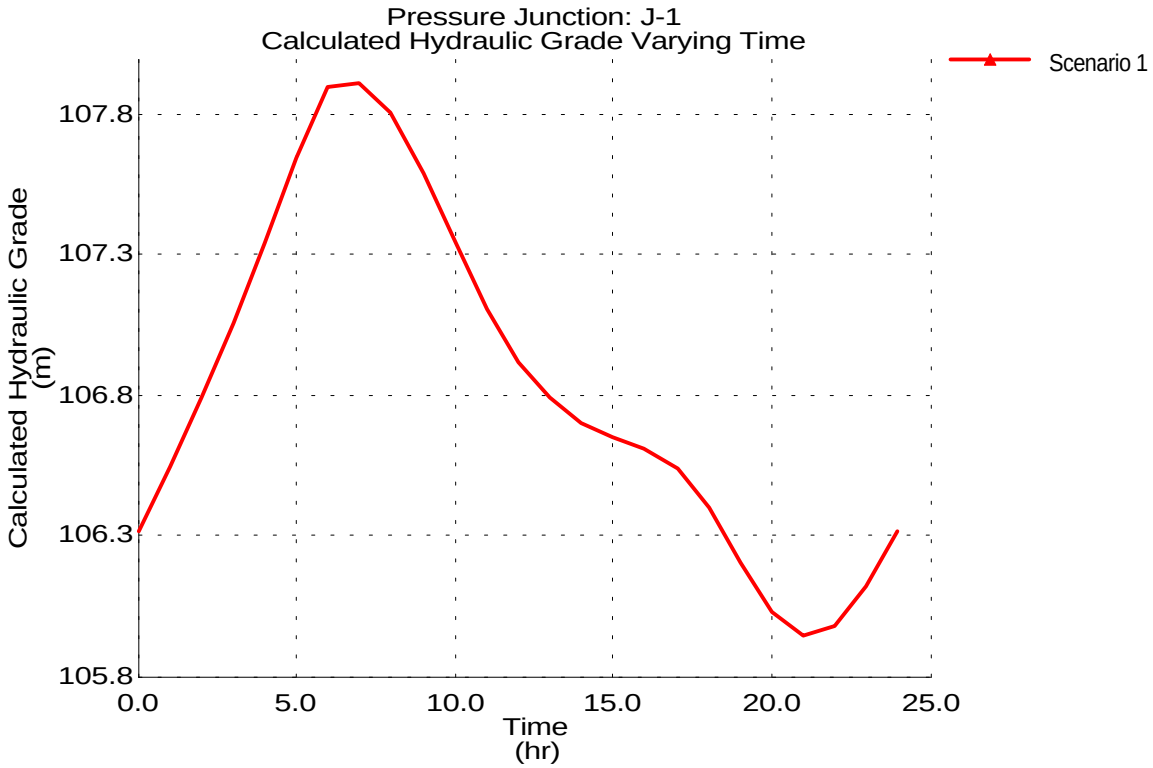

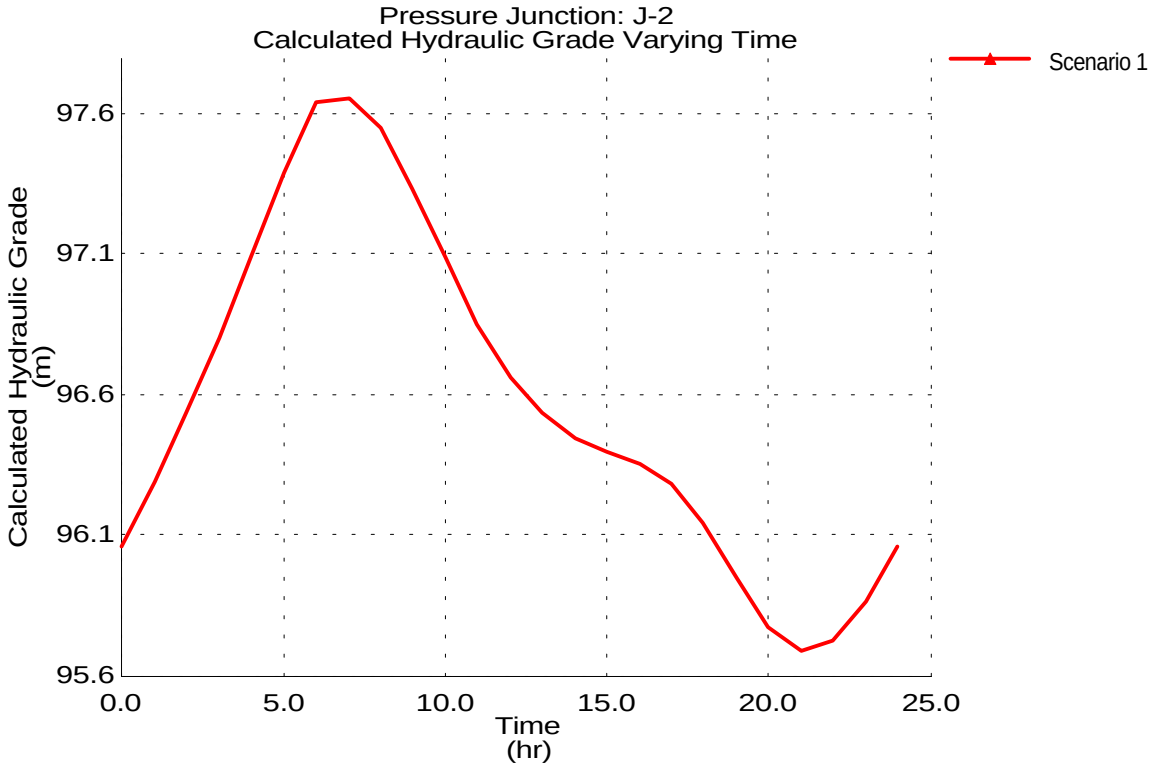

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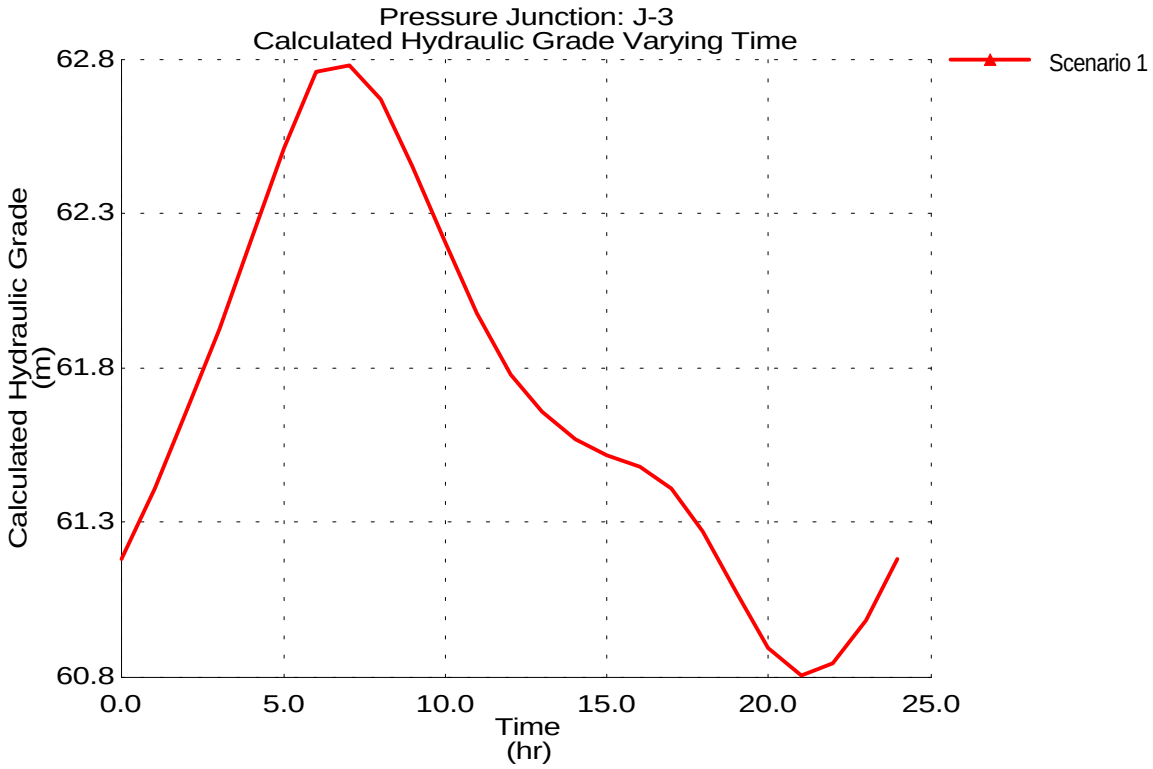

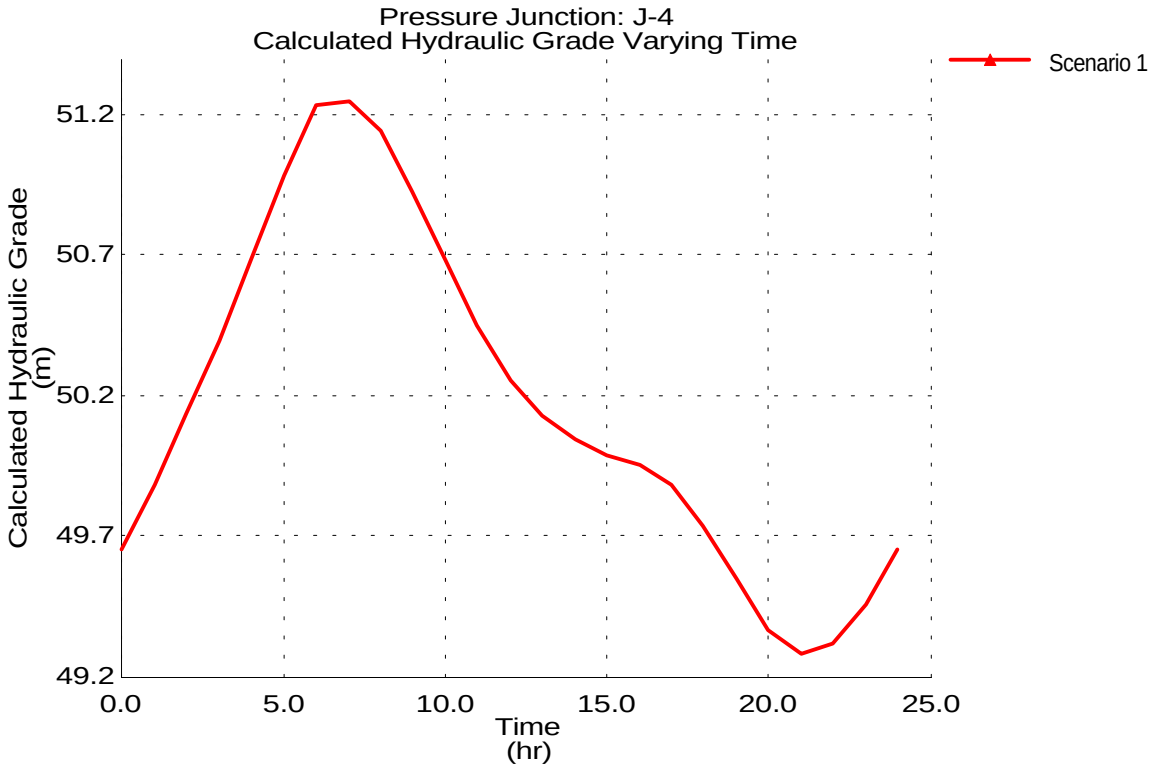

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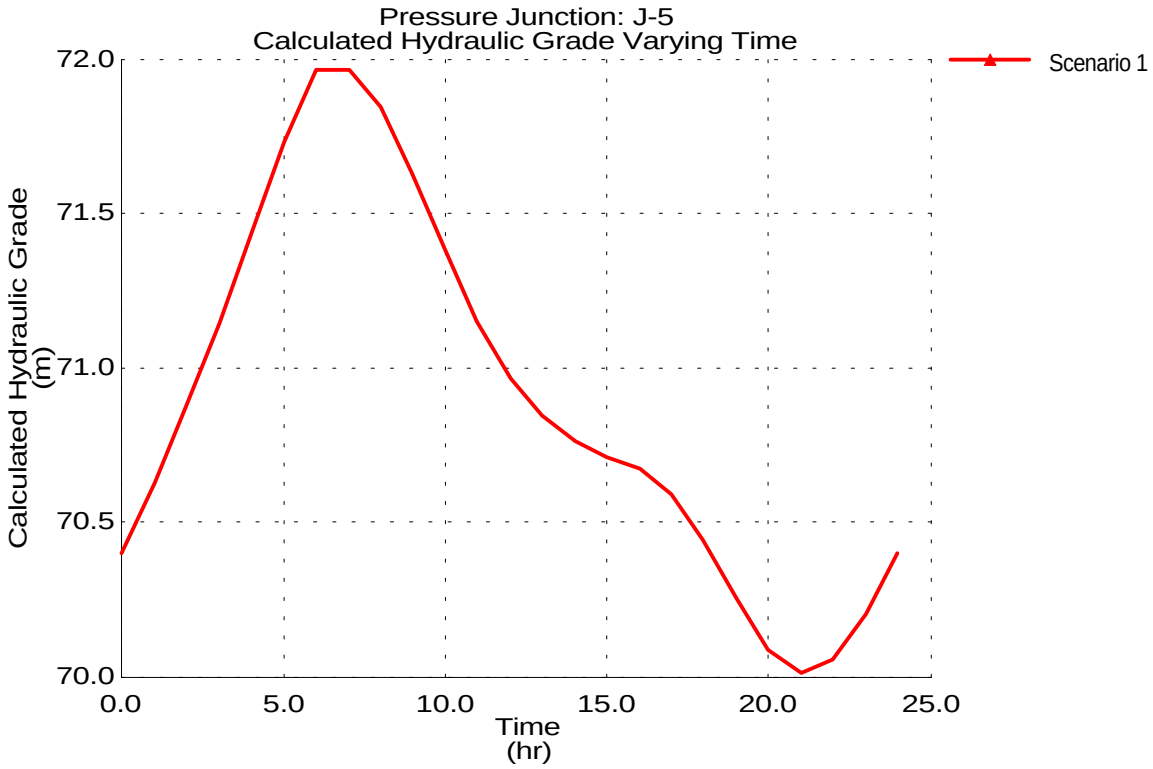

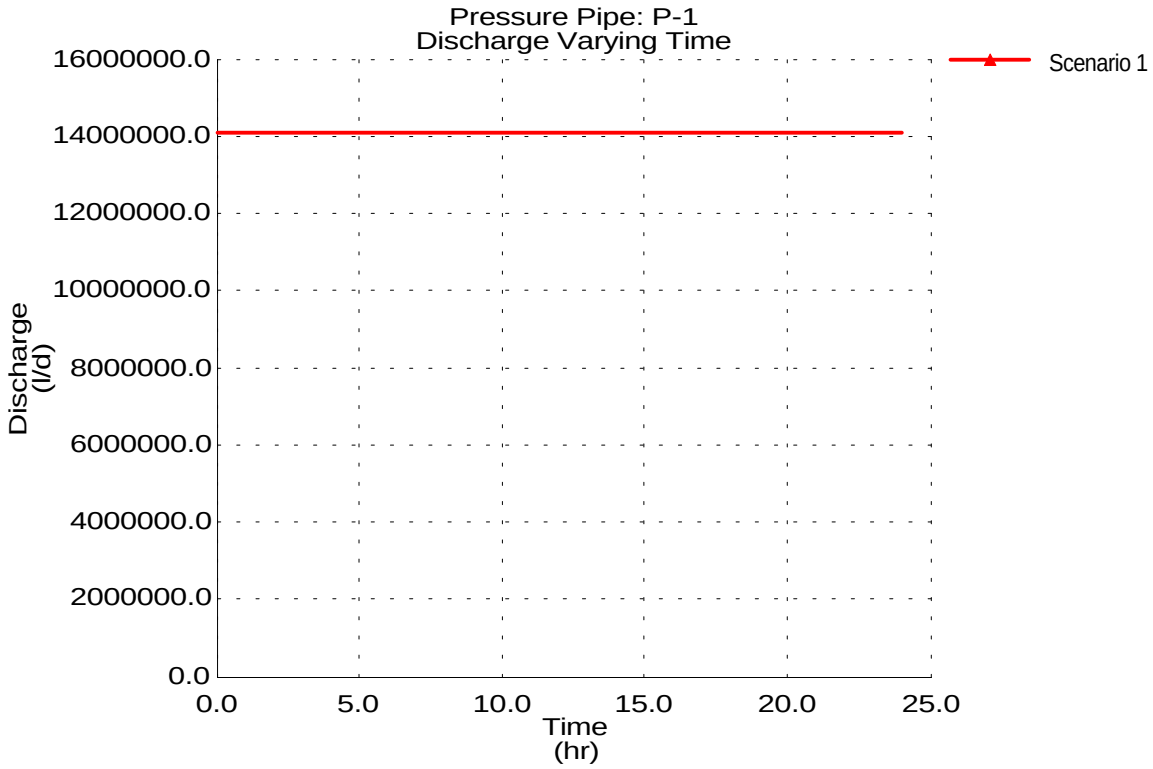

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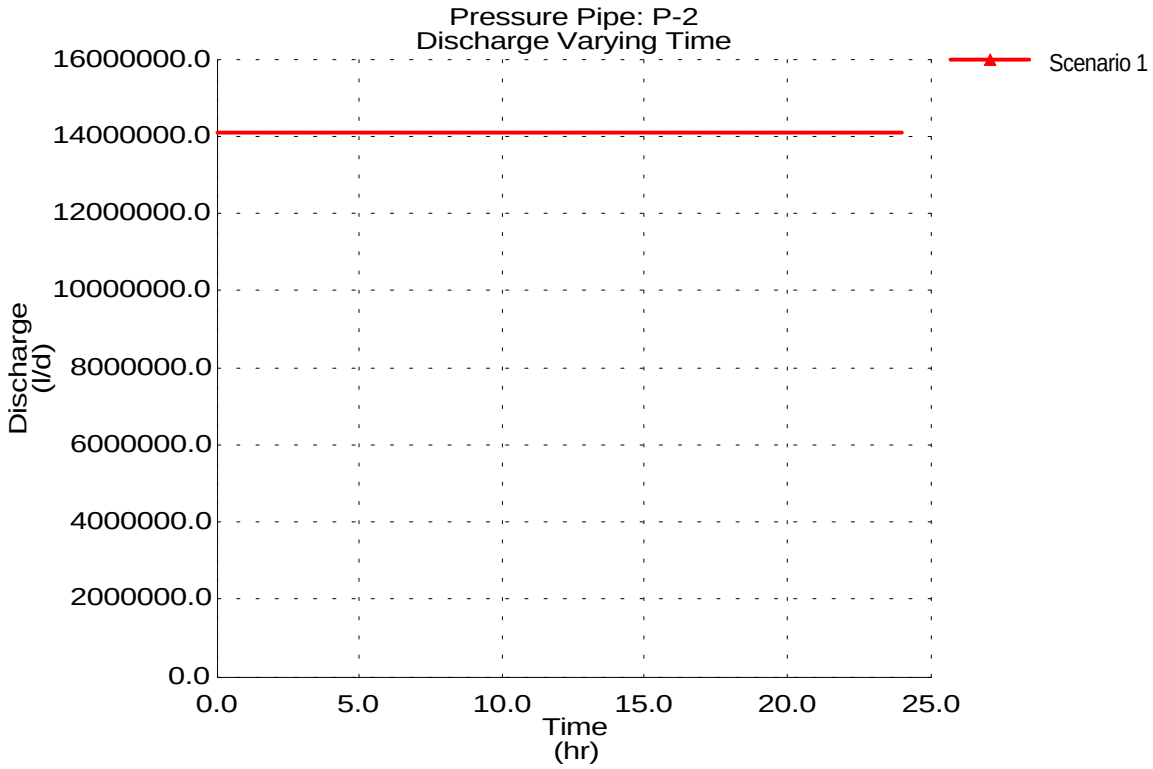

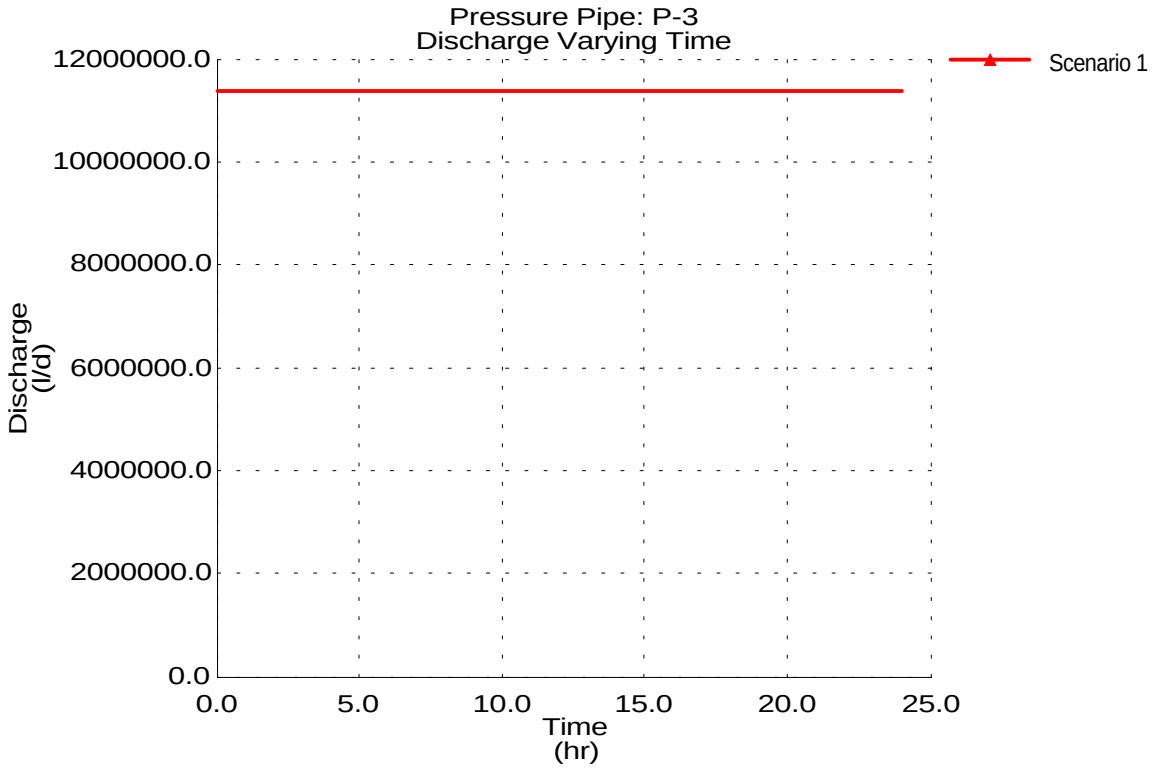

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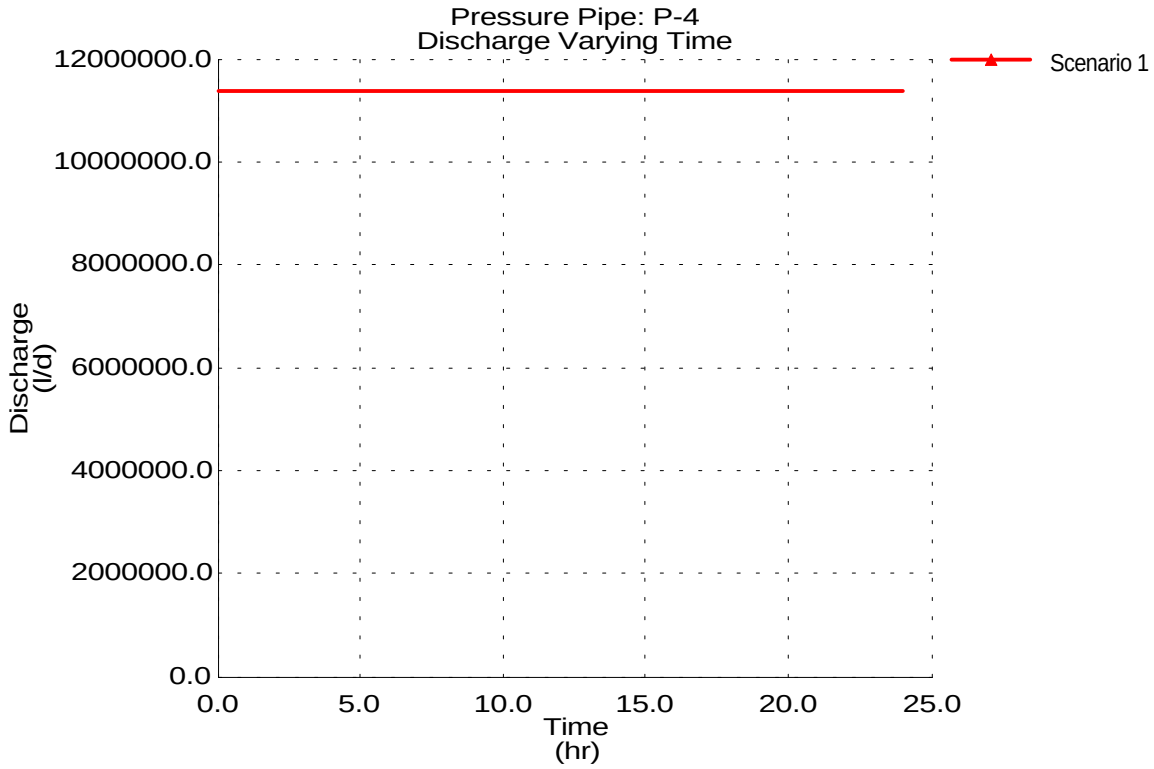
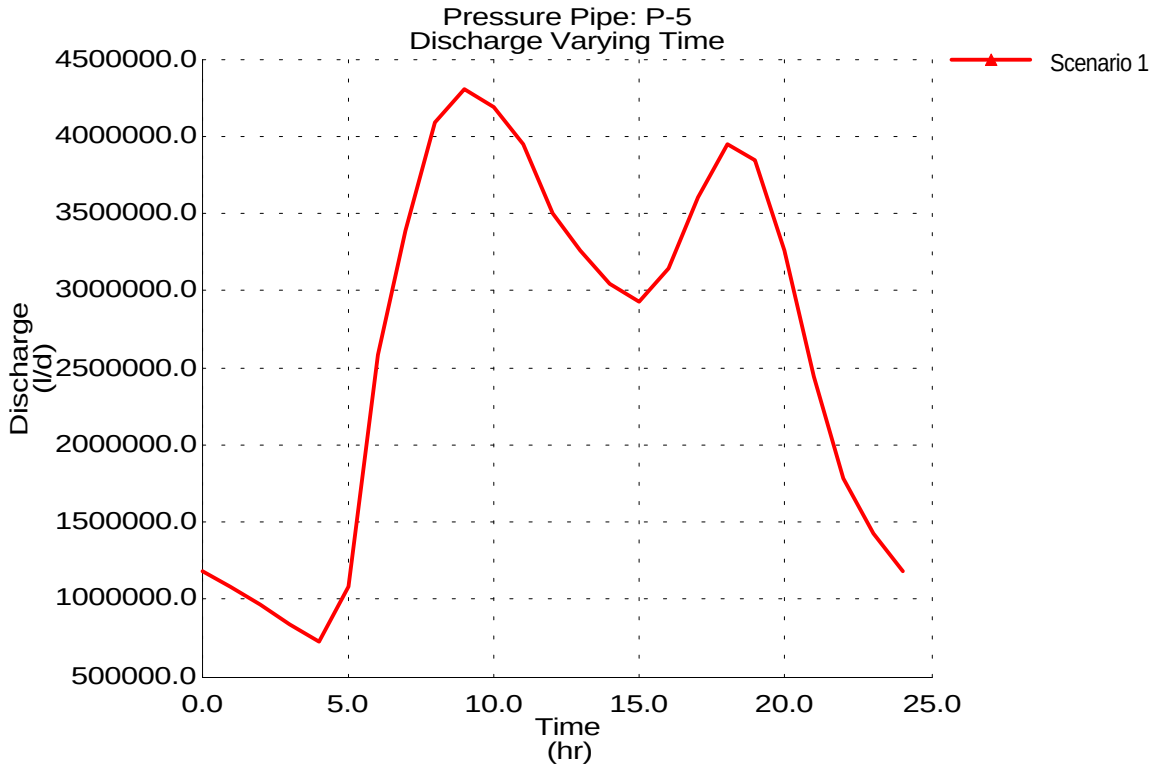




Scenario: Scenario 1

T-1

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,047.034 m	Elevation	72.000 m
Y	3,064.817 m	Zone	Zone-1

Operating Range Summary			
Maximum Elevation	72.000 m	Maximum Level	4.200 m
Initial HGL	70.400 m	Initial Level	2.600 m
Minimum Elevation	68.000 m	Minimum Level	0.200 m
Base Elevation	67.800 m		

Storage Summary			
Section Type	Constant Area	Circular Tank Shape?	false
Diameter	N/A ft	Average Area	270.25 m^2
Inactive Volume	0.0000 m^3	Total Active Volume	1,080.9999 m^3

User Data			
Date Installed		Date Retired	
Inspection Date		SCADA ID	
Observed Level	0.00 ft	Lining	
Condition		Metered	false
Clearwell Storage	false	Elevated Tank	false
Existing	false		

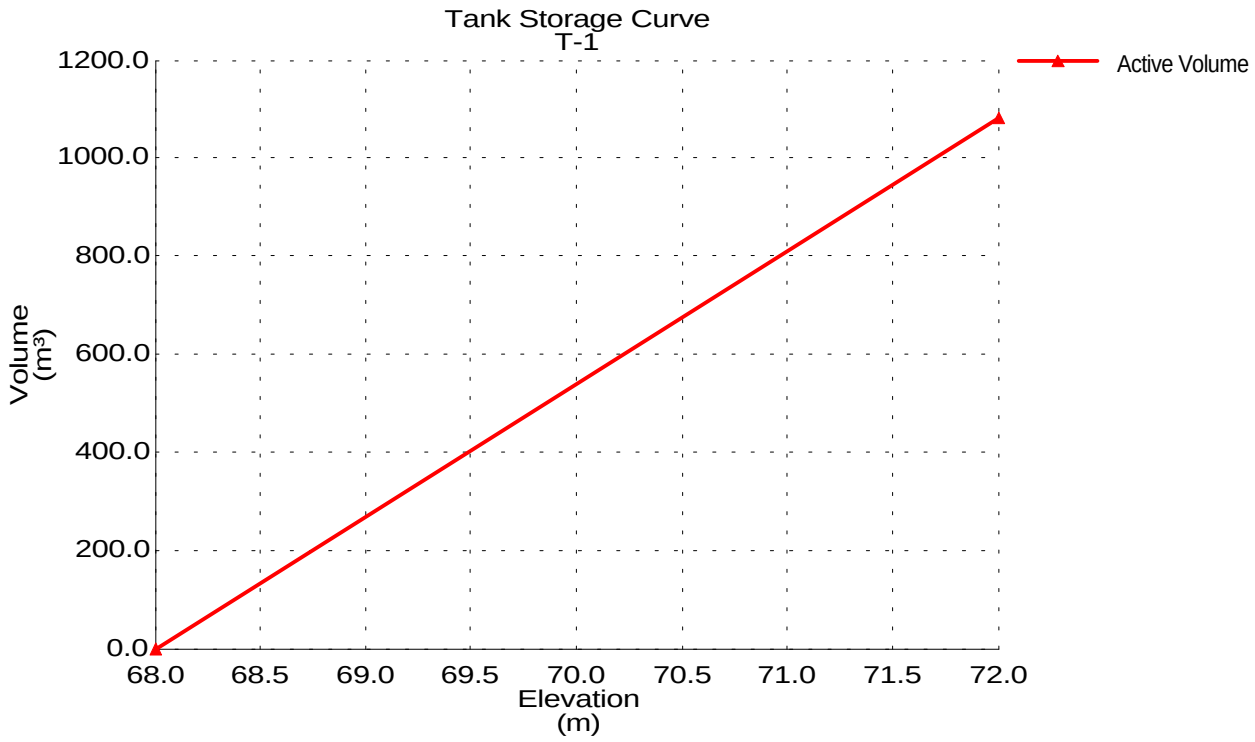
Scenario: Scenario 1

History:

Location Description:

Calculated Results Summary

Time	Calculated Hydraulic Grade (m)	Calculated Level (m)	Pressure (m H2O)	Calculated Percent Full (%)	Calculated Volume (m³)	Inflow (l/d)	Outflow (l/d)	Current Status
0.00 hr	70.400	2.600	2.5934	60.0	648.6001	1,505,280	-1,505,280	Filling
1.00 hr	70.632	2.832	2.8249	65.8	711.3207	1,612,800	-1,612,800	Filling
2.00 hr	70.881	3.081	3.0730	72.0	778.5208	1,720,320	-1,720,320	Filling
3.00 hr	71.146	3.346	3.3375	78.6	850.2006	1,854,720	-1,854,720	Filling
4.00 hr	71.432	3.632	3.6228	85.8	927.4811	1,962,240	-1,962,240	Filling
5.00 hr	71.734	3.934	3.9245	93.4	1,009.2412	1,612,800	-1,612,800	Filling
6.00 hr	71.983	4.183	4.1726	99.6	1,076.4413	107,520	-107,520	Filling
7.00 hr	72.000	4.200	4.1891	100.0	1,080.9209	-698,880	698,880	Draining
8.00 hr	71.892	4.092	4.0816	97.3	1,051.8011	-1,397,760	1,397,760	Draining
9.00 hr	71.676	3.876	3.8667	91.9	993.5613	-1,612,800	1,612,800	Draining
10.00 hr	71.428	3.628	3.6186	85.7	926.3612	-1,505,280	1,505,280	Draining
11.00 hr	71.196	3.396	3.3871	79.9	863.6406	-1,263,359	1,263,359	Draining
12.00 hr	71.001	3.201	3.1929	75.0	811.0004	-806,400	806,400	Draining
13.00 hr	70.877	3.077	3.0688	71.9	777.4009	-564,480	564,480	Draining
14.00 hr	70.790	2.990	2.9820	69.7	753.8806	-349,439	349,439	Draining
15.00 hr	70.736	2.936	2.9283	68.4	739.3206	-241,920	241,920	Draining
16.00 hr	70.698	2.898	2.8911	67.5	729.2403	-456,959	456,959	Draining
17.00 hr	70.628	2.828	2.8208	65.7	710.2008	-913,920	913,920	Draining
18.00 hr	70.487	2.687	2.6803	62.2	672.1205	-1,263,359	1,263,359	Draining
19.00 hr	70.292	2.492	2.4860	57.3	619.4803	-1,155,839	1,155,839	Draining
20.00 hr	70.114	2.314	2.3082	52.9	571.3209	-564,480	564,480	Draining
21.00 hr	70.027	2.227	2.2214	50.7	547.8005	241,920	-241,920	Filling
22.00 hr	70.064	2.264	2.2586	51.6	557.8808	913,920	-913,920	Filling
23.00 hr	70.205	2.405	2.3992	55.1	595.9611	1,263,361	-1,263,361	Filling
24.00 hr	70.400	2.600	2.5934	60.0	648.6014	1,505,280	-1,505,280	Filling



Scenario: Scenario 1

```
================================================================
Scenario: Scenario 1

================================================================
0.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,563,721 l/d
     Flow Stored     1,505,292 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 2.600 m

================================================================
1.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,456,173 l/d
     Flow Stored     1,612,785 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 2.832 m

================================================================
2.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,348,680 l/d
     Flow Stored     1,720,333 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 3.082 m

================================================================
3.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,214,258 l/d
     Flow Stored     1,854,700 l/d
```

```
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 3.347 m

============================================================
4.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,106,765 l/d
     Flow Stored     1,962,248 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 3.633 m

============================================================
5.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   12,456,173 l/d
     Flow Stored     1,612,785 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 3.935 m

============================================================
6.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   13,961,465 l/d
     Flow Stored     107,494 l/d
    ------------------------------------------------------------
     Boundary Summary
     T-1           Tank: Filling, Tank Level = 4.182 m

============================================================
7.0 hours - Hydraulic Summary
    ------------------------------------------------------------
     Iteration Summary
     Balanced       Trials = 2, Accuracy = 0.0
    ------------------------------------------------------------
     Flow Summary
     Flow Supplied   14,069,013 l/d
     Flow Demanded   14,767,885 l/d
```

```
    Flow Stored    -698,872 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 4.200 m

============================================================
8.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   15,466,757 l/d
    Flow Stored    -1,397,744 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 4.093 m

============================================================
9.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   15,681,798 l/d
    Flow Stored    -1,612,785 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 3.877 m

============================================================
10.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   15,574,305 l/d
    Flow Stored    -1,505,292 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 3.627 m

============================================================
11.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
```

```
    Flow Demanded   15,332,335 l/d
    Flow Stored     -1,263,377 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 3.395 m

============================================================
12.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,875,378 l/d
    Flow Stored     -806,420 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 3.200 m

============================================================
13.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,633,463 l/d
    Flow Stored     -564,505 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 3.075 m

============================================================
14.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,418,422 l/d
    Flow Stored     -349,463 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.990 m

============================================================
15.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
```

```
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,310,928 l/d
    Flow Stored     -241,915 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.935 m

============================================================
16.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,525,970 l/d
    Flow Stored     -456,957 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.899 m

============================================================
17.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,982,926 l/d
    Flow Stored     -913,913 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.829 m

============================================================
18.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   15,332,335 l/d
    Flow Stored     -1,263,377 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.688 m

============================================================
19.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
```

```
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   15,224,842 l/d
    Flow Stored     -1,155,829 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.493 m

==============================================================
20.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   14,633,463 l/d
    Flow Stored     -564,505 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Emptying, Tank Level = 2.313 m

==============================================================
21.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   13,827,098 l/d
    Flow Stored     241,915 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Filling, Tank Level = 2.228 m

==============================================================
22.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   13,155,099 l/d
    Flow Stored     913,913 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Filling, Tank Level = 2.265 m

==============================================================
23.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
```

```
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   12,805,636 l/d
    Flow Stored     1,263,377 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Filling, Tank Level = 2.405 m

============================================================
24.0 hours - Hydraulic Summary
   ------------------------------------------------------------
    Iteration Summary
    Balanced       Trials = 2, Accuracy = 0.0
   ------------------------------------------------------------
    Flow Summary
    Flow Supplied   14,069,013 l/d
    Flow Demanded   12,563,721 l/d
    Flow Stored     1,505,292 l/d
   ------------------------------------------------------------
    Boundary Summary
    T-1           Tank: Filling, Tank Level = 2.600 m

============================================================
Message Summaries
============================================================
(no messages)

============================================================
Completed: 2003/01/09 18:50:21
```

Scenario: Scenario 1

J-1

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,019.220 m	Elevation	120.000 m
Y	3,068.543 m	Zone	Zone-1

Demand Summary

Type	Demand (l/d)	Pattern
Inflow	14,069,000	Fixed

User Data			
Observed Pressure	0.00 psi	Observed Concentration	0.00 mg/l
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

History:

Location Description:

Calculated Results Summary

Time	Elevation (m)	Calculated Hydraulic Grade (m)	Pressure (m H2O)	Pressure Head (m)	Demand (Calculated) (l/d)
0.00 hr	120.000	106.314	-13.6515	-13.686	-14,069,000
1.00 hr	120.000	106.546	-13.4200	-13.454	-14,069,000
2.00 hr	120.000	106.795	-13.1720	-13.205	-14,069,000
3.00 hr	120.000	107.060	-12.9074	-12.940	-14,069,000
4.00 hr	120.000	107.346	-12.6222	-12.654	-14,069,000
5.00 hr	120.000	107.648	-12.3204	-12.352	-14,069,000
6.00 hr	120.000	107.897	-12.0724	-12.103	-14,069,000
7.00 hr	120.000	107.914	-12.0558	-12.086	-14,069,000
8.00 hr	120.000	107.806	-12.1633	-12.194	-14,069,000
9.00 hr	120.000	107.590	-12.3783	-12.410	-14,069,000
10.00 hr	120.000	107.342	-12.6263	-12.658	-14,069,000
11.00 hr	120.000	107.110	-12.8578	-12.890	-14,069,000
12.00 hr	120.000	106.915	-13.0521	-13.085	-14,069,000
13.00 hr	120.000	106.791	-13.1761	-13.209	-14,069,000
14.00 hr	120.000	106.704	-13.2629	-13.296	-14,069,000
15.00 hr	120.000	106.650	-13.3167	-13.350	-14,069,000
16.00 hr	120.000	106.612	-13.3539	-13.388	-14,069,000
17.00 hr	120.000	106.542	-13.4241	-13.458	-14,069,000
18.00 hr	120.000	106.401	-13.5647	-13.599	-14,069,000
19.00 hr	120.000	106.206	-13.7590	-13.794	-14,069,000
20.00 hr	120.000	106.028	-13.9367	-13.972	-14,069,000
21.00 hr	120.000	105.941	-14.0235	-14.059	-14,069,000
22.00 hr	120.000	105.978	-13.9863	-14.022	-14,069,000
23.00 hr	120.000	106.119	-13.8458	-13.881	-14,069,000
24.00 hr	120.000	106.314	-13.6515	-13.686	-14,069,000

Scenario: Scenario 1

J-2

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,029.599 m	Elevation	20.000 m
Y	3,058.359 m	Zone	Zone-1

Demand Summary

Type	Demand (l/d)	Pattern
Demand	0	Fixed

User Data			
Observed Pressure	0.00 psi	Observed Concentration	0.00 mg/l
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

History:

Location Description:

Calculated Results Summary

Time	Elevation (m)	Calculated Hydraulic Grade (m)	Pressure (m H2O)	Pressure Head (m)	Demand (Calculated) (l/d)
0.00 hr	20.000	96.058	75.8662	76.058	0
1.00 hr	20.000	96.290	76.0977	76.290	0
2.00 hr	20.000	96.539	76.3457	76.539	0
3.00 hr	20.000	96.804	76.6103	76.804	0
4.00 hr	20.000	97.090	76.8955	77.090	0
5.00 hr	20.000	97.392	77.1973	77.392	0
6.00 hr	20.000	97.641	77.4453	77.641	0
7.00 hr	20.000	97.658	77.4618	77.658	0
8.00 hr	20.000	97.550	77.3544	77.550	0
9.00 hr	20.000	97.334	77.1394	77.334	0
10.00 hr	20.000	97.086	76.8914	77.086	0
11.00 hr	20.000	96.854	76.6599	76.854	0
12.00 hr	20.000	96.659	76.4656	76.659	0
13.00 hr	20.000	96.535	76.3416	76.535	0
14.00 hr	20.000	96.448	76.2547	76.448	0
15.00 hr	20.000	96.394	76.2010	76.394	0
16.00 hr	20.000	96.356	76.1638	76.356	0
17.00 hr	20.000	96.286	76.0935	76.286	0
18.00 hr	20.000	96.145	75.9530	76.145	0
19.00 hr	20.000	95.950	75.7587	75.950	0
20.00 hr	20.000	95.772	75.5809	75.772	0
21.00 hr	20.000	95.685	75.4941	75.685	0
22.00 hr	20.000	95.722	75.5313	75.722	0
23.00 hr	20.000	95.863	75.6719	75.863	0
24.00 hr	20.000	96.058	75.8662	76.058	0

Scenario: Scenario 1

J-3

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,056.681 m	Elevation	20.000 m
Y	3,058.290 m	Zone	Zone-1

Demand Summary

Type	Demand (l/d)	Pattern
Demand	0	Fixed

User Data			
Observed Pressure	0.00 psi	Observed Concentration	0.00 mg/l
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

History:

Location Description:

Calculated Results Summary

Time	Elevation (m)	Calculated Hydraulic Grade (m)	Pressure (m H2O)	Pressure Head (m)	Demand (Calculated) (l/d)
0.00 hr	20.000	61.179	41.0747	41.179	0
1.00 hr	20.000	61.411	41.3062	41.411	0
2.00 hr	20.000	61.659	41.5542	41.659	0
3.00 hr	20.000	61.925	41.8188	41.925	0
4.00 hr	20.000	62.210	42.1040	42.210	0
5.00 hr	20.000	62.513	42.4058	42.513	0
6.00 hr	20.000	62.762	42.6538	42.762	0
7.00 hr	20.000	62.778	42.6704	42.778	0
8.00 hr	20.000	62.671	42.5629	42.671	0
9.00 hr	20.000	62.455	42.3479	42.455	0
10.00 hr	20.000	62.206	42.0999	42.206	0
11.00 hr	20.000	61.974	41.8684	41.974	0
12.00 hr	20.000	61.779	41.6741	41.779	0
13.00 hr	20.000	61.655	41.5501	41.655	0
14.00 hr	20.000	61.568	41.4633	41.568	0
15.00 hr	20.000	61.514	41.4095	41.514	0
16.00 hr	20.000	61.477	41.3723	41.477	0
17.00 hr	20.000	61.406	41.3021	41.406	0
18.00 hr	20.000	61.266	41.1615	41.266	0
19.00 hr	20.000	61.071	40.9672	41.071	0
20.00 hr	20.000	60.893	40.7895	40.893	0
21.00 hr	20.000	60.806	40.7027	40.806	0
22.00 hr	20.000	60.843	40.7399	40.843	0
23.00 hr	20.000	60.984	40.8804	40.984	0
24.00 hr	20.000	61.179	41.0747	41.179	0

Scenario: Scenario 1

J-4

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,070.921 m	Elevation	31.500 m
Y	3,051.365 m	Zone	Zone-1

Demand Summary

Type	Demand (l/d)	Pattern
Demand	11,381,000	Fixed

User Data			
Observed Pressure	0.00 psi	Observed Concentration	0.00 mg/l
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

History:

Location Description:

Calculated Results Summary

Time	Elevation (m)	Calculated Hydraulic Grade (m)	Pressure (m H2O)	Pressure Head (m)	Demand (Calculated) (l/d)
0.00 hr	31.500	49.652	18.1060	18.152	11,381,000
1.00 hr	31.500	49.884	18.3375	18.384	11,381,000
2.00 hr	31.500	50.132	18.5855	18.632	11,381,000
3.00 hr	31.500	50.398	18.8501	18.898	11,381,000
4.00 hr	31.500	50.684	19.1353	19.184	11,381,000
5.00 hr	31.500	50.986	19.4371	19.486	11,381,000
6.00 hr	31.500	51.235	19.6851	19.735	11,381,000
7.00 hr	31.500	51.251	19.7016	19.751	11,381,000
8.00 hr	31.500	51.144	19.5942	19.644	11,381,000
9.00 hr	31.500	50.928	19.3792	19.428	11,381,000
10.00 hr	31.500	50.680	19.1312	19.180	11,381,000
11.00 hr	31.500	50.447	18.8997	18.947	11,381,000
12.00 hr	31.500	50.253	18.7054	18.753	11,381,000
13.00 hr	31.500	50.128	18.5814	18.628	11,381,000
14.00 hr	31.500	50.041	18.4945	18.541	11,381,000
15.00 hr	31.500	49.987	18.4408	18.487	11,381,000
16.00 hr	31.500	49.950	18.4036	18.450	11,381,000
17.00 hr	31.500	49.880	18.3333	18.380	11,381,000
18.00 hr	31.500	49.739	18.1928	18.239	11,381,000
19.00 hr	31.500	49.544	17.9985	18.044	11,381,000
20.00 hr	31.500	49.366	17.8207	17.866	11,381,000
21.00 hr	31.500	49.279	17.7339	17.779	11,381,000
22.00 hr	31.500	49.316	17.7711	17.816	11,381,000
23.00 hr	31.500	49.457	17.9117	17.957	11,381,000
24.00 hr	31.500	49.652	18.1060	18.152	11,381,000

Scenario: Scenario 1

J-5

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	3,048.975 m	Elevation	40.000 m
Y	3,053.218 m	Zone	Zone-1

Demand Summary

Type	Demand (l/d)	Pattern
Demand	2,688,000	Residential

User Data			
Observed Pressure	0.00 psi	Observed Concentration	0.00 mg/l
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

History:

Location Description:

Calculated Results Summary

Time	Elevation (m)	Calculated Hydraulic Grade (m)	Pressure (m H2O)	Pressure Head (m)	Demand (Calculated) (l/d)
0.00 hr	40.000	70.395	30.3187	30.395	1,182,720
1.00 hr	40.000	70.628	30.5509	30.628	1,075,200
2.00 hr	40.000	70.878	30.7997	30.878	967,680
3.00 hr	40.000	71.144	31.0650	31.144	833,280
4.00 hr	40.000	71.430	31.3508	31.430	725,760
5.00 hr	40.000	71.731	31.6505	31.731	1,075,200
6.00 hr	40.000	71.963	31.8828	31.963	2,580,480
7.00 hr	40.000	71.967	31.8864	31.967	3,386,880
8.00 hr	40.000	71.846	31.7654	31.846	4,085,760
9.00 hr	40.000	71.626	31.5459	31.626	4,300,800
10.00 hr	40.000	71.379	31.3002	31.379	4,193,280
11.00 hr	40.000	71.152	31.0737	31.152	3,951,360
12.00 hr	40.000	70.966	30.8882	30.966	3,494,400
13.00 hr	40.000	70.846	30.7685	30.846	3,252,480
14.00 hr	40.000	70.763	30.6853	30.763	3,037,440
15.00 hr	40.000	70.711	30.6333	30.711	2,929,920
16.00 hr	40.000	70.670	30.5926	30.670	3,144,960
17.00 hr	40.000	70.591	30.5142	30.591	3,601,920
18.00 hr	40.000	70.444	30.3668	30.444	3,951,360
19.00 hr	40.000	70.251	30.1747	30.251	3,843,840
20.00 hr	40.000	70.084	30.0079	30.084	3,252,480
21.00 hr	40.000	70.009	29.9335	30.009	2,446,080
22.00 hr	40.000	70.054	29.9786	30.054	1,774,080
23.00 hr	40.000	70.199	30.1225	30.199	1,424,640
24.00 hr	40.000	70.395	30.3187	30.395	1,182,720

Scenario: Scenario 1

P-1

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Ductile Iron	Hazen- Williams C	120.0
Diameter	450 mm	Minor Loss Coefficient	0.000
Check Valve?	false	Length	4,000.000 m
From Node	J-1	To Node	J-2

Elevations			
From Elevation	120.000 m	To Elevation	20.000 m

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Observed Flow	0.00 gpm
Lining		Pipe Class	
Exterior Coating		Nominal Diameter	0.00 in
Condition		Skeletonized	false
Metered	false	Existing	false

Scenario: Scenario 1

History:

Calculated Results Summary

Time	Control Status	Discharge (l/d)	Velocity (m/s)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Calculated Friction Headloss (m)	Calculated Minor Headloss (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/m)
0.00 hr	Open	14,069,000	1.024	106.314	96.058	10.256	0.000	10.256	0.00256
1.00 hr	Open	14,069,000	1.024	106.546	96.290	10.256	0.000	10.256	0.00256
2.00 hr	Open	14,069,000	1.024	106.795	96.539	10.256	0.000	10.256	0.00256
3.00 hr	Open	14,069,000	1.024	107.060	96.804	10.256	0.000	10.256	0.00256
4.00 hr	Open	14,069,000	1.024	107.346	97.090	10.256	0.000	10.256	0.00256
5.00 hr	Open	14,069,000	1.024	107.648	97.392	10.256	0.000	10.256	0.00256
6.00 hr	Open	14,069,000	1.024	107.897	97.641	10.256	0.000	10.256	0.00256
7.00 hr	Open	14,069,000	1.024	107.914	97.658	10.256	0.000	10.256	0.00256
8.00 hr	Open	14,069,000	1.024	107.806	97.550	10.256	0.000	10.256	0.00256
9.00 hr	Open	14,069,000	1.024	107.590	97.334	10.256	0.000	10.256	0.00256
10.00 hr	Open	14,069,000	1.024	107.342	97.086	10.256	0.000	10.256	0.00256
11.00 hr	Open	14,069,000	1.024	107.110	96.854	10.256	0.000	10.256	0.00256
12.00 hr	Open	14,069,000	1.024	106.915	96.659	10.256	0.000	10.256	0.00256
13.00 hr	Open	14,069,000	1.024	106.791	96.535	10.256	0.000	10.256	0.00256
14.00 hr	Open	14,069,000	1.024	106.704	96.448	10.256	0.000	10.256	0.00256
15.00 hr	Open	14,069,000	1.024	106.650	96.394	10.256	0.000	10.256	0.00256
16.00 hr	Open	14,069,000	1.024	106.612	96.356	10.256	0.000	10.256	0.00256
17.00 hr	Open	14,069,000	1.024	106.542	96.286	10.256	0.000	10.256	0.00256
18.00 hr	Open	14,069,000	1.024	106.401	96.145	10.256	0.000	10.256	0.00256
19.00 hr	Open	14,069,000	1.024	106.206	95.950	10.256	0.000	10.256	0.00256
20.00 hr	Open	14,069,000	1.024	106.028	95.772	10.256	0.000	10.256	0.00256
21.00 hr	Open	14,069,000	1.024	105.941	95.685	10.256	0.000	10.256	0.00256
22.00 hr	Open	14,069,000	1.024	105.978	95.722	10.256	0.000	10.256	0.00256
23.00 hr	Open	14,069,000	1.024	106.119	95.863	10.256	0.000	10.256	0.00256
24.00 hr	Open	14,069,000	1.024	106.314	96.058	10.256	0.000	10.256	0.00256

P-2

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Ductile Iron	Hazen- Williams C	120.0
Diameter	450 mm	Minor Loss Coefficient	0.000
Check Valve?	false	Length	10,007.000 m
From Node	J-2	To Node	T-1

Elevations			
From Elevation	20.000 m	To Elevation	72.000 m

Initial Status	
Initial Status	Open

User Data	
Date Installed	Date Retired

Scenario: Scenario 1

User Data			
Inspection Date		Observed Flow	0.00 gpm
Lining		Pipe Class	
Exterior Coating		Nominal Diameter	0.00 in
Condition		Skeletonized	false
Metered	false	Existing	false

History:

Calculated Results Summary

Time	Control Status	Discharge (l/d)	Velocity (m/s)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Calculated Friction Headloss (m)	Calculated Minor Headloss (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/m)
0.00 hr	Open	14,069,000	1.024	96.058	70.400	25.658	0.000	25.658	0.00256
1.00 hr	Open	14,069,000	1.024	96.290	70.632	25.658	0.000	25.658	0.00256
2.00 hr	Open	14,069,000	1.024	96.539	70.881	25.658	0.000	25.658	0.00256
3.00 hr	Open	14,069,000	1.024	96.804	71.146	25.658	0.000	25.658	0.00256
4.00 hr	Open	14,069,000	1.024	97.090	71.432	25.658	0.000	25.658	0.00256
5.00 hr	Open	14,069,000	1.024	97.392	71.734	25.658	0.000	25.658	0.00256
6.00 hr	Open	14,069,000	1.024	97.641	71.983	25.658	0.000	25.658	0.00256
7.00 hr	Open	14,069,000	1.024	97.658	72.000	25.658	0.000	25.658	0.00256
8.00 hr	Open	14,069,000	1.024	97.550	71.892	25.658	0.000	25.658	0.00256
9.00 hr	Open	14,069,000	1.024	97.334	71.676	25.658	0.000	25.658	0.00256
10.00 hr	Open	14,069,000	1.024	97.086	71.428	25.658	0.000	25.658	0.00256
11.00 hr	Open	14,069,000	1.024	96.854	71.196	25.658	0.000	25.658	0.00256
12.00 hr	Open	14,069,000	1.024	96.659	71.001	25.658	0.000	25.658	0.00256
13.00 hr	Open	14,069,000	1.024	96.535	70.877	25.658	0.000	25.658	0.00256
14.00 hr	Open	14,069,000	1.024	96.448	70.790	25.658	0.000	25.658	0.00256
15.00 hr	Open	14,069,000	1.024	96.394	70.736	25.658	0.000	25.658	0.00256
16.00 hr	Open	14,069,000	1.024	96.356	70.698	25.658	0.000	25.658	0.00256
17.00 hr	Open	14,069,000	1.024	96.286	70.628	25.658	0.000	25.658	0.00256
18.00 hr	Open	14,069,000	1.024	96.145	70.487	25.658	0.000	25.658	0.00256
19.00 hr	Open	14,069,000	1.024	95.950	70.292	25.658	0.000	25.658	0.00256
20.00 hr	Open	14,069,000	1.024	95.772	70.114	25.658	0.000	25.658	0.00256
21.00 hr	Open	14,069,000	1.024	95.685	70.027	25.658	0.000	25.658	0.00256
22.00 hr	Open	14,069,000	1.024	95.722	70.064	25.658	0.000	25.658	0.00256
23.00 hr	Open	14,069,000	1.024	95.863	70.205	25.658	0.000	25.658	0.00256
24.00 hr	Open	14,069,000	1.024	96.058	70.400	25.658	0.000	25.658	0.00256

P-3

Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Ductile Iron	Hazen- Williams C	120.0
Diameter	400 mm	Minor Loss Coefficient	0.000
Check Valve?	false	Length	3,000.000 m
From Node	T-1	To Node	J-3

Elevations			
From Elevation	72.000 m	To Elevation	20.000 m

Scenario: Scenario 1

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Observed Flow	0.00 gpm
Lining		Pipe Class	
Exterior Coating		Nominal Diameter	0.00 in
Condition		Skeletonized	false
Metered	false	Existing	false

History:

Calculated Results Summary

Time	Control Status	Discharge (l/d)	Velocity (m/s)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Calculated Friction Headloss (m)	Calculated Minor Headloss (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/m)
0.00 hr	Open	11,381,000	1.048	70.400	61.179	9.221	0.000	9.221	0.00307
1.00 hr	Open	11,381,000	1.048	70.632	61.411	9.221	0.000	9.221	0.00307
2.00 hr	Open	11,381,000	1.048	70.881	61.659	9.221	0.000	9.221	0.00307
3.00 hr	Open	11,381,000	1.048	71.146	61.925	9.221	0.000	9.221	0.00307
4.00 hr	Open	11,381,000	1.048	71.432	62.210	9.221	0.000	9.221	0.00307
5.00 hr	Open	11,381,000	1.048	71.734	62.513	9.221	0.000	9.221	0.00307
6.00 hr	Open	11,381,000	1.048	71.983	62.762	9.221	0.000	9.221	0.00307
7.00 hr	Open	11,381,000	1.048	72.000	62.778	9.221	0.000	9.221	0.00307
8.00 hr	Open	11,381,000	1.048	71.892	62.671	9.221	0.000	9.221	0.00307
9.00 hr	Open	11,381,000	1.048	71.676	62.455	9.221	0.000	9.221	0.00307
10.00 hr	Open	11,381,000	1.048	71.428	62.206	9.221	0.000	9.221	0.00307
11.00 hr	Open	11,381,000	1.048	71.196	61.974	9.221	0.000	9.221	0.00307
12.00 hr	Open	11,381,000	1.048	71.001	61.779	9.221	0.000	9.221	0.00307
13.00 hr	Open	11,381,000	1.048	70.877	61.655	9.221	0.000	9.221	0.00307
14.00 hr	Open	11,381,000	1.048	70.790	61.568	9.221	0.000	9.221	0.00307
15.00 hr	Open	11,381,000	1.048	70.736	61.514	9.221	0.000	9.221	0.00307
16.00 hr	Open	11,381,000	1.048	70.698	61.477	9.221	0.000	9.221	0.00307
17.00 hr	Open	11,381,000	1.048	70.628	61.406	9.221	0.000	9.221	0.00307
18.00 hr	Open	11,381,000	1.048	70.487	61.266	9.221	0.000	9.221	0.00307
19.00 hr	Open	11,381,000	1.048	70.292	61.071	9.221	0.000	9.221	0.00307
20.00 hr	Open	11,381,000	1.048	70.114	60.893	9.221	0.000	9.221	0.00307
21.00 hr	Open	11,381,000	1.048	70.027	60.806	9.221	0.000	9.221	0.00307
22.00 hr	Open	11,381,000	1.048	70.064	60.843	9.221	0.000	9.221	0.00307
23.00 hr	Open	11,381,000	1.048	70.205	60.984	9.221	0.000	9.221	0.00307
24.00 hr	Open	11,381,000	1.048	70.400	61.179	9.221	0.000	9.221	0.00307

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Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Calibration Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Ductile Iron	Hazen- Williams C	120.0

Scenario: Scenario 1

Pipe Characteristics			
Diameter	400 mm	Minor Loss Coefficient	0.000
Check Valve?	false	Length	3,750.000 m
From Node	J-3	To Node	J-4

Elevations			
From Elevation	20.000 m	To Elevation	31.500 m

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Observed Flow	0.00 gpm
Lining		Pipe Class	
Exterior Coating		Nominal Diameter	0.00 in
Condition		Skeletonized	false
Metered	false	Existing	false

History:

Calculated Results Summary

Time	Control Status	Discharge (l/d)	Velocity (m/s)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Calculated Friction Headloss (m)	Calculated Minor Headloss (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/m)
0.00 hr	Open	11,381,000	1.048	61.179	49.652	11.527	0.000	11.527	0.00307
1.00 hr	Open	11,381,000	1.048	61.411	49.884	11.527	0.000	11.527	0.00307
2.00 hr	Open	11,381,000	1.048	61.659	50.132	11.527	0.000	11.527	0.00307
3.00 hr	Open	11,381,000	1.048	61.925	50.398	11.527	0.000	11.527	0.00307
4.00 hr	Open	11,381,000	1.048	62.210	50.684	11.527	0.000	11.527	0.00307
5.00 hr	Open	11,381,000	1.048	62.513	50.986	11.527	0.000	11.527	0.00307
6.00 hr	Open	11,381,000	1.048	62.762	51.235	11.527	0.000	11.527	0.00307
7.00 hr	Open	11,381,000	1.048	62.778	51.251	11.527	0.000	11.527	0.00307
8.00 hr	Open	11,381,000	1.048	62.671	51.144	11.527	0.000	11.527	0.00307
9.00 hr	Open	11,381,000	1.048	62.455	50.928	11.527	0.000	11.527	0.00307
10.00 hr	Open	11,381,000	1.048	62.206	50.680	11.527	0.000	11.527	0.00307
11.00 hr	Open	11,381,000	1.048	61.974	50.447	11.527	0.000	11.527	0.00307
12.00 hr	Open	11,381,000	1.048	61.779	50.253	11.527	0.000	11.527	0.00307
13.00 hr	Open	11,381,000	1.048	61.655	50.128	11.527	0.000	11.527	0.00307
14.00 hr	Open	11,381,000	1.048	61.568	50.041	11.527	0.000	11.527	0.00307
15.00 hr	Open	11,381,000	1.048	61.514	49.987	11.527	0.000	11.527	0.00307
16.00 hr	Open	11,381,000	1.048	61.477	49.950	11.527	0.000	11.527	0.00307
17.00 hr	Open	11,381,000	1.048	61.406	49.880	11.527	0.000	11.527	0.00307
18.00 hr	Open	11,381,000	1.048	61.266	49.739	11.527	0.000	11.527	0.00307
19.00 hr	Open	11,381,000	1.048	61.071	49.544	11.527	0.000	11.527	0.00307
20.00 hr	Open	11,381,000	1.048	60.893	49.366	11.527	0.000	11.527	0.00307
21.00 hr	Open	11,381,000	1.048	60.806	49.279	11.527	0.000	11.527	0.00307
22.00 hr	Open	11,381,000	1.048	60.843	49.316	11.527	0.000	11.527	0.00307
23.00 hr	Open	11,381,000	1.048	60.984	49.457	11.527	0.000	11.527	0.00307
24.00 hr	Open	11,381,000	1.048	61.179	49.652	11.527	0.000	11.527	0.00307

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Scenario Summary	
Label	Scenario 1
Physical Alternative	Base-Physical
Demand Alternative	Base-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Fire Flow-Scenario 2
Cost Alternative	Base-Cost
User Data Alternative	Base-User Data

Scenario: Scenario 1

Calibration Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Ductile Iron	Hazen- Williams C	120.0
Diameter	400 mm	Minor Loss Coefficient	0.000
Check Valve?	false	Length	100.000 m
From Node	T-1	To Node	J-5

Elevations			
From Elevation	72.000 m	To Elevation	40.000 m

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Observed Flow	0.00 gpm
Lining		Pipe Class	
Exterior Coating		Nominal Diameter	0.00 in
Condition		Skeletonized	false
Metered	false	Existing	false

History:

Calculated Results Summary

Time	Control Status	Discharge (l/d)	Velocity (m/s)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Calculated Friction Headloss (m)	Calculated Minor Headloss (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/m)
0.00 hr	Open	1,182,720	0.109	70.400	70.395	0.005	0.000	0.005	0.00005
1.00 hr	Open	1,075,200	0.099	70.632	70.628	0.004	0.000	0.004	0.00004
2.00 hr	Open	967,680	0.089	70.881	70.878	0.003	0.000	0.003	0.00003
3.00 hr	Open	833,280	0.077	71.146	71.144	0.002	0.000	0.002	0.00002
4.00 hr	Open	725,760	0.067	71.432	71.430	0.002	0.000	0.002	0.00002
5.00 hr	Open	1,075,200	0.099	71.734	71.731	0.004	0.000	0.004	0.00004
6.00 hr	Open	2,580,480	0.238	71.983	71.963	0.020	0.000	0.020	0.00020
7.00 hr	Open	3,386,880	0.312	72.000	71.967	0.033	0.000	0.033	0.00033
8.00 hr	Open	4,085,760	0.376	71.892	71.846	0.046	0.000	0.046	0.00046
9.00 hr	Open	4,300,800	0.396	71.676	71.626	0.051	0.000	0.051	0.00051
10.00 hr	Open	4,193,280	0.386	71.428	71.379	0.048	0.000	0.048	0.00048
11.00 hr	Open	3,951,360	0.364	71.196	71.152	0.043	0.000	0.043	0.00043
12.00 hr	Open	3,494,400	0.322	71.001	70.966	0.035	0.000	0.035	0.00035
13.00 hr	Open	3,252,480	0.300	70.877	70.846	0.030	0.000	0.030	0.00030
14.00 hr	Open	3,037,440	0.280	70.790	70.763	0.027	0.000	0.027	0.00027
15.00 hr	Open	2,929,920	0.270	70.736	70.711	0.025	0.000	0.025	0.00025
16.00 hr	Open	3,144,960	0.290	70.698	70.670	0.028	0.000	0.028	0.00028
17.00 hr	Open	3,601,920	0.332	70.628	70.591	0.037	0.000	0.037	0.00037
18.00 hr	Open	3,951,360	0.364	70.487	70.444	0.043	0.000	0.043	0.00043
19.00 hr	Open	3,843,840	0.354	70.292	70.251	0.041	0.000	0.041	0.00041
20.00 hr	Open	3,252,480	0.300	70.114	70.084	0.030	0.000	0.030	0.00030
21.00 hr	Open	2,446,080	0.225	70.027	70.009	0.018	0.000	0.018	0.00018
22.00 hr	Open	1,774,080	0.163	70.064	70.054	0.010	0.000	0.010	0.00010
23.00 hr	Open	1,424,640	0.131	70.205	70.199	0.007	0.000	0.007	0.00007
24.00 hr	Open	1,182,720	0.109	70.400	70.395	0.005	0.000	0.005	0.00005

Scenario: Scenario 1

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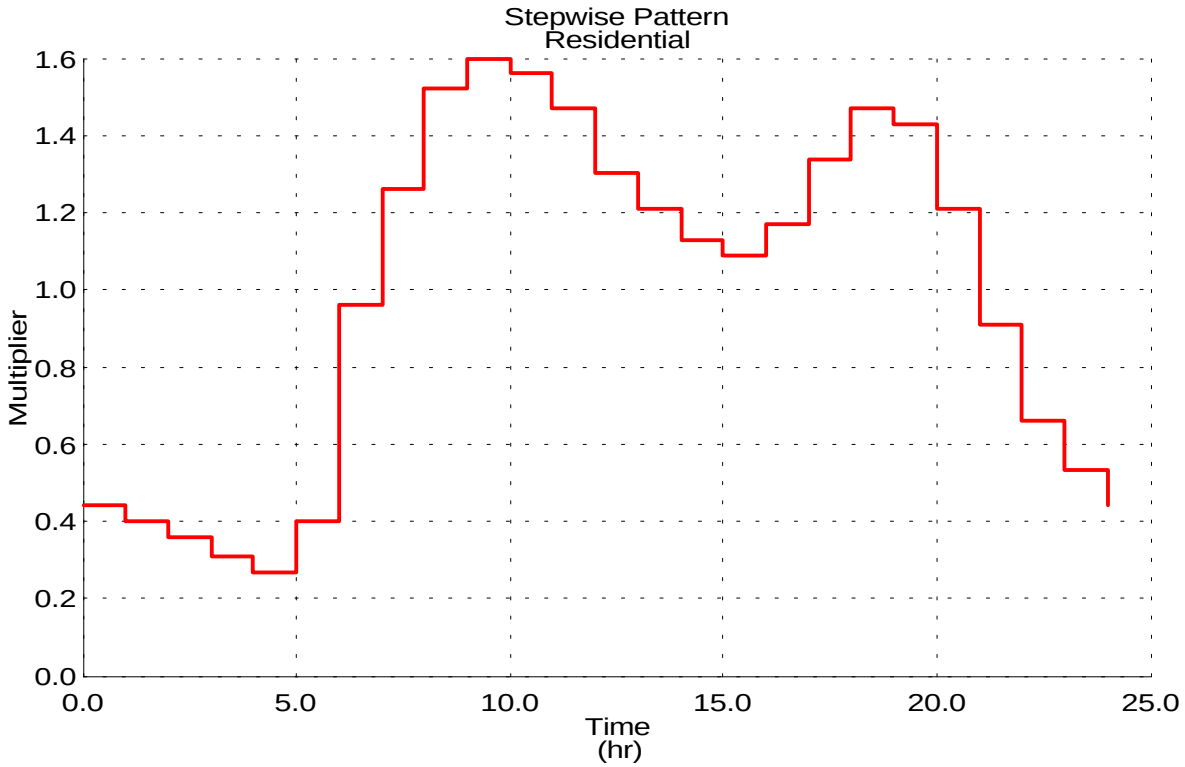
Pattern Summary

Pattern	Residential	Format	Stepwise
Start Time	0.00 hr	Starting Multiplier	0.400
Duration	24.00 hr		

Pattern

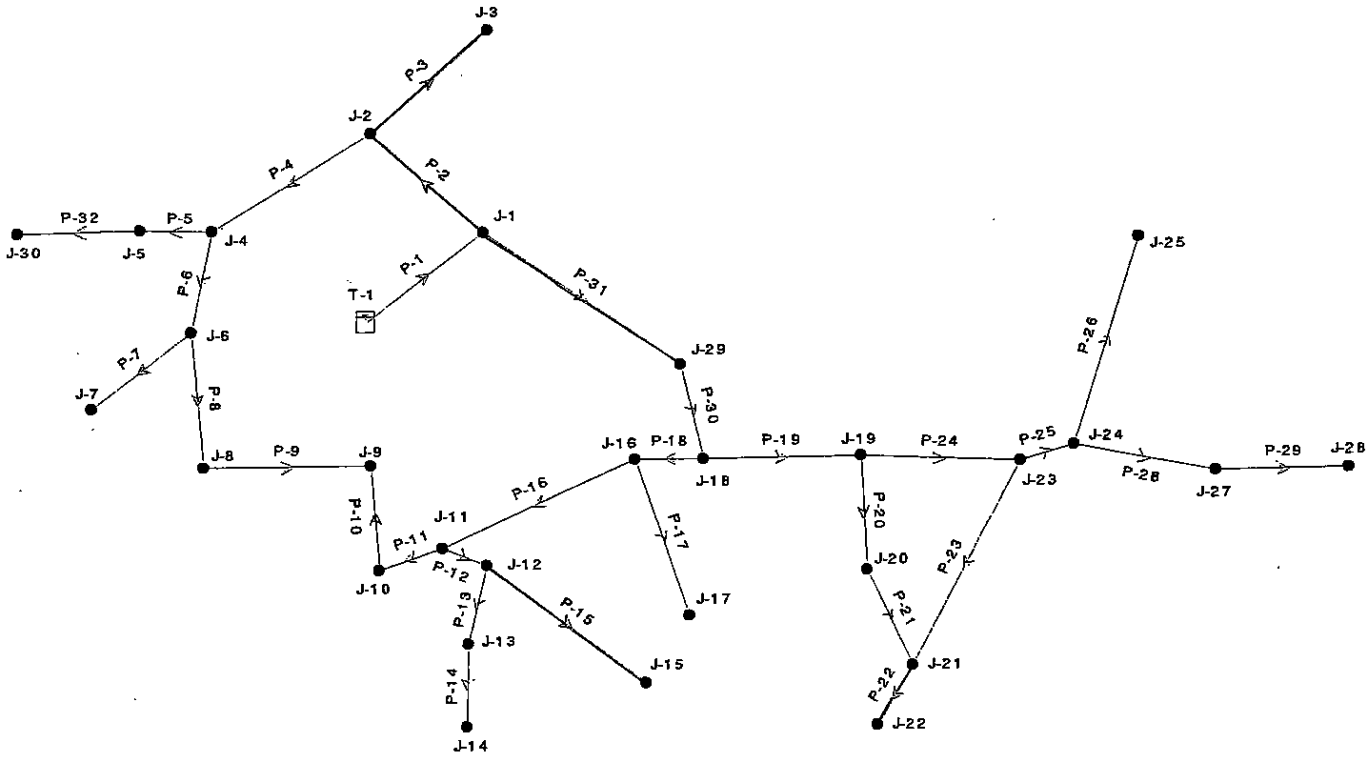
Time from Start (hr)	Multiplier
1.00	0.350
2.00	0.300
3.00	0.260
4.00	0.210
5.00	0.350
6.00	0.950
7.00	1.280
8.00	1.570
9.00	1.650
10.00	1.600
11.00	1.510
12.00	1.320
13.00	1.230
14.00	1.140
15.00	1.090
16.00	1.190
17.00	1.370
18.00	1.510
19.00	1.460
20.00	1.230
21.00	0.910
22.00	0.630
23.00	0.490
24.00	0.400



参考資料 ３.３

ディヤガハ配水区管網計算書

Scenario: Base



Scenario: Base
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Demand (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (m H2O)
J-1	42.92	Zone-1	Demand	194,000	Fixed	194,000	67.84	24.86
J-2	1.72	Zone-1	Demand	372,000	Fixed	372,000	65.40	63.52
J-3	1.40	Zone-1	Demand	399,000	Fixed	399,000	34.12	32.64
J-4	5.08	Zone-1	Demand	137,000	Fixed	137,000	62.75	57.52
J-5	10.86	Zone-1	Demand	62,000	Fixed	62,000	61.05	50.06
J-6	11.79	Zone-1	Demand	130,000	Fixed	130,000	61.50	49.59
J-7	28.20	Zone-1	Demand	130,000	Fixed	130,000	56.81	28.53
J-8	54.29	Zone-1	Demand	253,000	Fixed	253,000	60.87	6.56
J-9	31.83	Zone-1	Demand	253,000	Fixed	253,000	60.87	28.97
J-10	16.19	Zone-1	Demand	28,000	Fixed	28,000	61.38	45.08
J-11	13.31	Zone-1	Demand	28,000	Fixed	28,000	61.45	48.02
J-12	12.97	Zone-1	Demand	28,000	Fixed	28,000	61.24	48.15
J-13	14.48	Zone-1	Demand	28,000	Fixed	28,000	60.50	45.91
J-14	10.68	Zone-1	Demand	28,000	Fixed	28,000	60.33	49.53
J-15	26.57	Zone-1	Demand	28,000	Fixed	28,000	60.15	33.50
J-16	17.23	Zone-1	Demand	28,000	Fixed	28,000	62.71	45.37
J-17	9.49	Zone-1	Demand	28,000	Fixed	28,000	61.51	51.89
J-18	24.88	Zone-1	Demand	125,000	Fixed	125,000	63.19	38.21
J-19	19.68	Zone-1	Demand	1,092,000	Fixed	1,092,000	58.50	38.72
J-20	30.09	Zone-1	Demand	391,000	Fixed	391,000	44.29	14.16
J-21	10.11	Zone-1	Demand	514,000	Fixed	514,000	33.79	23.62
J-22	8.80	Zone-1	Demand	280,000	Fixed	280,000	26.25	17.40
J-23	17.54	Zone-1	Demand	48,000	Fixed	48,000	56.06	38.43
J-24	18.11	Zone-1	Demand	48,000	Fixed	48,000	55.89	37.68
J-25	39.35	Zone-1	Demand	1,050,000	Fixed	1,050,000	54.81	15.42
J-27	19.96	Zone-1	Demand	621,000	Fixed	621,000	46.67	26.64
J-28	11.90	Zone-1	Demand	383,000	Fixed	383,000	39.98	28.01
J-29	31.74	Zone-1	Demand	349,000	Fixed	349,000	63.77	31.95
J-30	4.48	Zone-1	Demand	850,000	Fixed	850,000	42.00	37.43

Scenario: Base
Steady State Analysis
Pipe Report

Label	Length (m)	Diameter (mm)	Material	Hazen-Williams C	Check Valve?	Minor Loss Coefficient	Control Status	Discharge (l/d)	Upstream Structure Hydraulic Grade (m)	Downstream Structure Hydraulic Grade (m)	Pressure Pipe Headloss (m)	Headloss Gradient (m/km)
P-1	100	400	Ductile Iron	120.0	false	0.00	Open	7,905,000	68.00	67.84	0.16	1.57
P-2	1,500	250	Ductile Iron	120.0	false	0.00	Open	2,341,794	67.84	65.40	2.44	1.63
P-3	2,155	79	PVC	130.0	false	0.00	Open	399,000	65.40	34.12	31.28	14.52
P-4	1,271	198	PVC	130.0	false	0.00	Open	1,570,794	65.40	62.75	2.65	2.09
P-5	69	97	PVC	130.0	false	0.00	Open	912,000	62.75	61.05	1.70	24.65
P-6	452	123	PVC	130.0	false	0.00	Open	521,794	62.75	61.50	1.25	2.76
P-7	996	65	PVC	130.0	false	0.00	Open	130,000	61.50	56.81	4.69	4.71
P-8	819	123	PVC	130.0	false	0.00	Open	261,794	61.50	60.87	0.63	0.77
P-9	887	123	PVC	130.0	false	0.00	Open	8,794	60.87	60.87	1.28e-3	1.45e-3
P-10	758	123	PVC	130.0	false	0.00	Open	-244,206	60.87	61.38	0.51	0.68
P-11	85	123	PVC	130.0	false	0.00	Open	-272,206	61.38	61.45	0.07	0.83
P-12	9	44	PVC	130.0	false	0.00	Open	112,000	61.45	61.24	0.22	23.93
P-13	111	44	PVC	130.0	false	0.00	Open	56,000	61.24	60.50	0.74	6.64
P-14	92	44	PVC	130.0	false	0.00	Open	28,000	60.50	60.33	0.17	1.84
P-15	591	44	PVC	130.0	false	0.00	Open	28,000	61.24	60.15	1.09	1.84
P-16	704	123	PVC	130.0	false	0.00	Open	-412,206	61.45	62.71	1.26	1.78
P-17	650	44	PVC	130.0	false	0.00	Open	28,000	62.71	61.51	1.20	1.84
P-18	211	123	PVC	130.0	false	0.00	Open	-468,206	62.71	63.19	0.48	2.26
P-19	887	250	Ductile Iron	120.0	false	0.00	Open	4,427,000	63.19	58.50	4.69	5.29
P-20	720	97	PVC	130.0	false	0.00	Open	808,641	58.50	44.29	14.21	19.73
P-21	665	79	PVC	130.0	false	0.00	Open	417,641	44.29	33.79	10.50	15.79
P-22	1,000	79	PVC	130.0	false	0.00	Open	280,000	33.79	26.25	7.54	7.54
P-23	1,710	79	PVC	130.0	false	0.00	Open	-376,359	33.79	56.06	22.26	13.03
P-24	1,300	250	Ductile Iron	120.0	false	0.00	Open	2,526,359	58.50	56.06	2.43	1.87
P-25	50	198	PVC	130.0	false	0.00	Open	2,102,000	56.06	55.89	0.18	3.58
P-26	1,090	198	PVC	130.0	false	0.00	Open	1,050,000	55.89	54.81	1.08	0.99
P-28	995	123	PVC	130.0	false	0.00	Open	1,004,000	55.89	46.67	9.22	9.26
P-29	1,350	97	PVC	130.0	false	0.00	Open	383,000	46.67	39.98	6.69	4.95
P-30	213	300	Ductile Iron	120.0	false	0.00	Open	-5,020,206	63.19	63.77	0.58	2.74
P-31	1,310	300	Ductile Iron	120.0	false	0.00	Open	-5,369,206	63.77	67.84	4.07	3.11
P-32	880	97	PVC	130.0	false	0.00	Open	850,000	61.05	42.00	19.05	21.64

 Nippon Jogesuido Sekkei Co., Ltd.
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666