

(2) **Alternative C-2**

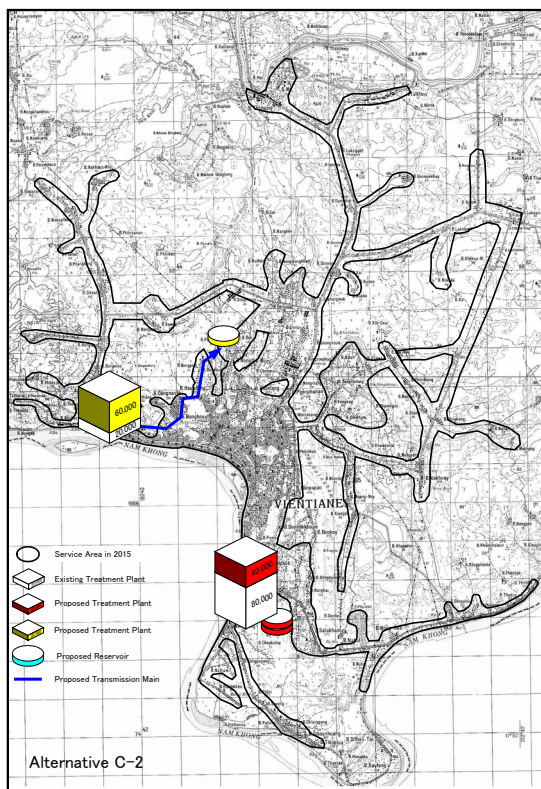
1) Intake and Treatment Plant

1st Stage (Expansion of Existing Chinaimo Water Treatment Plant, see Figure 4)

- Intake Facilities: Use of the existing intake structure, replacement of 4 of the 6 existing pumps
- Treatment Plant: Expansion of 40,000 m³/day

2nd Stage (Expansion of Kaolieo Water Treatment Plant, see Figure 6)

- Intake Facilities: Construction of new intake facilities from the Mekong River
- Treatment Plant: Construction expansion facilities of 60,000 m³/day



For this alternative, C-2, an expansion capacity of 40,000 m³/day at the existing Chinaimo Treatment Plant for the 1st Stage is considered as the same as Alternative C-1. A new treatment plant of 60,000 m³/day at the existing Kaolieo Treatment Plant is considered for the 2nd Stage. Process of each treatment is planned as the same as the existing Chinaimo Treatment Plant. For the expansion of the existing Chinaimo Treatment Plant during 1st Stage, additional intake structures will not be required, but replacement of some intake pumps will be required. The plan of the treatment facilities and flow diagram for the expansion of 40,000 m³/day at Chinaimo Treatment Plant for the 1st Stage are the same as alternative C-1, as shown in Figure 11 and Figure 12 respectively. Figure 17 and Figure 18 show a

plan of the treatment facilities and flow diagram for the expansion capacity of 60,000 m³/day at the Kaolieo Treatment Plant for the 2nd Stage. Detailed specifications of the treatment facilities for alternative C-2 are attached to Annex-14.

2) Pipelines

1st Stage

- Clear Water Transmission Pipelines: Installation of 2.2 km of pipelines
- Booster Pumping Stations: Improvement of the Km6 Booster Pumping Station
- Distribution Trunk Mains: Installation of 26.3 km of pipelines

2nd Stage

- Clear Water Transmission: Installation of 9.9 km of pipelines

- Distribution Centre: Construction of new distribution centre capable of 60,000 m³/day
- Booster Pumping Stations: Improvement of the Km6 BP station
- Booster Pumping Stations: Improvement of the Km12 BP station
- Distribution Trunk Mains: Installation of 85.1 km of pipelines

Improvement of the Km6 BP station in the 1st Stage and 2nd Stage will be for securing water supply to the northern part of Vientiane, especially the Dongdok area. The improvement will include replacement of the existing pumps with new larger capacity and higher head pumps and construction of a new pump house. Improvement of the Km12 BP station in the 2nd Stage will be mainly for the water supply to the new industrial area in the eastern part of the City.

In the 2nd Stage, clear water will be transmitted from the Kaolieo Treatment Plant to a distribution centre and then distributed from the distribution centre to consumers. The distribution centre is proposed to be constructed in the Phonetong area in the northern part of downtown of central Vientiane.

Figure 19 shows the clear water transmission pipelines and distribution trunk mains required for alternative C-2. These required pipelines are obtained from a hydraulic network analysis prepared for this alternative. The required pipeline length by pipeline diameters by stages are summarized in Figure 16.

Figure 16 Required Pipelines by Diameters for Alternative C-2

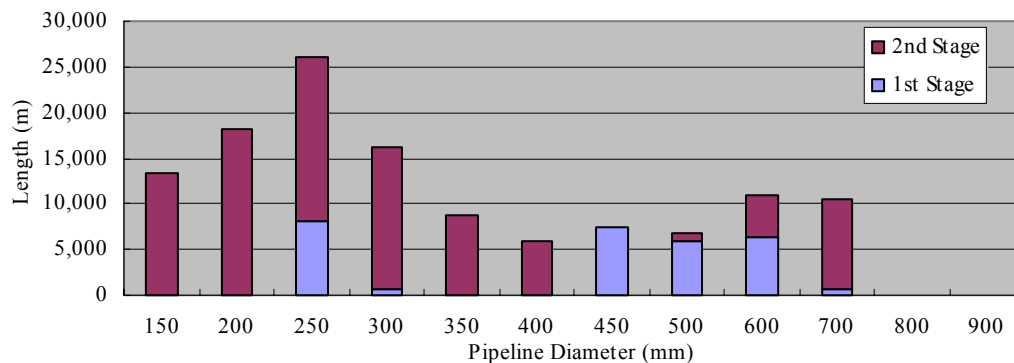


Figure 18

Flow Diagram for Expansion of 60,000 m³/day at Kaolieo Treatment Plant
FLOW DIAGRAM OF EXPANSION OF KAOLIEO WATER TREATMENT PLANT (Case C-2 & T-2)

177.10
176.70
176.30
175.90
175.50
175.10
174.70
174.30
173.90
173.50
173.10
172.70
172.30
171.90
171.50
171.10
170.70
170.30
169.90
169.50
169.10
168.70
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166.30
165.90
165.50
165.10
164.70
164.30
163.90

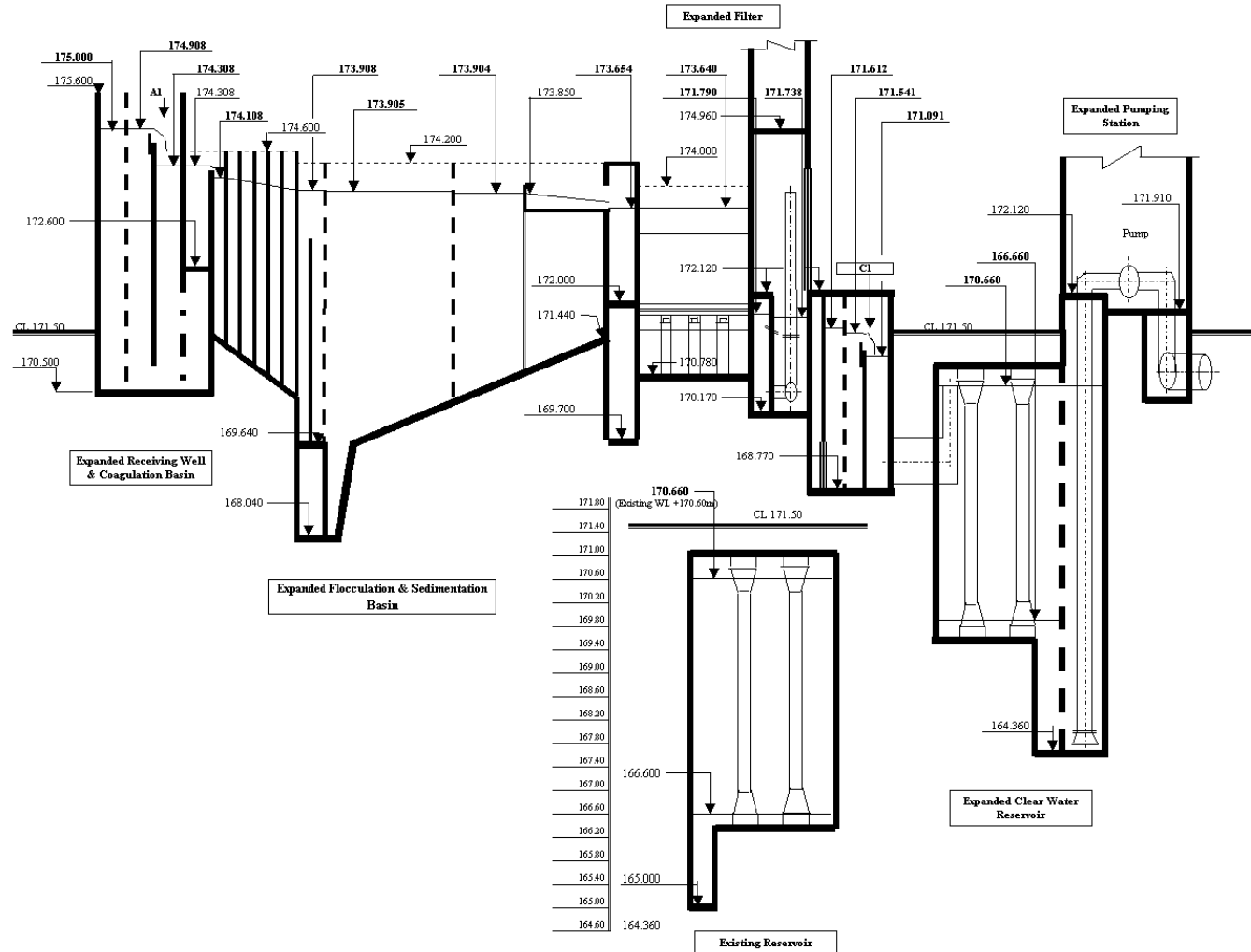
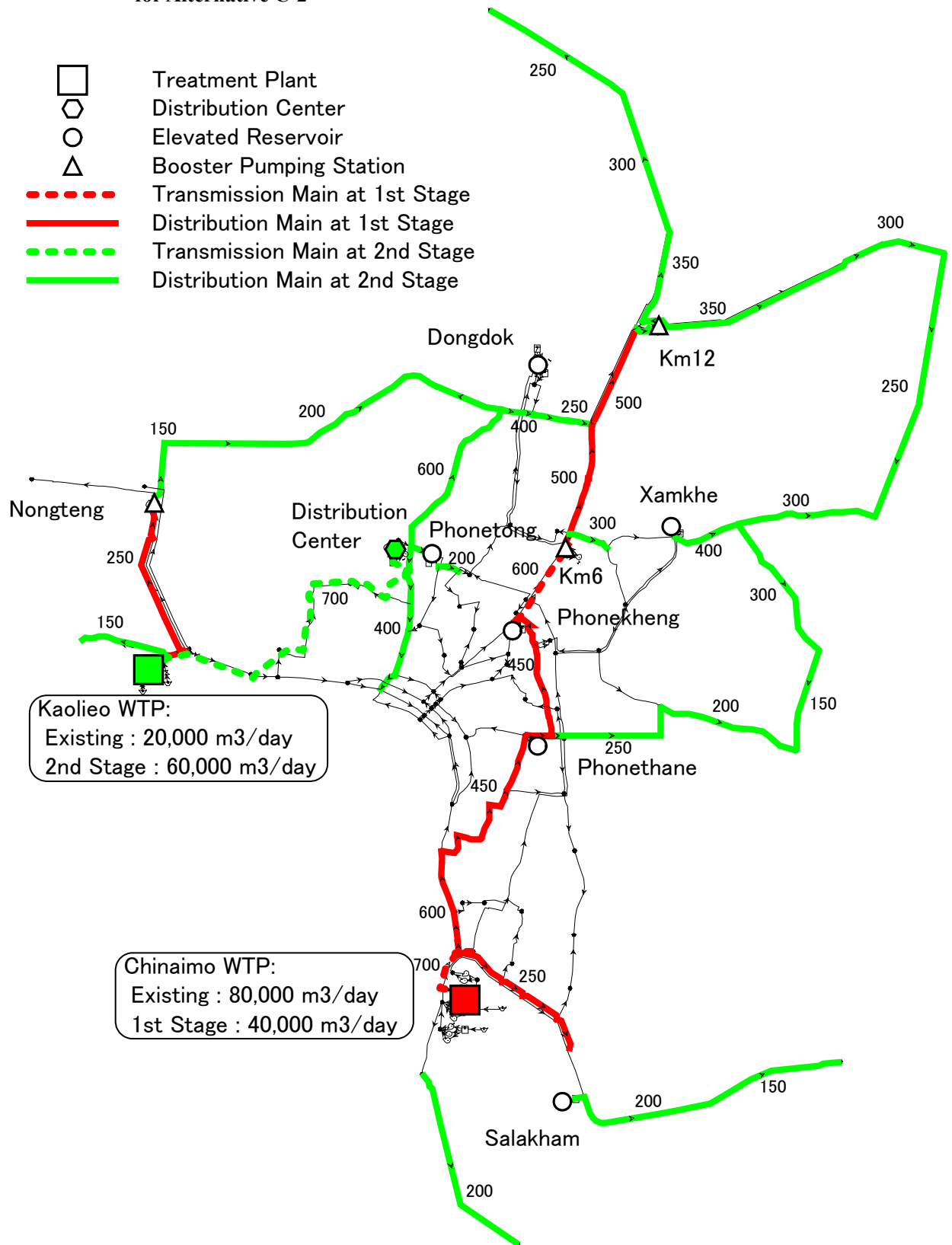


Figure 19 Clear Water Transmission and Distribution Trunk Mains Required for Alternative C-2



3) Costs (Construction, O/M)

Based on the results of facility planning for alternative C-2, preliminary cost estimates have been conducted for the alternative comparison. The results of the cost estimates are shown on Table 5 in United State Dollars.

Table 5 Preliminary Cost Estimates for Alternative C-2

		(x 1,000 US\$)		
Alternative C-2		Total	Foreign	Local
1. Construction Cost		59,789	41,817	17,972
1.1	Treatment Plants	22,209	14,257	7,952
	Expansion of Kaolieo T.P.	13,427	8,693	4,734
	Expansion of Chinaimo T.P.	8,782	5,564	3,218
1.2	Clear Water Transmission Pipelines	7,447	6,137	1,310
	For the 1st Stage	409	337	72
	For the 2nd Stage	7,038	5,800	1,238
1.3	Distribution Center	4,376	2,984	1,392
	For the 1st Stage	-	-	-
	For the 2nd Stage	4,376	2,984	1,392
1.4	Booster Pump Station	1,611	1,321	290
	For the 1st Stage	737	607	130
	For the 2nd Stage	874	714	160
1.5	Distribution Trunk Mains	24,146	17,118	7,028
	For the 1st Stage	9,950	7,590	2,360
	For the 2nd Stage	14,196	9,528	4,668
2. Operation and Maintenance Cost		6,732	1,297	5,435
2.1	Electricity	5,383	-	5,383
	Expanded Kaolieo T.P.	846	-	846
	Expanded Chinaimo T.P.	2,194	-	2,194
	Distribution Center	809	-	809
	Booster Pump Station	1,534	-	1,534
2.2	Chemical Cost	1,297	1,297	-
	Expanded Kaolieo T.P.	402	402	-
	Alum	384	384	-
	Polymer	10	10	-
	Chlorine	8	8	-
	Expanded Chinaimo T.P.	895	895	-
	Alum	620	620	-
	Polymer	18	18	-
	Chlorine	257	257	-
2.3	Salary	52	-	52
	Treatment Plant	52	-	52
	Expanded Kaolieo T.P.	16	-	16
	Expanded Chinaimo T.P.	36	-	36
Total Costs		66,521	43,114	23,407