

Engineers, Designers, Surveyors

COWAN ASSOCIATES, INC.

April 18, 1990

Mr. Mark J. Vasoli, Manager
Dublin Borough
119 Maple Avenue
P.O. Box 52
Dublin, PA 18917

Received: APR 20 1990
Richard S. Cowan, PE, Ret.
James R. Leister, PE/PLS
William D. Kee, PE
Johann F. Szautner, PE/PLS
CC: Borough Officials _____
PC _____ P&R _____ ZB _____
Solic _____ Eng _____ Other **BRUNO MERCURI**
FI **Mark Vasoli**
Cowan Work file

Subject: Sequa Corporation
Proposed Water Treatment Plant (WTP)
Operation and Maintenance (O&M) Cost Estimate
CAI 04502.05

Dear Mr. Vasoli:

As requested, we have estimated the O&M costs for the proposed WTP which is in the planning stage and is intended to treat the volatile organic contamination (VOC) problem in the Borough's groundwater. Since this WTP is in the planning stage, we have made the following assumptions to develop our cost estimate:

1. The Dublin WTP will use a similar air stripping/granular activated carbon (GAC) system as the one Sequa uses in their Prince William County, Virginia WTP.
2. The design flow equals 200,000 gallons per day (gpd) as per conversations with Mr. Bruno Mercuri, Borough Hydrogeologist.
3. Water will be suitable for public consumption following treatment.
4. All Borough residents will be connected to the public water system. Any excess water will be discharged by the WTP to a stream.
5. The design influent concentration of trichloroethylene (TCE), which is the predominant VOC, equals 500 micrograms per liter (ug/L).
6. The design effluent concentration of TCE equals 5 ug/L in accordance with the Maximum Contaminant Level established by the Pennsylvania Department of Environmental Resources (PaDER).
7. Electrical costs will be based on \$0.07 per Kilowatt-hour.
8. The pumps will operate 20 hours per day.
9. The air stripping system will not "foul" which means that chemicals such as sulfuric acid (which is currently being used at the Virginia WTP) will not be required to clean the filter media.

AR 300770

Based on the preceding assumptions, we used the following WTP units as the basis for our cost estimates:

1. Two well pumps
2. Hydropneumatic tank
3. Chlorination prior to air stripper
4. Air stripping tower
5. Effluent transfer pump following air stripper
6. Carbon adsorption units
7. Backwash holding tank
8. Chlorination prior to storage tank
9. Treated water surge tank
10. Booster pump following storage tank

Please note that this system, as per Sequa's request, is modeled after the WTP in Virginia. Additionally, PaDER has informed us that an air quality permit and air treatment are not required for air strippers which discharge less than one pound per hour (lb/hr) of pollutant (TCE) to the air such as our case (assuming 500 mg/L @ 200,000 gpd = 0.03 lb/hr).

The preliminary air stripper and GAC systems will contain the following based on our design criteria:

Air Stripper:

1. Number of units = 1
2. Diameter = 2.5'
3. Height = 35'
4. Blower = 1.5 HP

GAC:

1. Numbers of units = 2
2. Diameter = 7.0'
3. Amount of GAC per unit = 5,000 lbs.
4. Booster pump = 2 HP

The estimated capital costs for the preceding equipment is \$55,000 for the air stripper and \$185,000 for the GAC system. These systems are to remove 99% of the TCE which is an effluent concentration of 5 ug/L.

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The following are our estimated O&M costs for the proposed WTP:

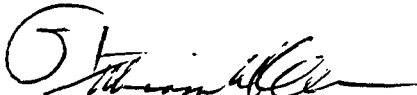
<u>Item</u>	<u>Cost</u>
1. Personnel (part-time WTP Operator salary plus benefits)	\$ 20,000
2. Electrical costs	11,340
3. Chemicals - chlorine (1 mg/L @ 200,000 gpd @ \$0.60/lb)	370
4. GAC replacement (@ \$6/day)	2,190
5. Laboratory analyses (1/month for VOC's @ \$200/test as per DER requirements)	2,400
6. Miscellaneous parts replacement	<u>1,000</u>
Subtotal	\$ 37,300
Engineering (@ 10%)	3,730
Legal (@ 10%)	3,730
Administration (@ 5%)	1,870
Contingencies (@ 20%)	<u>7,460</u>
Total	\$ 54,090 (74¢/1000 gal.)

Additionally, as requested, we have revised our cost estimate for the proposed water distribution system to reflect the additional piping required to connect the wells to the WTP. Enclosed is our revised cost estimate entitled "Cost Estimate, Dublin (Sequa) Water Distribution System Construction", last revised April 18, 1990, and consisting of four sheets; and our plan entitled "Sequa Corporation Portion Key Map, Water Distribution System for Dublin Borough, Bucks County, PA", last revised April 18, 1990.

We trust that the preceding information is helpful.

Very truly yours,

COWAN ASSOCIATES, INC.


William D. Kee, P.E.

WDK:jle

CC: John Philip Diefenderfer, Esq., Borough Solicitor

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Cost Estimate
 Dublin (Sequa)
 Water Distribution System Construction
 CAI 04502.05
 March 1, 1990
 Revised March 22, 1990
 Revised April 18, 1990

<u>Item No.</u>	<u>Description</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Total Price</u>
A.	S. Main St., Rickerts Rd., Mill St. and Elephant Rd. (not including pipe from Deep Run Rd. to Dublin Meadows)			
1.	6" DIP, Class 52, Laying Condition 3 (fire hydrant pipe)	200 L.F.	\$ 35.00	\$ 7,000.00
2.	8" DIP, Class 52, Laying Condition 3	1,800 L.F.	45.00	81,000.00
3.	12" DIP, Class 52, Laying Condition 3	7,880 L.F.	55.00	433,400.00
4.	Gate Valve, 6"	15 Each	500.00	7,500.00
5.	Gate Valve, 8"	7 Each	650.00	4,550.00
6.	Gate Valve, 12"	17 Each	800.00	13,600.00
7.	Fire Hydrants	14 Each	1,700.00	23,800.00
8.	Fittings - Compact Ductile Iron	3,800 Lbs.	3.50	13,300.00
9.	Connection to Exist. Waterlines	3 Each	750.00	2,250.00
10.	Final Trench Restoration - Borough Streets (4½" BCBC, 1½" ID-2)	5,570 L.F.	13.00	72,410.00
11.	Trench Restoration - Main St. (5" BCBC, 2' ID2, 1½" ID-2A)	2,800 L.F.	22.00	61,600.00
12.	Trench Restoration - Elephant Road (5" BCBC, 2" ID-2A)	1,450 L.F.	17.00	24,650.00
13.	Temporary Paving (includes lateral trenches)	10,530 L.F.	3.50	36,855.00
14.	Service Connection - Same side of Road (includes trench restoration)	32 Each	500.00	16,000.00
15.	Service Connection - Opposite side of Road (includes trench restoration)	27 Each*	1,600.00	43,200.00
16.	Protection and Maintenance of Traffic	1 L.S.	10,000.00	10,000.00
17.	Blasting Bond (if required by PennDOT)	1 L.S.	3,000.00	3,000.00
18.	Drainage Culvert Crossing	2 Each	1,500.00	3,000.00
19.	Curb and Sidewalk Replacement with Curb Stops	24 Each	130.00	3,120.00
20.	Full Width Bituminous Overlay - Elephant Road	370 Tons	40.00	14,800.00
21.	Full Width Overlay - Rickerts Road	1,000 Tons	40.00	40,000.00
22.	Full Width Overlay - Mill St.	200 Tons	40.00	8,000.00
	Subtotal			\$ 923,035.00
	Contingency (10%)			92,365.00
	Engineering (Design and Const. Inspec. (15%))			138,500.00
	Legal & Adminis. (3%)			27,700.00
	Total			\$1,181,600.00

*includes 8 houses north of Rickerts Road in Hilltown Township

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B. Elephant Road, Dublin Meadows to Deep Run Road

1.	6" DIP, Class 52, Laying Condition 3 (fire hydrants)	20 L.F.	35.00	700.00
2.	12" DIP, Class 52, Laying Condition 3	1,270 L.F.	55.00	69,850.00
3.	Gate Valves - 6"	2 Each	500.00	1,000.00
4.	Gate Valves - 12"	4 Each	800.00	3,200.00
5.	Fire Hydrants	2 Each	1,700.00	3,400.00
6.	Final Trench Restoration (5" BCBC, 2" ID-2A)	1,270 L.F.	17.00	21,590.00
7.	Service Connections			
	a. Same side of road	9 Each	500.00	4,500.00
	b. Opposite side of road	4 Each	1,600.00	6,400.00
8.	Full Width Bituminous Overlay	280 Tons	40.00	<u>11,200.00</u>
	Subtotal			\$ 121,840.00
	Contingency (10%)			12,160.00
	Engineering (Design and Const. Inspec. (15%))			18,300.00
	Legal & Adminis. (3%)			<u>3,700.00</u>
	Total			\$ 156,000.00

C. Whistlewood Connection

1.	8" DIP, Class 52, Laying Condition 3	500 L.F.	45.00	\$ 22,500.00
2.	Gate Valve, 8"	1 Each	650.00	650.00
3.	Temporary Paving	500 L.F.	3.50	1,750.00
4.	Final Trench Restoration (4½" BCBC, 1½" ID-2)	500 L.F.	13.00	6,500.00
5.	Connect to Existing System (tapping sleeve and valve)	1 Each	1,800.00	<u>1,800.00</u>
	Subtotal			\$ 33,200.00
	Contingency (10%)			3,300.00
	Engineering (Design and Const. Inspec. (15%))			5,000.00
	Legal & Adminis. (3%)			<u>1,000.00</u>
	Total			\$ 42,500.00

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D. Connection Pipe to Existing
Borough System (S. Main/
Elephant Rd. Intersection to
Main on Village Green Lane)

1.	6" DIP, Class 52 (for fire hydrant)	10 L.F.	35.00	350.00
2.	8" DIP, Class 52, Laying Condition 3	250 L.F.	45.00	11,250.00
3.	12" DIP, Class 52, Laying Condition 3	400 L.F.	55.00	22,000.00
4.	Gate Valve, 6" (for fire hydrant)	1 Each	500.00	500.00
5.	Gate Valve, 8"	2 Each	650.00	1,300.00
6.	Gate Valve, 12"	2 Each	800.00	1,600.00
7.	Fire Hydrants	1 Each	1,700.00	1,700.00
8.	Fittings - Compact Ductile Iron	315 Lbs.	3.50	1,103.00
9.	Connection to Exist. Waterlines	1 Each	750.00	750.00
10.	Final Trench Restoration - Borough Streets (4½" BCBC, 1½" ID-2A)	250 L.F.	13.00	3,250.00
11.	Final Trench Restoration - State Hwy. (5" BCBC, 2" ID-2, 1½" ID-2A)	400 L.F.	22.00	8,800.00
12.	Temporary Paving	650 L.F.	3.50	2,275.00
13.	Protection and Maintenance of Traffic	1 L.S.	2,600.00	2,600.00
14.	Curb and Sidewalk Replacement with Curb Stops	7 Each	130.00	910.00
15.	Full Width Overlay of Village Green Lane	55 Tons	40.00	<u>2,200.00</u>

Subtotal \$ 60,588.00

Contingency (10%) 6,112.00

Engineering (Design and

Const. Inspec. (15%) 9,100.00

Legal & Adminis. (3%) 1,800.00

Total \$ 77,600.00

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E. Production/Recovery Wells
(Location East of Shopping
Center - Connect to Waterline
on Elephant Road)

	<u>Well 1 PR.</u>	<u>Well 2 PR</u>	<u>Total</u>
1. Land for Well Site (1 Acre plus Access Strip) 1.4 Acres	\$ 70,000	\$ 70,000	\$ 140,000
2. Pump House (a) Mechanical	120,000	120,000	240,000
(b) Building	20,000	20,000	40,000
(c) Electrical	32,000	27,000	59,000
3. Well	18,000	20,000	38,000
4. Air Stripper/Granular Activated Carbon System	--	240,000	240,000
5. Piping: (a) Connect to Distribution System	--	12,100	12,100
(b) PR 1 to PR 2	36,000	--	36,000
(c) Rosanelli Well to PR 1	51,500	--	51,500
6. Rights-of-way for Piping	<u>13,800</u>	<u>--</u>	<u>13,800</u>
Subtotal	\$361,300	\$509,100	\$ 870,400
7. Contingencies (@ 10%)	36,100	50,900	87,000
8. Geologist (@ 10%)	36,100	50,900	87,000
9. Engineering (@ 10%)	36,100	50,900	87,000
10. Legal and Administrative (@ 10%)	<u>36,100</u>	<u>50,900</u>	<u>87,000</u>
Total	\$505,700	\$712,700	\$1,218,400

F. Water Services (per service)

1. 3/4 copper tubing curb stop to house Average distance 100 feet	\$ 500.00
2. Meter Setting (pressure relief valve, check valve, bypass)	150.00
3. Lawn Restoration 100' x 8'	<u>380.00</u>
	\$ 1,030.00

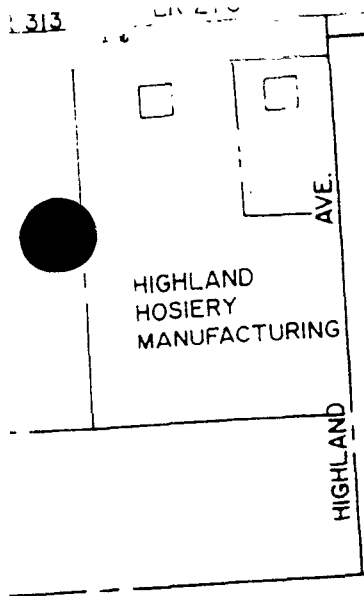
Therefore:

Recommended Service Connections Item A - 59 x \$1030	\$ 60,770
Recommended Service Connections Item B - 13 x \$1030	<u>13,390</u>
Subtotal	\$ 74,160
Contingencies (25%)	<u>18,540</u>
Total	\$ 92,700

Grand Total

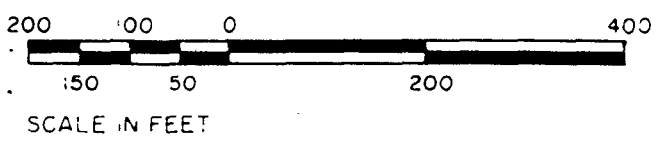
\$2,768,800

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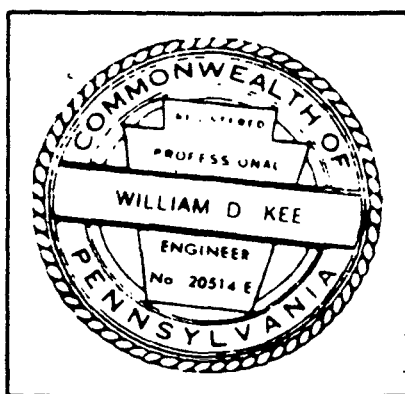


- PROPERTY WITH CONTAMINATED WELL.
- PROPERTY WITH WELL IN DANGER OF CONTAMINATION FROM T.C.E. PLUME.
- BCM MONITORING WELL.
- G & M MONITORING WELL.

- PROPOSED WATER LINES & SIZES BY SEQUA
- 12" PROPOSED WATERLINES & SIZES
- PROPOSED WATER VALVES
- WATER VALVES BY OTHERS
- PROPOSED FIRE HYDRANTS



NO	DATE	REVISIONS	BY	CHK
2	4-18-90	Added well interconnect piping	TJK	
1	3/22/90	ADDED P2 WELLS, HILLTOWN HOUSES, TEST WELLS, CONTAMINATED WELLS, ENDANGERED WELLS.	JAC	WDK



SEQUA CORPORATION PORTION

KEY MAP

WATER DISTRIBUTION SYSTEM

FOR
DUBLIN BOROUGH
BUCKS COUNTY, PA.

DRAWN BY DDR	SURVEY CHK BY
FINAL CHK BY	PROJECT ENGINEER
DATE 2-28-90	SCALE 1"=200'



ENGINEERS, DESIGNERS, SURVEYORS
 120 PENN-AM DRIVE P.O. BOX 949
 QUAKERTOWN, PENNSYLVANIA 18951
 215 536 7075

DWC NO	1
OF ONE	
JOB NO	04500205

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