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TABLE III-1**FIRST ZONE WATER STORAGE STORAGE CHARACTERISTICS**

TANK DESIGNATION	TYPE OF TANK	OVER FLOW ELEVATION (ft above msl)	MINIMUM USABLE ELEVATION (ft above msl)	TANK RANGE HEAD (feet)	TANK DIAMETER (feet)	USABLE STORAGE (mg)
Joppa	Ground	233.0	211.0	22.0	110	1.5
Magnolia	Standpipe	233.0	208.0	25.0	55	0.4
Otter Point	Elevated	233.0	211.0	22.0	N/A	0.3
Joppatowne	Elevated	233.0	204.4	28.6	N/A	0.1
Stepney	Elevated	233.0	200.5	32.5	N/A	0.3
Trimble (Future)	Elevated	233.0	200.5	32.5	N/A	2.0
Swan Creek (Future)	Elevated	233.0	200.5	32.5	72	1.0

Notes:

- 1) Unless otherwise indicated, all minimum elevations based upon EPA model elevations.
- 2) Magnolia Tank design capacity based upon a minimum elevation of 211.0 feet above msl.

TABLE IV-1

**SUMMARY OF FIRST ZONE
AVERAGE AND MAXIMUM DAY DEMANDS**

	Zone 1A		Zone 1B		Zones 1A And 1B	
Design Year	Average Day Demand With Point Demand (MGD)	Maximum Day Demand With Point Demand (MGD)	Average Day Demand With Point Demand (MGD)	Maximum Day Demand With Point Demand (MGD)	Total First Zone Average Day Demand (MGD)	Total First Zone Maximum Day Demand (MGD)
2005	3.11	3.61	7.15	10.37	10.26	13.98
2010	3.25	3.81	8.05	11.67	11.30	15.48
2015	3.37	3.99	8.81	12.77	12.18	16.76
2020	3.63	4.36	10.47	15.18	14.10	19.54
2025	3.99	4.89	12.77	18.52	16.76	23.41

Note: There are no point demands within Subzone 1B.

TABLE IV-2

**SUMMARY OF TOTAL HARFORD COUNTY
AVERAGE AND MAXIMUM DAY DEMANDS**

	Zone 1		Zones 2, 3 and 4		Totals	
Design Year	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Total County Average Day Demand (MGD)	Total County Maximum Day Demand (MGD)
2005	10.3	14.0	6.0	9.4	16.3	23.4
2010	11.3	15.5	6.8	10.3	18.1	25.7
2015	12.2	16.8	7.6	11.2	19.8	28.0
2020	14.1	19.5	9.4	13.7	23.5	33.3
2025	16.8	23.4	10.3	14.9	27.0	38.3

TABLE IV-3

GENERAL HYDRAULIC DESIGN PARAMETERS

The following hydraulic design parameters have been employed as guidelines in the evaluation of modeling results and in the development of recommended system improvements:

Maximum Allowable Pipeline Velocity (ft per sec)	System Pressures During Non-Fire Flow Events		Hydrant Pressures at Point of Fire Flow
	Minimum Allowable (psi)	Maximum Allowable (psi)	Minimum Allowable (psi)
6	28	120	20

TABLE IV-4

GENERAL DESIGN GUIDELINES

Harford County requires that the following general design guidelines be followed in the development of the First Zone Water Study:

- 1. Where possible, pipeline alignments should generally follow roadway alignments within the public right of way. With regard to either State Highway or Railroad rights of way, pipelines should parallel these rights of way in easements located outside of the State Highway or Railroad rights of way.**

- 2. Siting of proposed water storage facilities should take into account both the ease and cost of site acquisition as well as distribution system hydraulic considerations. County Government and Board of Education sites are to receive the highest priorities.**

- 3. With respect to pumping station improvements, consideration should be given to employing ITT-Gould pumps because of their compatibility with the County's existing mechanical equipment.**

TABLE IV-5**FIRE FLOW DESIGN PARAMETERS**

Fire Flow Designation	Zone	Fire Flow Name	Fire Flow Demand (gpm)
1	1A	Aberdeen Interconnection "G"	2800
2	1A	Roye Williams Elementary School	1500
3	1B	Route 40 & Route 152	3500
4	1B	Woodbridge	1500
5	1B	Hanson Road Near Harford Square	1500
6	1B	Woodsdale	1500
7	1B	Washington Court	1500
8	1B	End of Rumsey Island	1500
9	1B	Trimble Road @ The Gap	2500
10	1B	Riverside Industrial Park	3500
11	1B	West Aberdeen Booster Station	1500
12	1B	Route 7 & Route 152	1500

Note: For hydraulic modeling purposes, all fire flow tests are for a duration of 2 hours.

TABLE V-1
ANALYSIS OF
SUBZONE 1A WATER STORAGE REQUIREMENTS

Design Year	Maximum Day Demand Without Point Demand (MGD)	Equalization Storage 20% of Max Day (MG)	Fireflow Storage Requirements 2800 GPM x 120 Min. (MG)	Total Storage Requirements (MG)	Total Planned Usable Storage (MG)
2005	1.61	0.32	0.34	0.66	0.30
2010	1.81	0.36	0.34	0.70	1.00
2015	1.99	0.40	0.34	0.74	1.00
2020	2.36	0.47	0.34	0.81	1.00
2025	2.89	0.58	0.34	0.92	1.00

Revised 3-06-08, FHD

TABLE V-2
ANALYSIS OF
SUBZONE 1B WATER STORAGE REQUIREMENTS

Design Year	Maximum Day Demand Without Point Demand (MGD)	Equalization Storage 20% of Max Day (MG)	Fireflow Storage Requirements 3500 GPM x 120 Min. (MG)	Total Storage Requirements (MG)	Total Planned Usable Storage (MG)
2005	10.37	2.07	0.42	2.49	2.30
2010	11.67	2.33	0.42	2.75	2.30
2015	12.77	2.55	0.42	2.97	4.20
2020	15.18	3.04	0.42	3.46	4.20
2025	18.52	3.70	0.42	4.12	4.20

Note: Assumes Joppatowne Tank will be decommissioned in Year 2015.

TABLE V-3
ANALYSIS OF
FIRST ZONE WATER STORAGE REQUIREMENTS

Design Year	Maximum Day Demand Without Point Demand (MGD)	Equalization Storage 20% of Max Day (MG)	Fireflow Storage Requirements 3500 GPM x 120 Min. (MG)	Total Storage Requirements (MG)	Total Planned Usable Storage (MG)
2005	11.98	2.40	0.42	2.82	2.60
2010	13.48	2.70	0.42	3.12	3.60
2015	14.76	2.95	0.42	3.37	5.60
2020	17.54	3.51	0.42	3.93	5.60
2025	21.41	4.28	0.42	4.70	5.60

Note: Assumes Stepney Tank, which is in service in 2005, will be decommissioned by Year 2010. Also assumes Joppatowne Tank will be decommissioned in Year 2015.

TABLE V-4

COMPARISON OF SUBZONE 1A
MAXIMUM DAY DEMANDS AND PLANNED SAFE PUMPING CAPACITY

Design Year	Maximum Day Demand With Point Demand (MGD)	Abingdon WTP Planned Safe Pumping Capacity (MGD)	Havre de Grace WTP Planned Safe Pumping Capacity (MGD)	Perryman WTP Planned Safe Pumping Capacity (MGD)	Total Zone 1A Planned Safe Pumping Capacity (MGD)
2005	3.61	0	5.50	0	5.50
2010	3.81	0	5.50	0	5.50
2015	3.99	0	5.50	0	5.50
2020	4.36	0	5.50	0	5.50
2025	4.89	0	5.50	0	5.50

Note: Except for emergency conditions, the hydraulic modeling analyses in this study assume Subzones 1A and 1B are operated as independent zones. Thus under these assumptions, only the Havre De Grace Plant will serve Subzone 1A under normal operating conditions.

TABLE V-5

COMPARISON OF SUBZONE 1B
MAXIMUM DAY DEMANDS AND PLANNED SAFE PUMPING CAPACITY

Design Year	Maximum Day Demand With Point Demand (MGD)	Abingdon WTP Planned Safe Pumping Capacity (MGD)	Havre de Grace WTP Planned Safe Pumping Capacity (MGD)	Perryman WTP Planned Safe Pumping Capacity (MGD)	Total Zone 1B Planned Safe Pumping Capacity (MGD)
2005	10.37	5.04	0	2.93	7.97
2010	11.67	10.95	0	2.93	13.88
2015	12.77	11.53	0	2.93	14.46
2020	15.18	14.27	0	2.93	17.20
2025	18.52	14.27	0	2.93	17.20

Note: Except for emergency conditions, the hydraulic modeling analyses in this study assume Subzones 1A and 1B are operated as independent zones. Thus under these assumptions, only the Abingdon and Perryman Plants will serve Subzone 1B under normal operating conditions.

TABLE V-6

**COMPARISON OF FIRST ZONE
MAXIMUM DAY DEMANDS AND PLANNED SAFE PUMPING CAPACITY**

Design Year	Maximum Day Demand With Point Demand (MGD)	Abingdon WTP Planned Safe Pumping Capacity (MGD)	Havre de Grace WTP Planned Safe Pumping Capacity (MGD)	Perryman WTP Planned Safe Pumping Capacity (MGD)	Total First Zone Planned Safe Pumping Capacity (MGD)
2005	13.98	5.04	5.5	2.93	13.47
2010	15.48	10.95	5.5	2.93	19.38
2015	16.76	11.53	5.5	2.93	19.96
2020	19.54	14.27	5.5	2.93	22.70
2025	23.41	14.27	5.5	2.93	22.70

Note: Except for emergency conditions, the hydraulic modeling analyses in this study assume Subzones 1A and 1B are operated as independent zones. Thus under these assumptions, only the Havre De Grace Plant will serve Subzone 1A and only the Abingdon and Perryman Plants will serve Subzone 1B under normal operating conditions. As may required, all three plants are available to serve the combined Subzones 1A and 1B, i.e., the First Zone.

TABLE V-7**RECOMMENDED CAPITAL IMPROVEMENT PROGRAM****2010 ADDITIONS & UPGRADES**

PROPOSED PROJECTS	PROJECT DESCRIPTION	ESTIMATED PROJECT COST
1- 36", 30" & 24" Abingdon Road Transmission Main	850 LF 36" parallel transmission main; 2,350 LF 30" replacement main; 4,450 LF 24" parallel transmission main from I-95 to Rte 40	\$ 6,430,000
2- Oak Grove Booster Station	Developer facility	
3- 1-MG Swan Harbor Tank, 16" Transmission Main	1-MG Elevated Tank, 6,000 LF 16" transmission main	\$ 7,220,000
4- 16" Route 40 Transmission Main	20,400 LF 16" parallel transmission main, Route 40 from Swan Harbor tank to Philadelphia Rd	\$ 9,920,000
	SUBTOTAL	\$ 23,570,000

2015 ADDITIONS & UPGRADES

PROPOSED PROJECTS	PROJECT DESCRIPTION	ESTIMATED PROJECT COST
5- 2-MG Trimble Road Elevated Storage Tank, 16" Transmission Main	2 MG elevated tank ; 1,800 LF 16" transmission main	\$ 7,890,000
6- 12" Route 40 Transmission Main	1,250 LF 12" parallel transmission main, Route 40 from Edgewood Rd	\$ 570,000
7- 12" Route 7 Transmission Main	2,000 LF 12" transmission main from Edgewood Road to Fashion Way	\$ 910,000
8- Magnolia Booster Station Upgrade	Hydro-pneumatic tank; building addition; upgrade telemetry; convert constant speed motors to VFDs	\$ 800,000

2015 ADDITIONS & UPGRADES (CONTINUED)

PROPOSED PROJECTS	PROJECT DESCRIPTION	ESTIMATED PROJECT COST
9- 20" Route 7 Transmission Main	3,800 LF 20" transmission main paralell to existing main Abingdon Rd and Harford Town Rd	\$ 2,720,000
10- 16" Route 7 Transmission Main	6,100 LF 16" transmission main, Harford Town Road to Route 543	\$ 3,610,000
11- 16" Route 7 Transmission Main	250 LF 16" transmission main, SW of Mountain Road	\$ 150,000
	SUBTOTAL	\$ 16,650,000

2020 ADDITIONS & UPGRADES

PROPOSED PROJECTS	PROJECT DESCRIPTION	ESTIMATED PROJECT COST
12- 12" Route 7 & Clayton Road Transmission Main	7,500 LF 12" transmission main from Fashion Way to Clayton Rd to Rte 40	\$ 4,150,000
	SUBTOTAL	\$ 4,150,000

	CAPITAL IMPROVEMENT TOTAL	\$ 44,370,000
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Note: Project costs include estimated construction costs at August 2007 prices; a 20% contingency allowance for construction; engineering, construction phase services, administrative costs, and right of way costs at 35% of the total construction cost; and a 10% contingency allowance for the aggregate of the aforementioned non-construction costs.

TABLE VI-1
OTTER POINT CREEK 2007 WATER QUALITY SUMMARY

Parameter	Range	Comments
Dissolved Oxygen	2 to 18 mg/L; Avg = 10 mg/L	DO varied significantly during the summer months
Salinity	0.1 to 4 ppt	Salinity was very low from Jan to July (< 0.2 ppt). It increased significantly during Aug to Dec.
Temperature	32 to 90 degrees F	Water temperature was close to 32 F during winter and peaked during the summer months
pH	7 to 10.5	pH was between 7 and 9 (except during July/Aug when it went up to 10.5)
Turbidity	< 5 to 900 NTU	Average turbidity was less than 20 NTU. Significant excursions up to 900 NTU during Mar, Apr, July, Oct and Nov.
Total Chlorophyll	< 2 to 70 ug/L	Chlorophyll peaked during Apr-Jun and Oct-Dec
Water Depth	1 to 8 ft	Depth was between 1 to 2 ft, except for one day in Dec when it peaked at 8 ft.

TABLE VI-2
SALINITY CLASSIFICATION

Salinity Range	Classification	Comments
< 0.5 ppt	Fresh water	Fresh water has a salt concentration less than 0.5 parts per thousand
0.5 to 35 ppt	Brackish water	Brackish water is usually a mixture of fresh water and salt (sea) water. It is usually found in estuaries and bays where the river meets the sea/ocean.
35 to 50 ppt	Saline water	The average sea/ocean water has a salinity of 35 to 40 ppt
> 50 ppt	Brine	Brine has a very high salt concentration

TABLE VI-3**CONCEPTUAL COST ESTIMATE FOR A NEW 20 MGD DESALINATION WATER PLANT**

Item	Description	Quantity	Unit	Unit Price	Item Price
1	Preliminary Engineering and Alternative Intake Study	1	LS	\$1,500,000	\$1,500,000
2	Geotechnical and Hydrogeologic Investigations	1	LS	\$150,000	\$150,000
3	Phase 1 Environmental Audit	1	LS	\$100,000	\$100,000
4	Conventional Pre-Treatment	30.0	mgd	\$5,000,000	\$150,000,000
5	Brackish RO Treatment	20.0	mgd	\$3,000,000	\$60,000,000
6	30 mgd Raw Water Pump Station and Intake	1	LS	\$13,500,000	\$13,500,000
7	36" RW Pipe to Intake	500	LF	\$2,700	\$1,350,000
8	18" RO Concentrate Discharge Pipe	16,000	LF	\$300	\$4,800,000
9	20 mgd Finished Water Pump Station	1	LS	\$4,300,000	\$4,300,000
SUB-TOTAL					\$235,700,000
Engineering, Legal and Administrative (20 percent)					\$47,140,000
Contingency (30 percent)					\$70,710,000
TOTAL					\$354,000,000

TABLE VI-4
PROPOSED DESALINATION WTP -
CONCEPTUAL COST ESTIMATES ASSUMPTIONS

1. All costs are as January 2008 costs
2. The unit capital cost for conventional pre-treatment was assumed to be \$5.0 Million per mgd of capacity
3. The unit capital cost for low-concentration brackish RO membrane treatment was assumed to be \$3.0 Million per mgd of capacity
4. The brackish RO treatment was designed for a flow recovery of 70 percent. Hence, the conventional pre-treatment plant was designed for 1.5 times the capacity of the brackish RO treatment plant (and includes 5 percent for filter backwashing and in-plant usage).
5. A preliminary study cost of \$1.5 Million was included for both plant capacities. This cost includes pilot-scale testing and the feasibility/location of the raw water intake or other alternatives. The pilot testing cost is based on 6 months of testing at the proposed site.
6. Costs for site-specific geotechnical and hydrogeologic studies were estimated at \$150,000 to investigate the proposed plant site, and river bed and bank conditions for the future intake
7. Cost for a Phase 1 Environmental Audit of the proposed site was estimated at \$100,000
8. The Raw Water Pump Station (RWPS) was designed for the capacity of the conventional pre-treatment plant; and the Finished Water Pump Station (FWPS) was designed for the capacity of the brackish RO treatment plant.

Conceptual costs for the RWPS and the FWPS were based on cost curves developed by Sanks¹ and extrapolated to January 2008 dollars.

9. The raw water pipe cost assumes a passive intake in Bush River (approximately 500 ft into the river). The unit cost for raw water pipe installed in the River was estimated at \$75 per diameter inch per linear foot (equal to \$1,800 per linear foot for a 24-inch diameter pipe, and \$2,700 per linear foot for a 36-inch diameter pipe). Since the Bush River is very shallow near the proposed location, the actual intake location and design may be quite different. This cost estimate does not account for an alternate intake location and design. Raw water intake permitting costs are not included in this cost estimate.
10. It was assumed that the RO concentrate will be blended with effluent from the Sod Run WWTP (approximately 3 miles) and discharged to Chesapeake Bay. Since there are protected wetlands between the proposed desalination water plant site and the Sod Run WWTP discharge, directional drilling may be needed to install the RO concentrate pipe. The unit cost of directional drilling is estimated at \$12.50 per diameter inch per linear foot (equal to \$225 per linear feet for an 18-inch diameter pipe, and \$300 per linear feet for a 24-inch diameter pipe). Other waste streams from the plant site will be discharged to the County sewer system. Costs for a RO concentrate discharge pump station (if required) are not included. Costs for obtaining a NPDES Permit are not included. Costs for looking at other RO concentrate disposal options and associated permitting costs are not included.
11. A 20 percent engineering, legal and administrative cost was included
12. A 30 percent contingency cost was included
13. Cost escalation to the probable date of construction was not included
14. Cost for finished water mains was not included

¹ Pump Station Design, R.L. Sanks, Editor-in-Chief, Butterworth Publishers, 1989

TABLE VI-5

PRESENT WORTH TABULATION

ALTERNATIVE	2008 Present Worth		
<p>I-A</p> <hr/> <p>Project Cost \$78,020,000 O & M \$19,500,000</p> <p>SUB-TOTAL \$97,520,000</p> <p>Additional Cost</p> <p>Connection Charge \$180,000 City Use Fee \$2,300,000 SRBC- Consumptive Fee \$5,300,000</p> <p>SUB-TOTAL \$7,780,000</p> <p>I-A TOTAL \$105,300,000</p>			
<p>I-B</p> <hr/> <p>Project Cost \$78,020,000 O & M \$12,800,000</p> <p>SUB-TOTAL \$90,820,000</p> <p>Additional Cost</p> <p>Connection Charge \$180,000 City Use Fee \$1,500,000 SRBC- Consumptive Fee \$3,500,000</p> <p>SUB-TOTAL \$5,180,000</p> <p>I-B TOTAL \$96,000,000</p>			
<p>II-A</p> <hr/> <p>Project Cost \$392,000,000 O & M \$41,000,000</p> <p>SUB-TOTAL \$433,000,000</p> <p>II-A TOTAL \$433,000,000</p>			
<p>II-B</p> <hr/> <p>Project Cost \$392,000,000 O & M \$27,000,000</p> <p>SUB-TOTAL \$419,000,000</p> <p>II-B TOTAL \$419,000,000</p>			

**TABLE VI-6
SOURCE ALTERNATIVES CRITERIA AND RANKING**

Criteria	Weight	Alternative Rating		Weighted Rating		Comments
		Options IA and IB	Options IIA and IIB	Options IA and IB	Options IIA and IIB	
Constructability	2	3	2	6	4	Abingdon plant construction involves fewer unit processes
Environmental Impacts	2	2	1	4	2	Site for expanded Abingdon WTP already in use as WTP
Land Acquisition	2	3	2	6	4	County may already own land required for Abingdon WTP expansion
Capital Costs	3	2	1	6	3	Capital cost of Abingdon WTP expansion much lower than desalination WTP
Operation and Maintenance Costs	3	2	1	6	3	O&M cost of Abingdon WTP expansion much lower than desalination WTP
Feasibility	2	3	2	6	4	Abingdon WTP expansion more feasible than desalination WTP
Permitting Issues	2	3	2	6	4	Fewer permits required for Abingdon WTP expansion than desalination WTP alternative
Public Acceptance	3	3	1	9	3	Public would probably favor Susquehanna R. water over Bush R. because of proximity to Sod Run WWTP discharge
Hydraulics	3	3	2	9	6	Extent of new/upgraded transmission mains required for Abingdon WTP much less than desalination WTP alternative
Raw Water Quality	2	3	1	6	2	Susquehanna R. water quality probably more consistent and easier to treat than Bush R./Church Creek
Safety	2	3	2	6	4	Bush R./Church Creek water supply more prone to contamination than Susquehanna R.
Reliability	3	3	2	9	6	Abingdon WTP less likely to experience equipment problems and County staff have operating experience
Time to Implement	1	2	1	2	1	Desalination plant requires extensive pilot testing
		Overall Weighted Rating		6.2	3.5	

Options:

IA is Big Inch source, 4.5 mgd to Aberdeen APG and 4.0 mgd to Edgewood APG

IB is Big Inch source, 4.0 mgd to Edgewood APG

IIA is Desalination WTP, 4.5 mgd to Aberdeen APG and 4.0 mgd to Edgewood APG

IIB is Desalination WTP, 4.0 mgd to Edgewood APG

Rating: Scale of 0-3, with 3 being excellent and 0 being undesirable or poor

Weighting: Scale of 1-3, with 3 being most important, 1 being least important

Overall Weighted Rating: Average of weighted ratings for each of the criteria

TABLE VII- 1

DESCRIPTION OF CONVEYANCE IMPROVEMENTS
ALTERNATIVE 1A - ABINGDON SUPPLY - 8.5 MGD BRAC DEMAND

ITEM NO.	PROJECT NAME	REMARKS	MAIN SIZE, INCHES	LINEAR FEET
1	36" Abingdon Road Transmission Main	Upgrade 30" to 36"	36	2,060
2	16" Route 7 Transmission Main		16	11,320
3	16" Edgewood Rd Transmission Main		16	3,440
4	24" Route 7 Transmission Main	New	24	9,900
		Upgrade 16" to 24"	24	6,100
		Upgrade 20" to 24"	24	3,800
5	20" Route 7 Transmission Main		20	4,460
6	20" Route 40 Transmission Main	Upgrade	20	23,130
7	16" Connector Transmission Main S. of Route 40		16	4,200
8	16" Route 40 Transmission Main		16	2,810

TABLE VII- 2

DESCRIPTION OF CONVEYANCE IMPROVEMENTS
ALTERNATIVE 1B - ABINGDON SUPPLY- 4.0 MGD BRAC DEMAND

ITEM NO.	PROJECT NAME	REMARKS	MAIN SIZE, INCHES	LINEAR FEET
1	16" Route 7 Transmission Main		16	11,320
2	16" Edgewood Rd Transmission Main		16	3,440

TABLE VII- 3

DESCRIPTION OF CONVEYANCE IMPROVEMENTS
ALTERNATIVE 2A - DESALINATION WTP - 8.5 MGD BRAC DEMAND

ITEM NO.	PROJECT NAME	REMARKS	MAIN SIZE, INCHES	LINEAR FEET
1	16" Route 7 Transmission Main		16	11,320
2	16" Edgewood Rd Transmission Main		16	3,440
3	20" Route 40 Transmission Main	Upgrade	20	15,640
4	20" Connector Transmission Main		20	4,200
5	16" Route 40 Transmission Main		16	2,810
6	20" Perryman Rd Transmission Main		20	7,120
7	16" Spesutia Rd Transmission Main		16	3,010
8	24" Perryman Rd/Canning House Rd Transmission Main		24	11,360
9	36" Connector to Plant		36	250
10	24" Canning House Rd/Mitchell Dr Transmission Main		24	4,020
11	24" Bush River Crossing		24	4,000
12	24" Long Bar Harbor Rd Transmission Main		24	3,280
13	20" Rt 40 Transmission Main		20	4,790

TABLE VII- 4**DESCRIPTION OF CONVEYANCE IMPROVEMENTS**
ALTERNATIVE 2B - ABINGDON SUPPLY- 4.0 MGD BRAC DEMAND

ITEM NO.	PROJECT NAME	REMARKS	MAIN SIZE, INCHES	LINEAR FEET
1	16" Route 7 Transmission Main		16	11,320
2	16" Edgewood Rd Transmission Main		16	3,440
3	12" Spesutia Rd Transmission Main		12	3,010
4	16" Perryman Rd Transmission Main		16	9,200
5	20" Canning House Rd Transmission Main		20	2,160
6	36" Connector to Plant		36	250
7	24" Canning House Rd/Mitchell Dr Transmission Main		24	4,020
8	24" Bush River Crossing		24	4,000
9	24" Long Bar Harbor Rd Transmission Main		24	3,280
10	20" Rt 40 Transmission Main		20	4,790

TABLE VII-5

PROJECT COST DERIVATION - ALTERNATIVE 1A

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED ¹ COSTS @ 35% (\$)	DESIGN & RELATED ¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED ¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
1- 36" Abingdon Road Transmission Main	Upgrade 30" to 36"	214,240	42,848	257,088	89,981	8,998	98,979	356,067
2- 16" Route 7 Transmission Main		3,060,928	612,186	3,673,114	1,285,590	128,559	1,414,149	5,087,262
3- 16" Edgewood Rd Transmission Main		930,717	186,143	1,116,860	390,901	39,090	429,991	1,546,851
							SUBTOTAL	6,990,181

TABLE VII-5 (cont.)

PROJECT COST DERIVATION - ALTERNATIVE 1A

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED ¹ COSTS @ 35% (\$)	DESIGN & RELATED ¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED ¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
4 - 24" Route 7 Transmission Main	New Upgrade 16" to 24" Upgrade 20" to 24"	4,724,720	944,944	5,669,664	1,984,382	198,438	2,182,821	7,852,485
5 - 20" Route 7 Transmission Main		1,461,096	292,219	1,753,315	613,660	61,366	675,026	2,428,342
6 - 20" Route 40 Transmission Main	Upgrade 16" to 20"	1,322,750	264,550	1,587,300	555,555	55,556	611,111	2,198,411
7- 16" Connector Transmission Main		1,135,680	227,136	1,362,816	476,986	47,699	524,684	1,887,500
8- 16" Route 40 Transmission Main		759,824	151,965	911,789	319,126	31,913	351,039	1,262,827
							SUBTOTAL	15,629,564
							TOTAL	22,619,745

USE 22,620,000

¹ Related Costs include easements, County project management & construction phase services

TABLE VII-6

PROJECT COST DERIVATION - ALTERNATIVE 1B

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED¹ COSTS @ 35% (\$)	DESIGN & RELATED¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
1- 16" Route 7 Transmission Main		3,060,928	612,186	3,673,114	1,285,590	128,559	1,414,149	5,087,262
2- 16" Edgewood Rd Transmission Main		1,030,224	206,045	1,236,269	432,694	43,269	475,963	1,712,232
							TOTAL	6,799,495
							USE	6,800,000

¹ Related Costs include easements, County project management & construction phase services

TABLE VII-7

PROJECT COST DERIVATION - ALTERNATIVE 2A

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED¹ COSTS @ 35% (\$)	DESIGN & RELATED¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
1- 16" Route 7 Transmission Main		3,060,928	612,186	3,673,114	1,285,590	128,559	1,414,149	5,087,262
2- 16" Edgewood Rd Transmission Main		930,176	186,035	1,116,211	390,674	39,067	429,741	1,545,953
3- 20" Route 40 Transmission Main		894,608	178,922	1,073,530	375,735	37,574	413,309	1,486,838
4 - 20" Connector Transmission Main		1,375,920	275,184	1,651,104	577,886	57,789	635,675	2,286,779
5 - 16" Route 40 Transmission Main		759,824	151,965	911,789	319,126	31,913	351,039	1,262,827
6- 20" Perryman Rd Transmission Main		2,332,512	466,502	2,799,014	979,655	97,966	1,077,621	3,876,635
							SUBTOTAL	15,546,295

TABLE VII-7 (cont.)

PROJECT COST DERIVATION - ALTERNATIVE 2A

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED ¹ COSTS @ 35% (\$)	DESIGN & RELATED ¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED ¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
7- 16" Spesutia Rd Transmission Main		813,904	162,781	976,685	341,840	34,184	376,024	1,352,708
8- 24" Perryman Rd/Canning House Rd Transmission Main		4,371,328	874,266	5,245,594	1,835,958	183,596	2,019,554	7,265,147
9- 36" Connector to WTP		143,000	28,600	171,600	60,060	6,006	66,066	237,666
10- 24" Canning House Rd/Mitchell Dr Transmission Main		1,546,896	309,379	1,856,275	649,696	64,970	714,666	2,570,941
11- 24" Bush River Crossing		4,992,000	998,400	5,990,400	2,096,640	209,664	2,306,304	8,296,704
12- 24" Long Bar Harbor Rd Transmission Main		1,262,144	252,429	1,514,573	530,100	53,010	583,111	2,097,683
13- 20" Rt 40 Transmission Main		1,569,204	313,841	1,883,045	659,066	65,907	724,972	2,608,017
							SUBTOTAL	24,428,867
							TOTAL	39,975,162

USE 39,980,000

¹ Related Costs include easements, County project management & construction phase services

TABLE VII-8

PROJECT COST DERIVATION - ALTERNATIVE 2B

PROPOSED PROJECTS	PROJECT DESCRIPTION	CONSTRUCTION COST IN 2008 (\$)	CONSTRUCTION CONTINGENCY COSTS @ 20% (\$)	TOTAL CONSTRUCTION COST (\$)	DESIGN & RELATED ¹ COSTS @ 35% (\$)	DESIGN & RELATED ¹ COST CONTINGENCY @10% (\$)	TOTAL DESIGN & RELATED ¹ COSTS (\$)	TOTAL PROJECT COST IN 2008 (\$)
	1- 16" Route 7 Transmission Main	3,060,928	612,186	3,673,114	1,285,590	128,559	1,414,149	5,087,262
	2- 16" Edgewood Rd Transmission Main	930,176	186,035	1,116,211	390,674	39,067	429,741	1,545,953
	3- 12" Spesutia Rd Transmission Main	626,080	125,216	751,296	262,954	26,295	289,249	1,040,545
	4- 16" Perryman Rd Transmission Main	2,487,680	497,536	2,985,216	1,044,826	104,483	1,149,308	4,134,524
	5- 20" Canning House Rd Transmission Main	707,616	141,523	849,139	297,199	29,720	326,919	1,176,058
	6- 36" Connector to Plant	143,000	28,600	171,600	60,060	6,006	66,066	237,666
	7 - 24" Canning House Rd /Mitchell Dr Transmission Main	1,546,896	309,379	1,856,275	649,696	64,970	714,666	2,570,941
	8 - 24" Bush River Crossing	4,992,000	998,400	5,990,400	2,096,640	209,664	2,306,304	8,296,704
	9-24" Long Bar Harbor Rd Transmission Main	1,262,144	252,429	1,514,573	530,100	53,010	583,111	2,097,683
	10-20" Rt 40 Transmission Main	1,569,204	313,841	1,883,045	659,066	65,907	724,972	2,608,017
							TOTAL	28,795,353

¹ Related Costs include easements, County project management & construction phase services

USE 28,800,000

TABLE IX-1

**PROVISIONAL COST ALLOCATION FOR 20 MGD ABINGDON WATER SUPPLY
EXPANSION**

	HARFORD COUNTY	BRAC	TOTAL
CONVEYANCE			
I-A	\$44,370,000	\$22,620,000	\$66,990,000
I-B	\$44,370,000	\$6,800,000	\$51,170,000
WATER SOURCE			
I-A			
Project Cost	\$56,070,000	\$41,450,000	\$97,520,000
Connection Charge	\$100,000	\$80,000	\$180,000
I-B			
Project Cost	\$72,660,000	\$18,160,000	\$90,820,000
Connection Charge	\$140,000	\$40,000	\$180,000
TOTALS			
I-A	\$100,540,000	\$64,150,000	\$164,690,000
I-B	\$117,170,000	\$25,000,000	\$142,170,000