

SHARON WATER MANAGEMENT ADVISORY COMMITTEE (WMAC) MEETING MINUTES FOR JULY 29, 2004

Prepared by Paul Lauenstein

Present at meeting:

WMAC Chairman Rory McGregor; WMAC members Jack Sulik, Cliff Towner, Paul Lauenstein, Lealdon Langley, Roger Thibault and Michael Birschbach; DPW Superintendent Eric Hooper, Selectman David Grasfield; citizen Alice Cheyer ; and Wright-Pierce representatives Paul Weisman and Jeff Musich

Summary of Minutes for the 7/29/04 WMAC Meeting

- 1. Approve minutes of the July 1, 2004 meeting (with alterations)**
- 2. Review well pumping data, tank level data, and water test reports**
- 3. Report on fire flow test at Moose Hill**
- 4. Nitrate contamination**
- 5. Update on potential well sites**
- 6. Report from the water conservation subcommittee**
- 7. Peer review of hydraulic model and scope for new Master Plan**
- 8. E-coders for radio meter system**
- 9. Schedule the next meeting for Thursday, August 19 at 7:30 PM**

Detailed Minutes for the 7/29/04 WMAC Meeting

- 1. Approve minutes of the July 1, 2004 meeting (with alterations)**

The July 1 minutes were approved with modifications related to chlorine concentrations by Eric Hooper.

- 2. Review well pumping data, tank level data, and water test reports**

Eric Hooper distributed copies of daily pumping records for the six town wells, as well as graphs of the four water storage tanks, for July 1 through July 24. He explained that the pumping figures reported for Well #3 were incorrect. He said the Y-axis for Well #3 in the SCADA system was 125% of the correct value. He said that for every 4 gallons reported by SCADA, only 3 gallons were actually pumped. He said the problem was discovered and corrected on July 26, but he did not know how long it had been going on. He said he suspected that it might have begun when the SCADA system went down last October, 2003. He said the problem was discovered as a result of the SCADA system prematurely

reaching the daily pumping limit for Well #3 of 380,000 gallons when the pumping rate indicated the 380,000 gallon limit could not have been reached in the elapsed time.

Jack Sulik pointed out that the SCADA system must have been reporting 133% of actual pumping if 4 gallons were being reported for every 3 gallons actually pumped.

Eric Hooper distributed a graph of monthly pumping records for the past several years so WMAC members would have a historical frame of reference for evaluating current pumping records presented at each monthly meeting. He pointed out that pumping in June of 2004 was higher than June of 2003.

Cliff Towner asked why that would be the case given that rainfall was 5.0" in June of 2004, considerably higher than the 2.4" of rainfall in June of 2003.

Eric Hooper replied that average rainfall can be a misleading statistic. He said the timing of the rainfall is important when considering the effect of rainfall on water use.

Paul Lauenstein commented that it poured on the previous morning of Wednesday, July 28, yet many sprinklers in his neighborhood were running that evening from 6:00 until 8:00. He said he didn't need to visit Yellowstone National Park to see predictable geysers like Old Faithful.

Alice Cheyer asked if there were anything the town could do to curb such wasteful lawn watering practices in summer.

Rory McGregor alluded to the water conservation questionnaire being circulated by the water conservation subcommittee and said the WMAC is working on finding solutions to such problems.

Eric Hooper said outdoor watering restrictions have helped reduce average daily water use in summer from 2.6 million gallons per day down to 2 million gallons per day. Even so, the DEP is trying to get towns to limit summer water use to 1.3 times winter use. He estimated Sharon's summer water use to be 1.5 times its winter use, adding that Sharon's daily per capita use is less than the DEP's recommended 65 gpcd.

Lealdon Langley asked why the population figure used to compute gpcd was the general population figure. He said it was not appropriate to include people on private wells in the computation since they do not use town water.

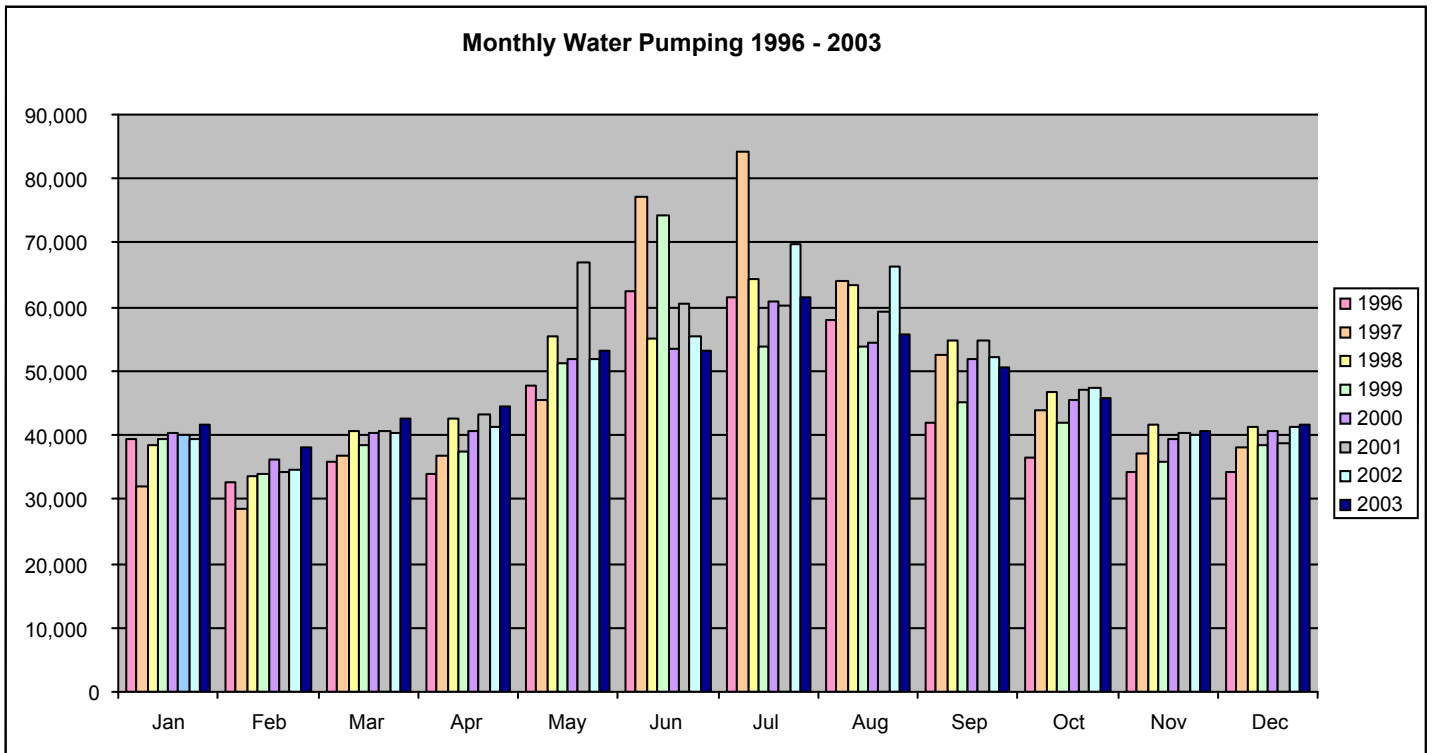
Eric Hooper replied that only a couple percent of Sharon's population who live on Mountain Street and Bay Road were on private wells. He said about 5,500 water bills go out versus about 6,100 trash removal bills, but he pointed out that some condominium complexes that only get one water bill get multiple trash removal bills.

Jack Sulik said he thought there were only about 100 to 120 people on private wells in Sharon.

Rory McGregor requested that Eric Hooper provide the WMAC with the population of people in Sharon on private wells.

Paul Lauenstein handed out a similar graph of historical monthly pumping over the past eight years, and pointed out that the trend of base water consumption in winter is climbing.

Roger Thibault speculated that this might be attributable to more bathrooms in many large new homes.



Lealdon Langley said water use is attributable to the number of inhabitants in a home, and that the number of bedrooms is a commonly used proxy for the number of inhabitants.

Rory McGregor said that Sharon’s population has not increased as much as water consumption, indicating rising per capita use.

Paul Lauenstein pointed out that the town’s average daily water pumping in the Water Department’s monthly report presented to the WMAC in both June and July was understated. For example, the July report said average daily pumping was 1,561 gpd whereas it should have said 2,016 gpd. Eric Hooper explained that in both cases the reported pumping total was for an incomplete month, but the spreadsheet was programmed to divide by the total number of days in the month. He said he did not want to reprogram the spreadsheet with the appropriate number of days for the WMAC report for fear of causing mistakes in the permanent records.

3. Report on fire flow test at Moose Hill

Eric Hooper reported that Cameron Testing tested fire flow at a hydrant located at the Kendall property at 396 Moose Hill Street (elevation 374 feet) on June 16 at 10:30 a.m. He said both static pressure at 18 psi and residual pressure at 15 psi were below the 20 psi needed for fire fighting. He said the hydraulic model predicted a static pressure of 19.5 psi. He said the model does not compensate for the 1.5 feet of extra elevation from ground level to the hydrant nozzle, which would account for part of the difference between predicted versus observed pressure.

Paul Lauenstein pointed out that Cameron Testing's report said the water level in the nearby tanks was 418.8 feet at 10:30 a.m. on June 16. However, the monthly tank graphs for June showed the water level in both the Moose Hill and Upland Road tanks at that time to be 421.5 feet, assuming the maximum Y-axis value to correspond with overflow at 426.8 feet. He said it appeared that the maximum value of the Y-axis must be different from overflow, and requested that the Water Department provide the committee with the elevations that correspond to the numbers on the Y-axes of the tank graphs for future reference.

Paul Lauenstein also pointed out that the measurement of residual pressure was conducted using about 500 gpm of flow. He asked if that would be sufficient to fight a fire in that area.

Eric Hooper replied that if a booster pump were installed to provide enough pressure, 500 gpm would be sufficient to fight a fire at the Kendall property.

Roger Thibault commented that the Kendall complex is significantly higher in elevation than Moose Hill Street. Eric Hooper said that a booster pump would overcome that problem.

4. Nitrate contamination

Eric Hooper reported that results of nitrate testing in 2004 have been consistent with past data.

Paul Lauenstein said he would like to see nitrate data presented to the WMAC from time to time, and offered to update the graphs of average annual nitrate concentrations he presented at the January 22 WMAC meeting.

Lealdon Langley cautioned that average nitrate concentration can be misleading. He said maximum concentration is more significant than average concentration since a short-term spike in nitrate concentration may have little effect on average concentration for the year, but could cause serious health problems.

Michael Birschbach asked if there are any other contaminants with which the WMAC should be concerned.

Jack Sulik called attention to the annual Consumer Confidence Report circulated annually to the entire town that lists a number of contaminants for which the Water Department routinely tests. He said the frequency of testing varies from contaminant to contaminant.

Rory McGregor said nitrates are of special concern because the town's waste water is disposed of by septic systems. The town has already implemented a more frequent sampling cycle because nitrate concentrations at some wells are approaching 5 mg/L. The health limit for nitrates is 10 mg/L.

Roger Thibault said the nitrate data should be readily available in the Water Department's computer archives, and asked that it be reported to the WMAC.

5. Update on potential well sites

Eric Hooper reported that although water quality samples had been taken at the cemetery, it would take two to three more weeks to get the results back from the lab. He said analyses of Fe, Mn, Na, chloride, nitrate, and VOC's had been ordered.

Cliff Towner asked which cemetery well was sampled. Eric Hooper replied that it was the Biko well at the junction of Dedham and Canton Streets. He said the flow at that well is unknown since it is an older well with no flow meter, adding that the samples were taken from a spigot off the well.

Roger Thibault inquired about the diameter and depth of the cemetery well. Eric Hooper said it is approximately 10" in diameter, and estimated that it might be 50 feet deep. He said he thought it was built in the 1950's.

Paul Lauenstein asked what conclusions should be drawn from the January 23, 2004 memorandum regarding future well sites passed out by Eric Hooper at the July 1 WMAC meeting. He said he was surprised to see that the Islamic Center site was reported to have a potential yield of 9 million gallons per day, since Sharon's largest existing well only produces 1 million gallons per day. Eric Hooper replied that the 9 million gallon per day figure pertained to the potential safe yield of the underlying aquifer according to Weston & Sampson.

Eric Hooper reported that Intoccia (the developer) has still not granted access to the Gobbi property for drilling exploratory test wells.

David Grasfield said that at this point there is no time frame for gaining access. He reported that Intoccia had indicated a 30-day time frame for a decision over a month ago.

Paul Lauenstein pointed out that the town's interest in determining the suitability of the Gobbi site for a town well should supercede the developer's interests, and asked at what point the town should invoke eminent domain and force the issue.

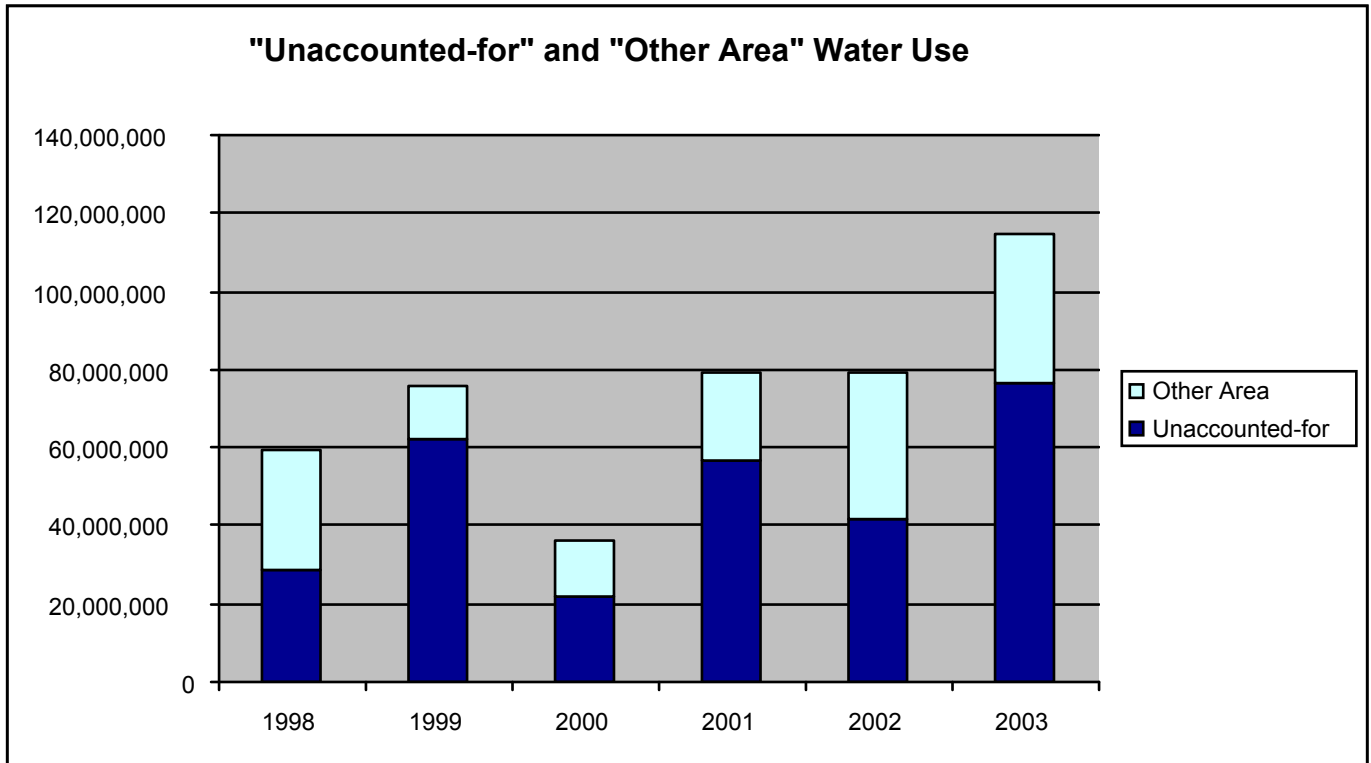
David Grasfield replied that the town also has an interest in influencing the nature of the development that is built on the Gobbi property. He said the willingness of the developer to work with the town could be compromised by forcing the developer to grant access for exploratory test wells against his will. He also pointed out that eminent domain is an appropriate tool for taking ownership of land, not merely for gaining access to land.

Jack Sulik commented that there is a statute that grants the requisite authority to the town to access land for the purpose of well exploration. Lealdon Langley concurred, and agreed to investigate the relevant law and report back to the WMAC at the next meeting.

6. Report from the water conservation subcommittee

Paul Lauenstein reported that the results of the water conservation questionnaire were not yet complete. He said they should be ready in time for the next WMAC meeting.

Paul Lauenstein asked how an intelligent water conservation plan could be developed without an understanding of where the water is going. He then passed out copies of a graph showing Unaccounted-for water plus Other Area water over the past six years. [*Note: "Other Area" is known volume from non-billed uses such as the annual hydrant flushing program, leaks, dirty water flushing (not part of the annual program), water breaks, and station use (for instance during sample collection and other maintenance)*]. He said the total of 115,000,000 gallons represented 20% of the total pumped for the year, and an increase of 45% over previous years. He pointed out that that much water is enough to supply the entire town for almost 2 months in summer. It is enough to replenish the entire 1.5 million gallons of usable storage in Sharon's four water tanks 76 times over.



Paul Lauenstein contrasted the 13.5% of unaccounted for water in 2003 with the 5.9% reported in a 1996 water audit by Amory Engineers, which they said at the time was indicative of a tight system. He added that the average for Other Area water use for the five years from 1998 through 2002 was 24 million gallons, over 14 million gallons less than the 38.4 million gallon figure for 2003.

Paul Lauenstein said the drop in residential water use from 451 million gallons in 2002 to 414 million gallons in 2003 would have resulted in a very significant drop in total pumping if the sum of Unaccounted-for plus Other Area water use had not increased so dramatically.

Paul Lauenstein said Sharon would have a problem applying for supplemental MWRA water unless it could do a better job of accounting for its water use. He reminded the committee that at the previous WMAC meeting, Eric Hooper had explained high Unaccounted-for water in 2003 by saying that Unaccounted-for water use normally fluctuates between high and low in alternate years. Eric Hooper had said that this biannual fluctuation was attributable to the six-month billing cycle. Paul Lauenstein pointed out that if the fluctuations were due to the billing cycle, residential water use, which represents the majority of billable water, should have exhibited the same high-low pattern in alternate years. However, this was not the case. Since 1996 the pattern of residential water use has been: up-down-down-up-down-down-down.

Paul Lauenstein asked the Water Department to explain how Unaccounted-for and Other Area water was used in the past four years and why they were so high in 2003. He passed out a chart and asked Eric Hooper to report back to the WMAC with his best estimates as to the amounts used in the various categories.

**ESTIMATES OF UNACCOUNTED-FOR & OTHER
AREA WATER**

<u>Category</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>
Fire Fighting				
Hydrant Flushing				
Dirty Water Flushing				
Water Main Breaks				
Station Use				
Under Reading Meters				
Other (specify):				

TOTAL

Eric Hooper said the problem with the SCADA records of Well #3 pumping might account for some of the increase in Unaccounted-for water in 2003.

Paul Lauenstein replied that even if reported pumping of 53 million gallons for Well #3 were 4/3 of actual pumping for the entire year in 2003, it would only account for around 13 million gallons of the 115 million gallons of Unaccounted-for plus Other Area water use. That would still leave about 102 million gallons to account for.

Eric Hooper said that MA DEP expects water suppliers to keep their Unaccounted-for water under 10% of the total pumped. In Sharon's case in 2003, that would amount to under 57 million gallons. He said after deducting the discrepancy attributable to the SCADA problem with Well #3, Sharon's Unaccounted-for water might come close to meeting that standard.

7. Peer review of hydraulic model and scope for new Master Plan

Eric Hooper stressed the importance of gaining WMAC members' faith in the hydraulic model as a credible means of analyzing Sharon's water supply system. He said that a peer review of the hydraulic model would help allay some WMAC members' doubts about the accuracy of the hydraulic model upon which the conclusions of the Metcalf & Eddy report are based. He said a peer review of the hydraulic model would validate the inputs of the report, not address the conclusions. It would explore the sensitivity of the analysis to varying assumptions such as fire flow. Eric Hooper explained that he wanted to utilize the model as a resource for making sound decisions, but needed the WMAC to accept the model as a valid analytical tool to do so.

In addition to evaluating the hydraulic model, Eric Hooper told the committee that Wright-Pierce proposed to prepare a scope for updating Sharon's water master plan. He commented that infrastructure improvements recommended in past water master plans were driven by population projections. Limited availability of groundwater, rising cost of imported water, and DEP's reluctance to increase permit limits have dictated a new philosophy. Sharon should try to live within the existing permit limits of 660 MG per year and 3.12 MG per day even though the town will continue to grow.

Lealdon Langley commented that there is still some flexibility in DEP permit limits based on population growth, but agreed that it is getting more difficult to obtain permit increases. He said the DEP standard for the ratio of summer to winter use has been drastically reduced from 2.5 to 1.3.

Eric Hooper said the stressed Ipswich River basin on the North Shore is a worst case scenario in which DEP has imposed tougher standards on communities in an effort to restore summer flow in the river. He added that the Neponset River, which is fed by tributaries originating in Sharon, is also stressed, and will make it difficult or impossible to get further increases in Sharon's permit.

Eric Hooper then introduced Paul Weisman and Jeff Musich of Wright-Pierce, a 50-year-old consulting firm based in Andover with expertise in hydraulic modeling. He said they have never before done any work for Sharon, and they would be looking at the water supply situation with fresh eyes. On the other hand, Paul Weisman lived in Sharon for 25 years and knows the geography of the town first-hand.

Paul Weisman handed out a memorandum addressed to Eric Hooper entitled Hydraulic Model Review and Master Plan Update Scoping. Task 1 is a review of the hydraulic model upon which the conclusions of the recent Metcalf & Eddy report are based, and Task 2 is development of a master plan scope development that would lead to the issue of an RFP to update Sharon's water master plan.

Jeff Musich told the committee that Wright-Pierce retains four full-time modelers who work with hydraulic models for both small towns and major cities. He said they work with industry-standard WaterCad software, the same software used by Sharon. A key question is what fire flow is appropriate for various neighborhoods in Sharon? He said the proposal for Sharon includes sensitivity analysis to see how the system responds to a range of fire flow assumptions.

With respect to the master plan scope development, Jeff Musich said that every community is unique, and suggested that DEP be included in initial discussions of Sharon's 20-year water supply goals. He also suggested that infrastructure regionalization should be considered.

Eric Hooper said Sharon's permit is currently up for renewal, and Duane LeVangie of the DEP is holding his cards close to the vest. He added that although Sharon may be self-sufficient in its water supply, it is not independent of the needs of its neighbors and nearby rivers.

Rory McGregor asked what it would take to satisfy the committee of the validity of the hydraulic model.

Roger Thibault said two steps are involved: first assessing the validity of the model itself and then determining what fire flows are appropriate.

Eric Hooper said that the model would have to be calibrated annually, and that the Water Department is not able to perform the necessary hydrant flow tests.

Paul Weisman emphasized that scoping the water master plan update by an independent consultant such as Wright-Pierce would afford an opportunity for all constituencies to have input and voice their concerns.

Jack Sulik said a presentation to the Board of Selectmen would be required.

Alice Cheyer said she hoped the evaluation of the hydraulic model would put to rest all distrust and suspicion of its accuracy on the part of WMAC members.

Paul Lauenstein said in order to trust the results of the hydraulic model, it must be properly calibrated to the physical system and properly operated when programming each scenario. Even if the hydraulic model is properly calibrated, if parameters are not input properly, the model will generate misleading results that could lead to bad decisions. In order to have faith in the results, WMAC members would have to be able to satisfy themselves that all parameters such as the status of valves, pumping rates at the wells, water levels in the tanks, etc. had been input correctly, and be able to read and understand the outputs. He pointed out that Eric Hooper had said that only trained engineers would be able to understand the inputs to and outputs from the hydraulic model, but he said that he might be able to learn. He added that as a WMAC member he would evaluate each Water Department proposal based on its merits, considering all available information, and not relying exclusively on modeled results.

Eric Hooper said there needs to be acknowledgement that the status of valves in the field are the same as the status of valves in the model. He allowed that a rock stuck in an open valve could create a difference between actual and modeled results, but that should not be a reason to reject the model. He added that the model would never be 100% perfect. A major source of error, for example, is that water consumption for every residence is assumed to be equal despite the fact that household water consumption in the Hampton Road area tends to be greater than household water consumption in the Heights area. Nevertheless, it is a useful tool for predicting what happens when the water supply infrastructure is changed.

Cliff Towner asked whether the Water Department or Wright-Pierce specified the scoping in Wright-Pierce's proposal. He pointed out that Paul Weisman had at one point referred to "your scope" in his comments, implying that the scope had been determined by the Sharon Water Department.

Jeff Musich replied that the proposal originated with Wright-Pierce and was not influenced by the Water Department. Eric Hooper agreed, saying the Water Department had nothing to do with defining the scope of the hydraulic model review or the master plan scope development described in the memorandum.

Rory McGregor asked the Wright-Pierce representatives how much the project would cost and how long it would take to complete.

Paul Weisman replied that task 1 (the hydraulic model review) would cost \$3,500 and task 2 (the master plan scope development) would cost \$2,500 for a total of \$6,000. He said both tasks could be completed within two months.

Rory McGregor asked if any field work were included. Paul Weisman replied that any necessary field work would be assigned to the Sharon Water Department in order to keep costs down.

Eric Hooper said the reason to hire a consultant is to establish faith in the model.

Lealdon Langley said that although the presenter's stated goal was to confirm the model, there is a possibility of discovering glitches in the model. He asked what would happen if such glitches were discovered.

Paul Weisman replied that if problems were identified with the model, then remedial action would be recommended at additional cost to the town.

Jeff Musich said he did not anticipate any difficulty in coming to an informed opinion on the hydraulic model's validity, and asked if the two month time frame were satisfactory.

Cliff Towner said he would vote against Wright-Pierce's proposal. He characterized it as simply a means of buying credibility for the proposed HPSD and water tank.

Roger Thibault said that the arguments for the HPSD and the water tank were based on results provided by the model, so the model's credibility is important.

Cliff Towner replied that he believes the model is reasonably accurate, and there is no need to review it.

David Grasfield said he thought the problem is not with the model's math, but rather with the assumptions input into the model. He asked which assumptions are troubling to WMAC members, and suggested a statistical approach involving testing the model for accuracy under a variety of assumptions.

Roger Thibault said the sensitivity analysis of selected fire flow requirements described in task 1, item 3 is central to the issue.

Lealdon Langley suggested a three step approach to the hydraulic model review. Wright-Pierce should first evaluate the model without prejudice, then solicit input from WMAC members, and finally address concerns of WMAC members. As for the master plan update, he said decisions about the distribution system should be made in the context of projected future demand and new water sources.

Alice Cheyer said zoning rules should also be considered, but unfortunately they are nullified by the 40-B law.

Jeff Musich said the impact of the 40-B law would be a factor in the master plan scope development.

Eric Hooper suggested that Wright-Pierce revise their proposal and circulate it to the WMAC. He said he would like to award the contract soon and asked the WMAC to vote on it at its next meeting.

8. E-coders for radio meter system

Eric Hooper said the Selectmen are waiting for a decision on the e-coder option before awarding the contract for a drive-by system to Ti-Sales. He said a decision from the WMAC is needed soon in order to complete Phase I in FY '05.

Rory McGregor said he favors the e-coders because their leak detection capabilities would help Sharon conserve water. He said they should be included in the \$150,000 Phase I pilot installation to see how effective they would be in detecting leaks.

Paul Lauenstein pointed out that 30% of Sharon's water meters are not Neptune meters and therefore would be incompatible with the e-coders. He asked if replacing those meters would add to the cost of the e-coders.

Eric Hooper replied that the non-Neptune meters are among the older meters targeted for replacement in the RFP, and as such would not constitute any additional cost to the town to accommodate the e-coders.

Paul Lauenstein asked if extra cost of adding e-coders to the Phase I installation would reduce the number of units installed because only \$150,000 had been approved for Phase I.

Eric Hooper replied that in addition to the \$150,000 approved for FY '04, an additional \$150,000 had been approved for FY '05, so there would be no need to reduce the number of units installed in Phase I if the e-coders were included.

Jack Sulik opposed the e-coders on the grounds that the extra \$56,000 could not be cost-justified by the water savings resulting from leak detection.

Cliff Towner asked if the e-coders would provide benefits down the road.

Eric Hooper said that although he favored the e-coders, he thought Jack Sulik's analysis that they are not cost-effective was probably correct.

Cliff Towner then asked Rory McGregor why he favored the e-coders, with Eric Hooper and Jack Sulik split on the issue.

Rory McGregor replied that he favors e-coders because notifying consumers on their water bills when they may have leaks would enhance consumer awareness of the need to conserve water.

Alice Cheyer asked if it were necessary to vote on e-coders for the entire town. She suggested voting on e-coders for Phase I only, and reserving judgement on whether to install e-coders in the rest of the town until after seeing results of the Phase I pilot.

Eric Hooper allowed that there would be no technical reasons that this could not be done. He reiterated the need for a decision at the next WMAC meeting.

9. Schedule the next meeting for Thursday, August 19 at 7:30 PM