I look at our water system and for the purpose of this meeting I will break it down into 4 functions:

Source: Our reservoirs wetlands, brooks and recharge areas
Filtration: The water treatment plant located on Pond Street and run by the joint board.
Storage: Standpipes
Distribution: Pipes underground carrying the water from the treatment plant to the consumer.

On June 17th, we will have a conversation relative to the discolored, dirty, murky, and sediment filled water that is coming out of the distribution system and into the homes and businesses of our consumers.

Understanding the water treatment plant has many concerns, if they do not relate to the above water such as the possible dysfunction of the clear well, then that item is not up for discussion per our Charter.

I will state my understanding on the functions of our water system and how they relate to the above water. If I am incorrect then please be prepared to provide that information.

Source: The Sources of our water comes from wooded and muddy areas however other than minerals naturally found in our water, which contribute to the growth of tuberculation the sediment problem is not from this function.

Filtration: The sediment coming into people's homes and businesses is not because of the amount of silt getting through the filtration system.

Filtration: ***Some silt is originated at intake to the treatment plant. Some silt and particles enter the plant through the raw water intake (Great Pond reservoir supply). The water then goes through settling tubes that filter the water. Some of the particles make it past the settling tubes. Beyond the intake, the water distribution is a sealed system, so silt and outside particles should not be getting in any other way unless there is a significant break in the system. Other sediment in the water is generally from tuberculation, which is discussed further below.***

Storage: Standpipes and water tanks need to be maintained and sediment does build up in these areas and usually do not enter the distribution system of pipes.

Storage: ***Standpipes' main function is for system pressure. Sedimentation does occur at the base of the standpipe, but those pipes are cleaned and the sedimentation is removed. This sedimentation does not enter the system.***

Question 1: Explain how these are cleaned of sediment and how that is stored.

1. Sediment is cleaned from the standpipes by an outside contractor. Tanks need to be drained and taken off line (usually during wintertime when there is less demand). A vactor truck is used to remove the sediment. When the cleaning occurs the cleaning is done only using system pressure which can cause a concern with water pressure in low pressure areas.

Distribution: The water pipes in our streets carry the water or distribute the water from the filtration plant throughout the town to the end consumer. This area in my understanding is where the cause of our dirty, muddy, discolored and sediment filled water begins.

Question 2: What is tuberculation and how does sediment build up in the Towns water pipes?

2. Tuberculation is the formation of corrosive particles on the inside of pipes (rust) which clings to the interior wall of the pipe in the distribution system. Currently, there is a chemical additive added at the plant to try and help with corrosion control. As the pump replacements are being implemented, that corrosion control program is being updated at the plant.

Question 3: Is this a natural occurrence?

3. ***Yes***

Question 4: Does this happen to other town's pipes?

4. Yes

Question 5: What is the procedure to remove sediment from the water pipes generally?

5. If the system is maintained, flushing 2 times per year.

Question 6: The Town of Randolph over a period of a decade has spent resources to clean and line the water pipes. Explain the process and its intent.

6. A large portion of the Town's pipes, but not the entire Town, have been cleaned and lined. The pipes are first cleaned to remove deposits and sediment. The majority of the Town's water mains are made of cast iron. Some areas have ductile iron and a small area has asbestos pipe. Once these pipes are cleaned, they are lined with concreate to prevent the rust and sedimentation going forward. Lining is to provide a clean surface and to seal small leaks.

The removal of sediment in water pipes is traditionally done through a process known as hydrant flushing. This opening of gates and the hydrant causes a change in pressure within the system causing the sediment to loosen and be discharged through the pipes and out the hydrant. This process should provide clear water to our end users. I say clear and not clean because there has been no documentation to suggest that our water is unsafe to drink or use.

It is obvious to almost all that the collective "we" did not follow regular maintenance of our distribution system. When a pipe breaks it does simulate that of hydrant flushing.

Question 7: Are broken pipes the cause of the current and past many months of sediment in the water?

7. No, although water main breaks can cause some localized sedimentation, our primary problem in recent months has been fluctuating flow (GPM) from the treatment plant. This causes a water hammer in the system which stirs up the sediment. When a water main develops a break, the internal pressure normally keeps dirt from entering the main unless there is a complete main burst, which we have not experienced recently. Once the repair is completed the area is flushed to remove any air and/or discolored water. Most of the common breaks with the town's infrastructure have been on 6" and 8" water mains--these breaks are isolated and do not cause town wide discolored water.

Question 8: Is hydrant flushing the only way to remove sediment from the water pipes?

8. No – you can do a process called "swabbing or pigging" the water distribution system. The process consists of pulling a swabbing device through the mains. Average cost is $8/linear foot @ 120 miles of water main = $5,068,800. This process can also clog any service connections due to excess sedimentation to the end user and additional costs will increase. An outside engineering service will also be needed to design and oversee the process.

Question 9: Does the Town have a hydrant flushing plan (this should be different than a schedule).

9. Yes—BETA Engineering developed a 5 year uni-directional flushing program in 2005. There is also a recommendation from DEP to start a moderate flush program. A moderate flush program was compiled to flush the Town mains in quadrants.

Question 10: How and by whom was this plan developed?

10. ***Plan designed in 2005 by BETA engineering***

Question 11: Are there other plans or schools of thought out there on sediment removal?

11. Yearly flushing program and corrosion control treatment at the plant. Environmental Partners overseeing treatment plant capital improvement project that is ongoing.

Question 12: Have we adopted a plan?

12. I am not sure of the term adopted as used. Basically, the BETA plan was developed and paid for in 2005. I would consider that the Town plan.

Question 13: Who decides on the adoption of the plan?

13. Town Meeting funded the contract with Beta in 2005 and BETA worked with the DPW Board when the plan was developed.

Question 14: In the plan, who is responsible to implement and carry out the plan? If they are not the same, explain.

14. The DPW Water Department through the DPW Director with assistance from BETA or another engineering firm, if needed.

Question 15: Does the hydrant flushing need to be done more than once?

15. ***Yes, 1 to 2 times annually is recommended.***

Question 16: Does Randolph have a schedule to carry out this plan?

16. We have been unable to locate the full plan until recently. It is a 5 year plan. It is spread out over 5 years because you have to maintain proper current reservoir levels, water system pressure with the town of Holbrook, demand on the Randolph system also needs to be maintained to lessen impacts to businesses and residents.

A hydrant flushing plan consists of manipulating gates and valves to control the direction and amount of water flow.

Question 17: Explain the types of controls that must be manipulated?

17. Main gates are closed in areas to be flushed and certain hydrants opened to rid the sediment. It is done in one direction to flush the sediment to one hydrant and limit impact to adjacent areas.

At this point 6/10/2020 I will assume that the Town of Randolph, acting through its DPW Superintendent and consulting with the Town Manager has approved a hydrant flushing plan. If we have not as of that date please indicate that we did not and if not be prepared to have one at this meeting for the Town Council to act on.

Question 18: This plan does it consist of the entire distribution system in Randolph and/or what Randolph has direct control over?

18. Yes, it would impact the entire system. Please note the plan is only effective if all hydrants and valves are operational.

Question 19: Explain in detail how this plan will clear the system of sediment.

19. An effective hydrant flushing plan will remove tuberculation on the infrastructure.

Question 20: Explain at what gate and hydrant you will begin and where you will end and how you will get there.

20. This is a 5 year plan that includes 15 books in total. Step one in year one of the plan would be the following:

(a)Valves closed will be the 6" gate at the intersection of Marconi Drive and Pond Ln.
(b) 24" gate on Oak St between Tangen St and Pine Ave
(c) 6" gate on Oak St between Tangen St and Pine Ave
(d) 6" gate at intersection of Oak and Pine Ave
(e) 6" gate at intersection of Oak and Cedar Ave
(f) 6" gate at intersection of Oak and Devine Rd
(g) 12" gate at intersection of Oak and Devine Rd

Hydrants to flush are Oak St between Tangen St and Devine Road all at the same time.

Note: Provide a detail map of our distribution system (9 copies).

Question 21: How long will this plan take to implement?

21. It is a 5 year plan.

Question 22: How long will this take from implementation through completion?

22. See above.

Believing that hydrant flushing must happen more than one time,

Question 23: What is the plan and schedule moving forward after the full completion of the first implementation?

23. After the 5 year plan is completed, it is critical that we flush twice a year.

Question 24: Do we have the in house capability to carry out the initial implementation of this plan?

24. Yes.

Question 25: Do we have the man power to carry this out?

25. Yes.

Question 26: What is the cost of the initial implementation through completion (total), understanding that this is an estimate?

26. Estimated cost = $1,002.75 per night--does not include a rest period payment (if hours run continuously). If flushing is 60 days per year for 5 years = $300,825 (does not include yearly contractual increases). Engineering oversight of operations could run up to 225,000.

Question 27: What is the suggested source of revenue?

27. Retained earnings.