LOUDOUN WATER

SELMA ESTATES AND RASPBERRY FALLS WATER SUPPLY SYSTEMS

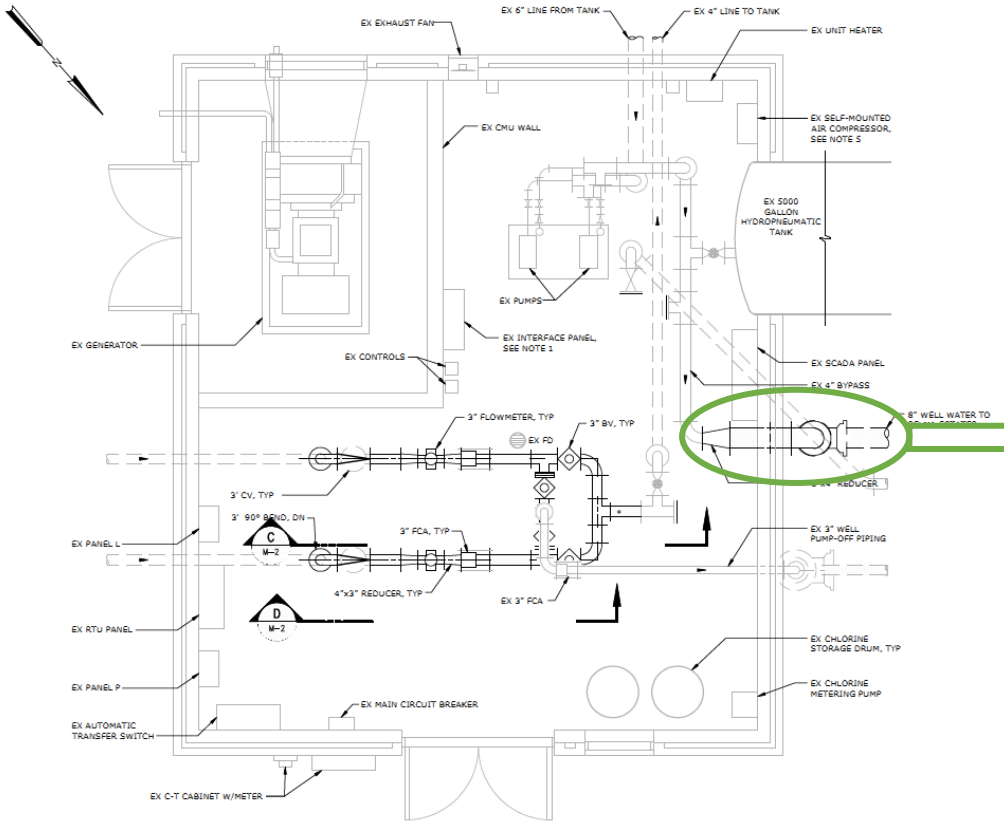
Public Meeting

September 24, 2015

Hazen

Raspberry Falls Water System

Raspberry Falls Water System

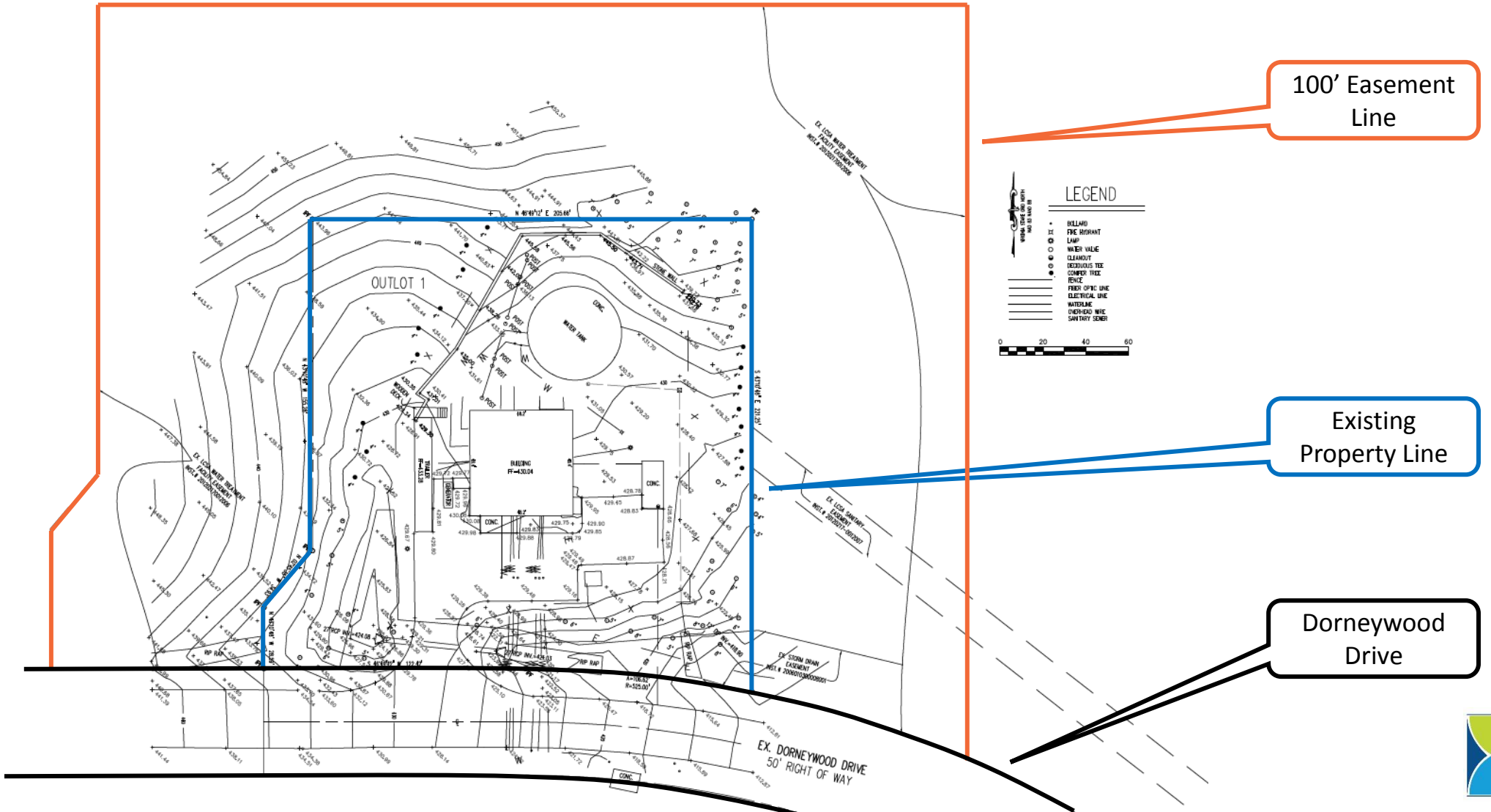


Repurposing of the System

- Piping inside the building will be reconfigured.
- New 8” pipeline will be installed to convey the water from Raspberry Falls to Selma Estates.

Pipeline to Selma Estates Water Treatment Plant

Selma Estates Water System

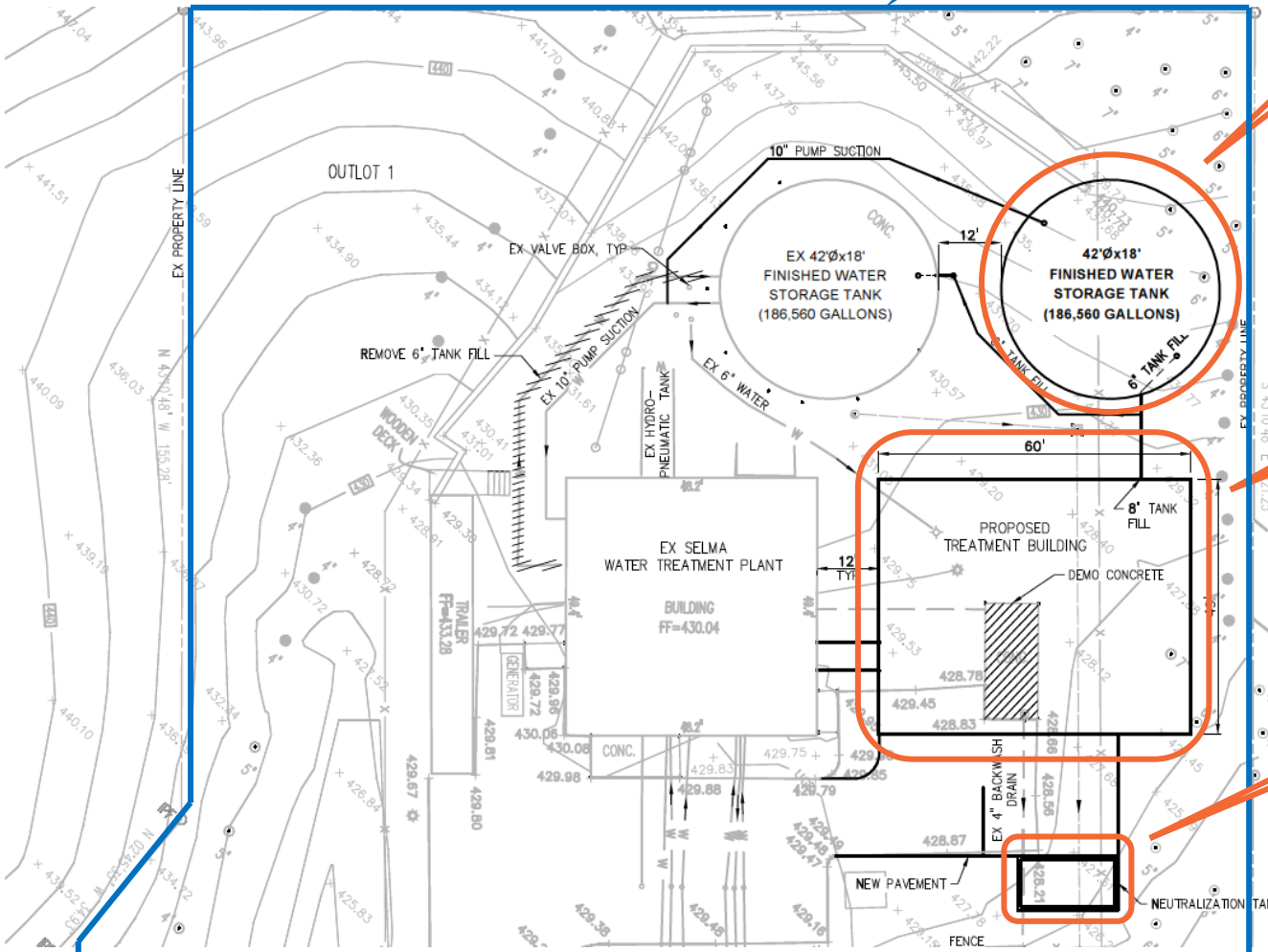


100’ Easement Line

Existing Property Line

Dorneywood Drive

Selma Estates Proposed Site Layout



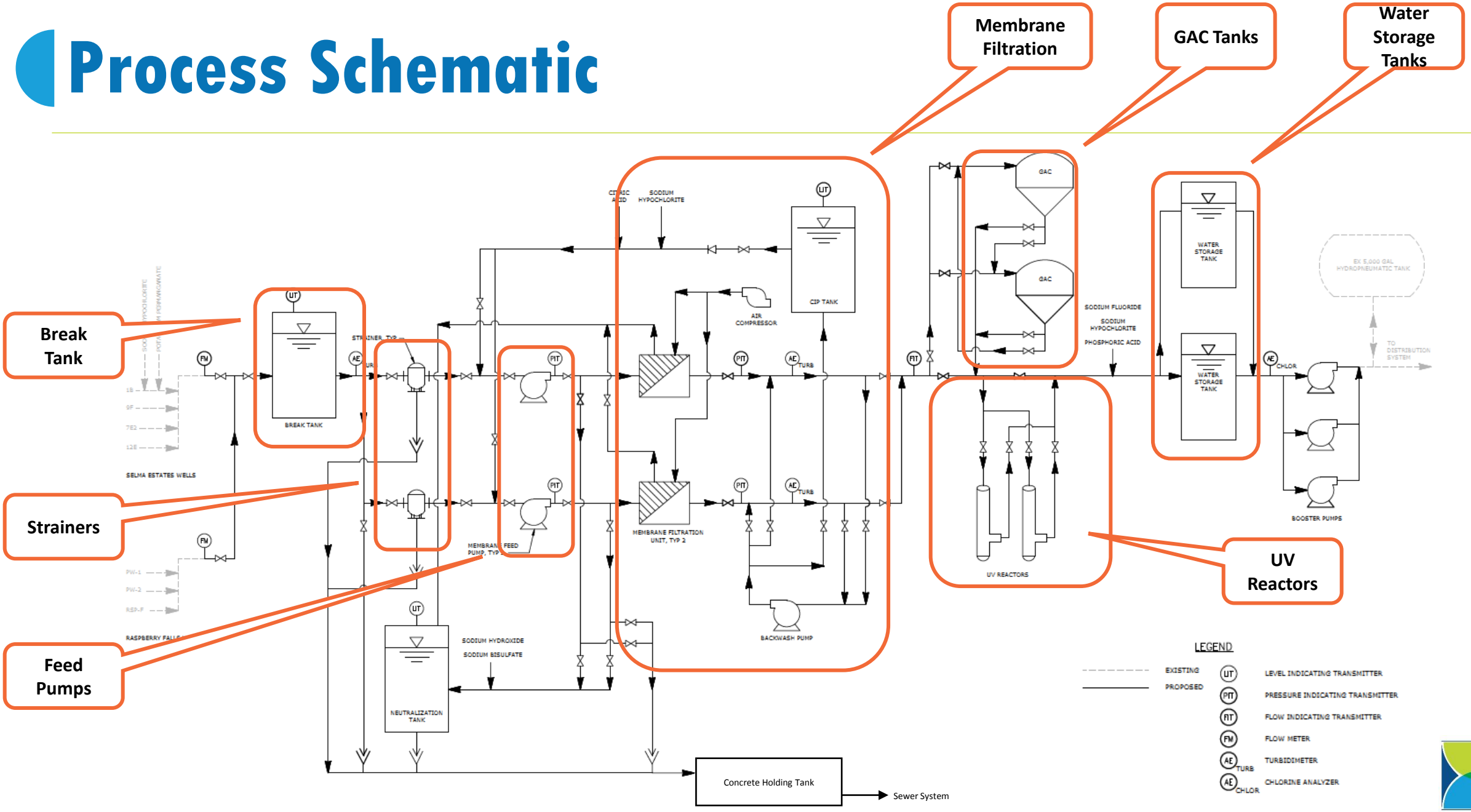
Existing Property Line

New Storage Tank

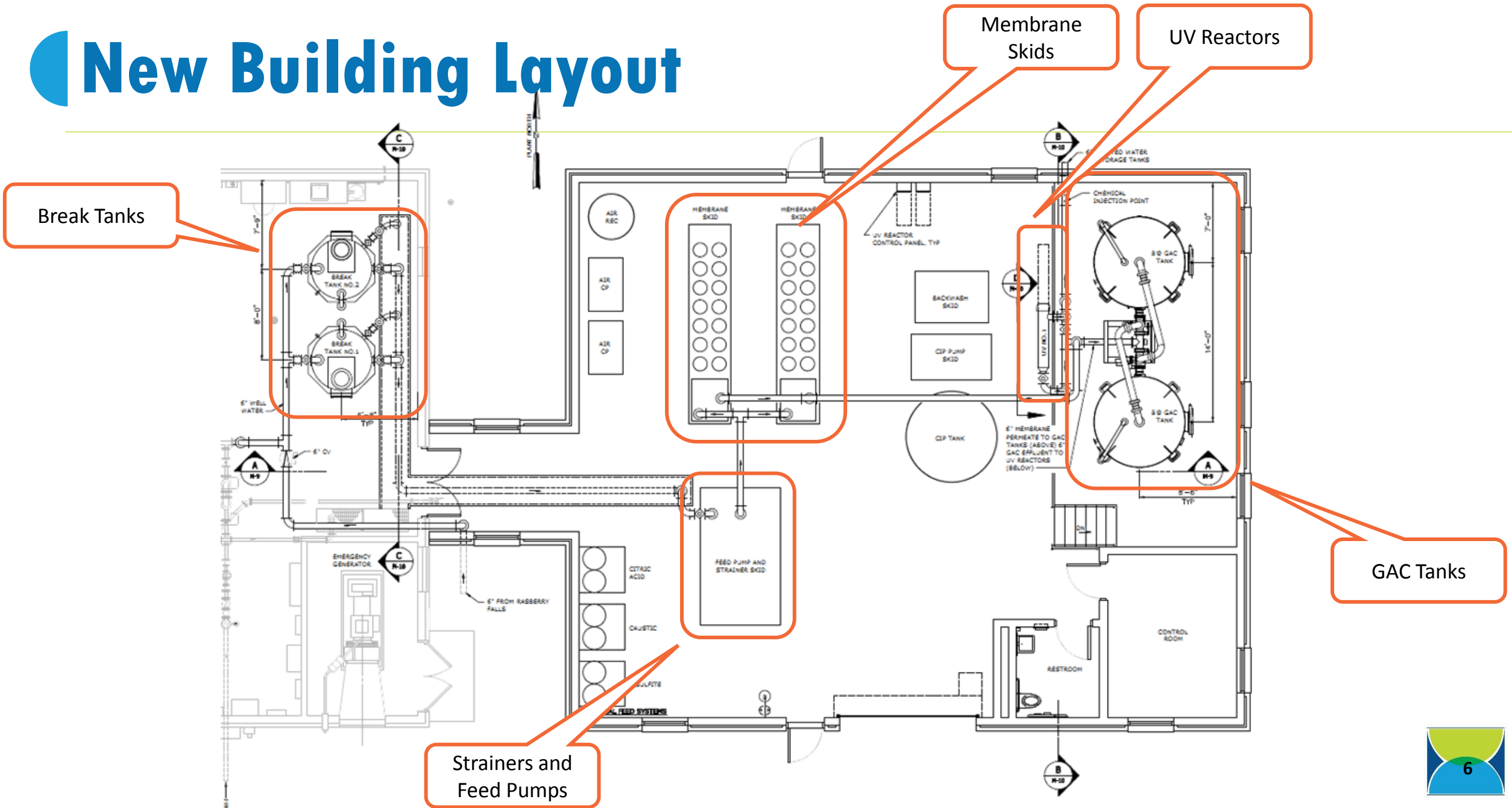
New Building (housing the treatment process)

New Underground Concrete Holding Tank

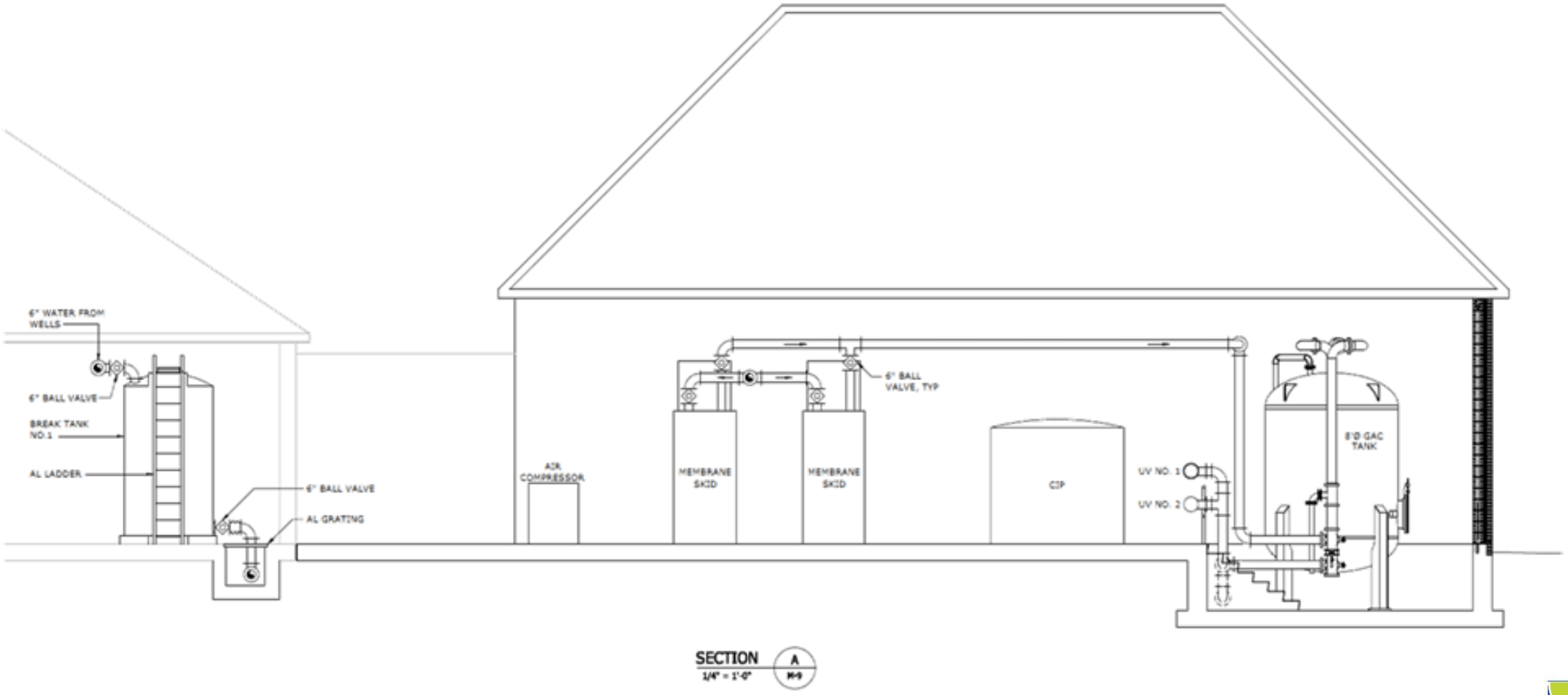
Process Schematic



New Building Layout



Cross-Section of the Proposed Building



Filtration

Membrane filtration is a water purification technology that uses a semipermeable membrane to remove particles that are larger than the pore openings from the water.

Advantages

- Removal of particulates, dissolved components and microorganisms (viruses, bacteria, cysts, etc.) based on the membrane type.
- Constant quality.
- Simple automation.
- No need for chemicals.
- Process and plant compactness.

Ultrafiltration to be installed at Selma Estates and Raspberry Falls

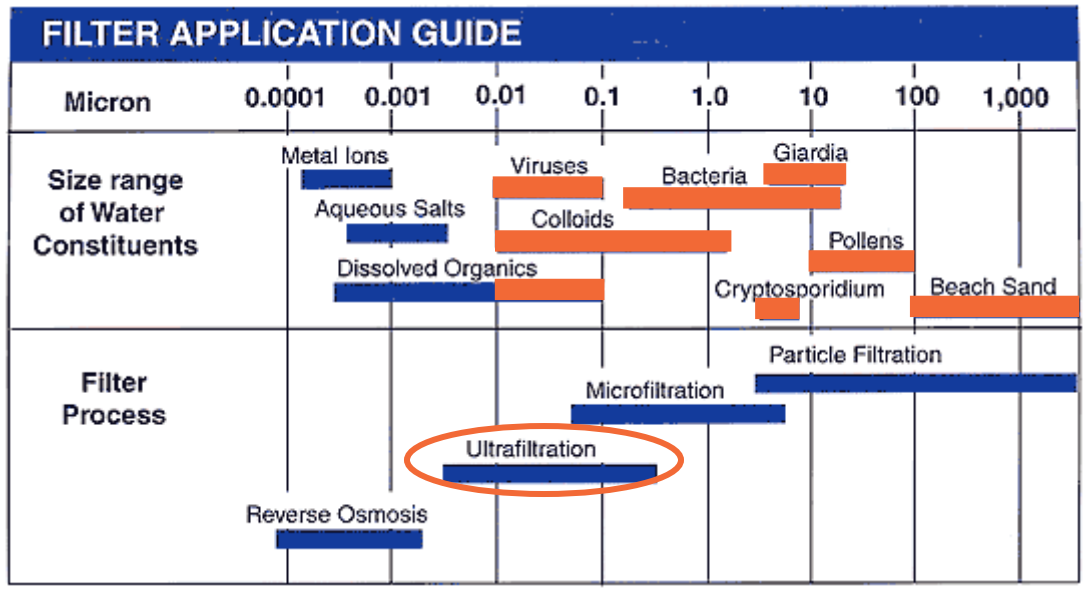


Image courtesy of: water-technology.net

Membrane Filtration

Membranes

- Configured as a fibre, tube, sheet

Modules (or elements)

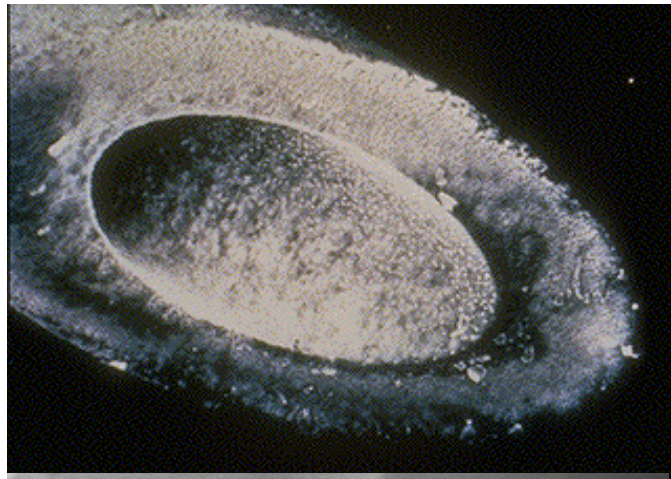
- Assembly of membrane material.

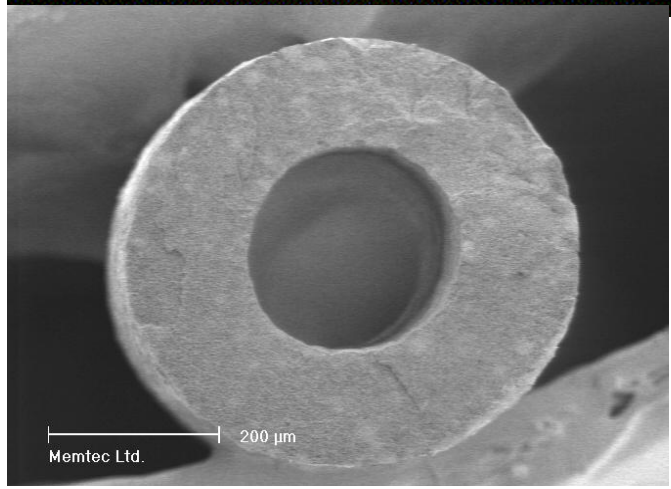
Units or Arrays

- Collection of pressure vessels or process tanks

Sub-micron pores reject:

- Bacteria
- Colloids
- Cryptosporidium
- Giardia cysts
- Virus





Ultrafiltration

Selected Membrane Specifications

Parameter	Design Value
Membrane Material	PVDF
Membrane Housing	PVC
Flow Configuration	Outside-in
Number of Skids	2
Nominal Pore Size	0.01 µm
Design Flow per Skid	307 gpm

Image courtesy of: H2O-Innovation

Adsorption

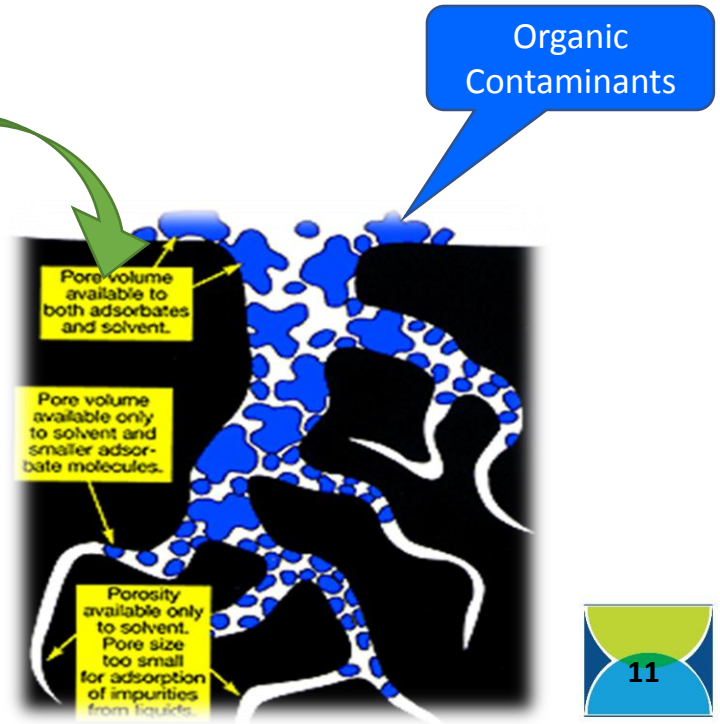
Granular activated carbon (GAC) is used to adsorb soluble organics. Adsorption occurs when molecules adhere to the internal walls of pores in carbon particles that are produced by thermal activation.

Advantages

- Reliable technology for the removal of organics
- Small space requirement
- Easily incorporated to an existing system

Disadvantages

- Regeneration/replacement costs.



Images courtesy of: TIGG.com, norit.com

GAC Adsorption

Selected GAC Specifications

Parameter	Design Value
Configuration	Two parallel pressure vessels
Flow Direction	Downflow
Design Flow per Reactor	307 gpm
EBCT (5-30 min. typ.)	15.4 min
Filtration rate (2-5 gpm/ft^2 typ.)	2.7 gpm/ft^2

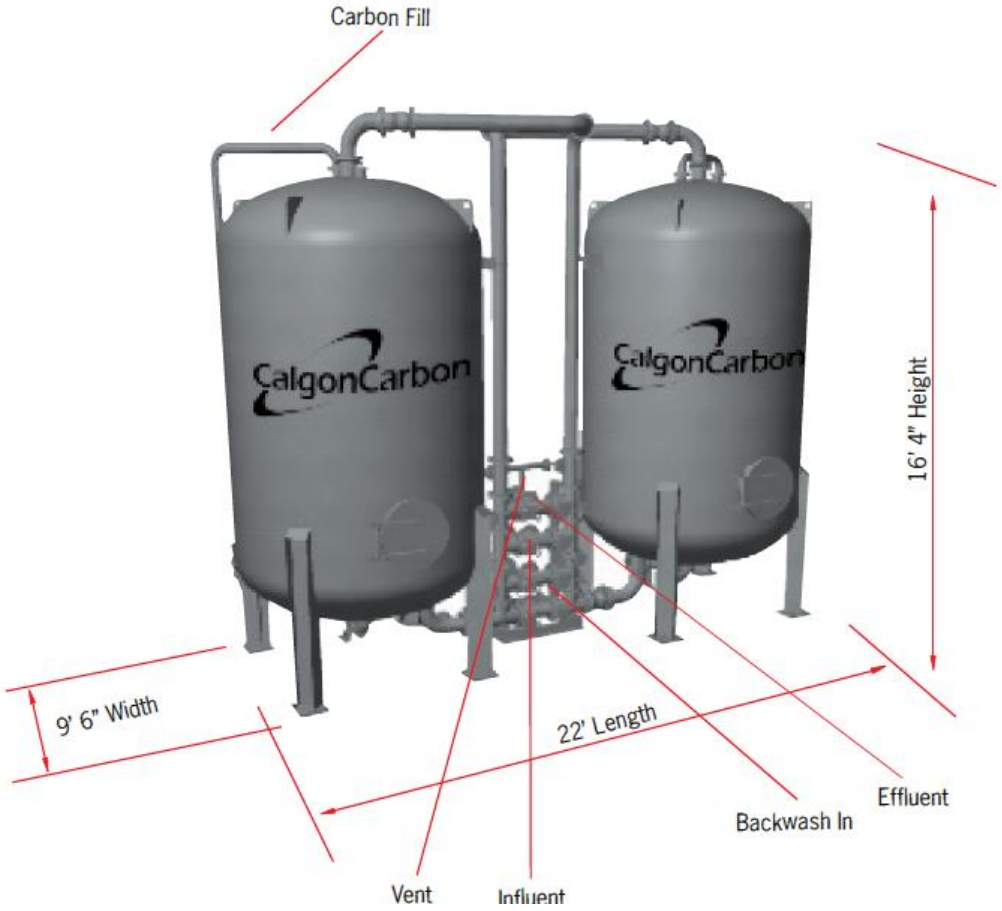


Image courtesy of: calgoncarbon.com

UV Disinfection

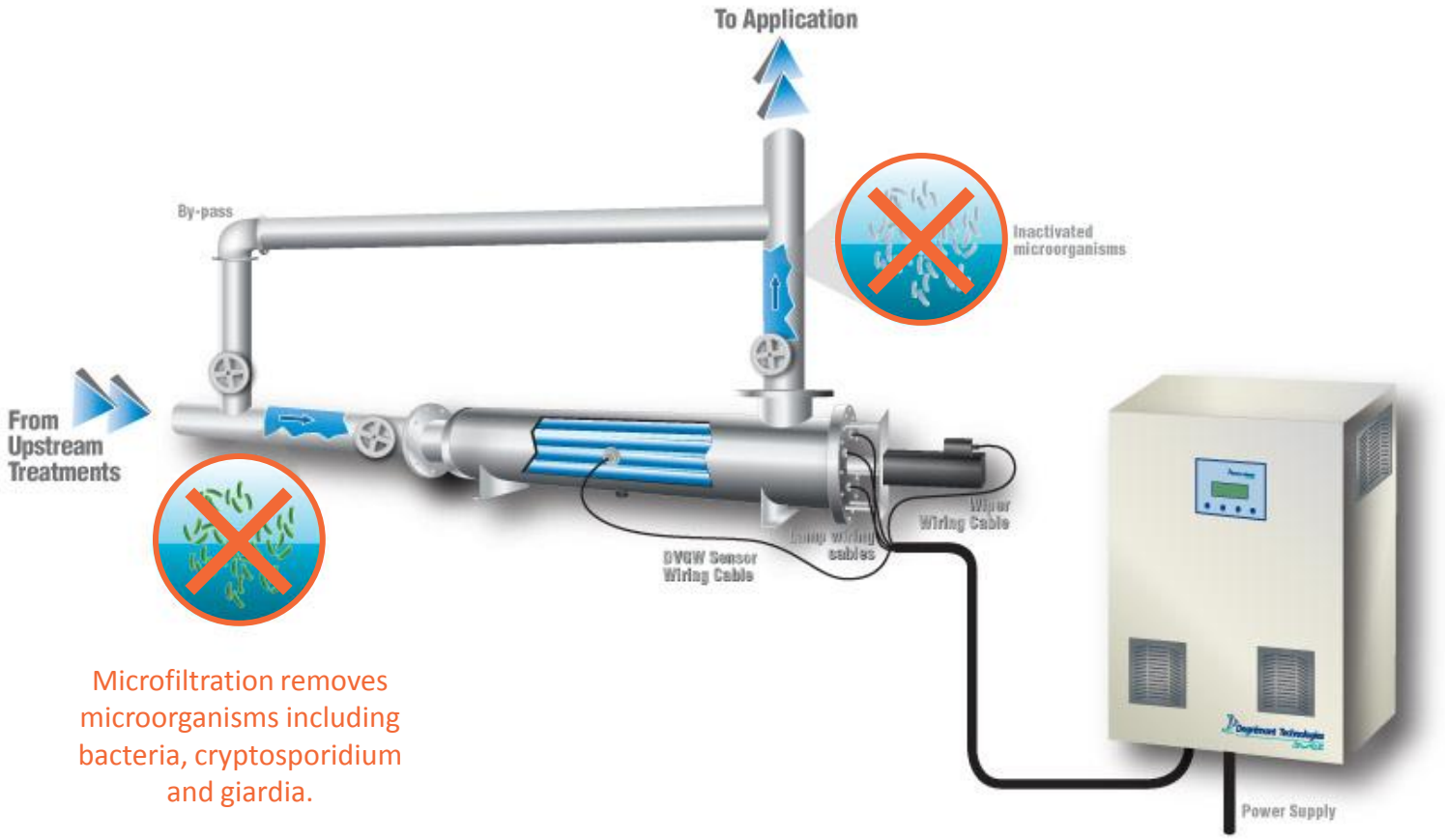
Ultraviolet (UV) disinfection is used in water treatment to inactivate pathogenic organisms that may be present.

Advantages

- Effective for Giardia and Cryptosporidium.
- Simple automation.
- Process compactness.

Disadvantages

- Not effective for viruses.
- No residual disinfectant to prevent regrowth of microorganisms.



Microfiltration removes microorganisms including bacteria, cryptosporidium and giardia.

Images courtesy of: degremont-technologies.com

UV Disinfection

Selected UV Reactor Specifications

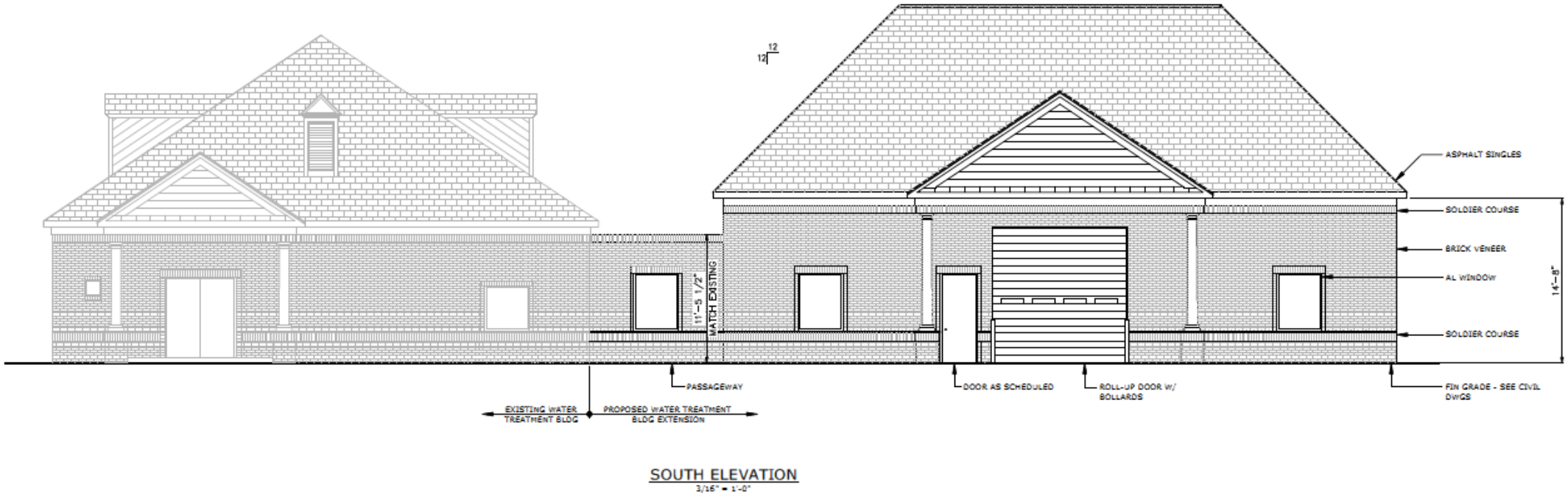
Parameter	Design Value
Vessel Type	Closed Reactor
Number of Reactors	2 (1 duty + 1 spare)
Design Flow per Reactor	307 gpm
Minimum Validated UV Dose	40 mJ/cm^2

Image courtesy of: TrojanUV.com

Water Storage

Provide water storage that can meet the water demand, provide contact time for disinfection, and provide emergency supply.

Architectural View of the Proposed Building



SOUTH ELEVATION

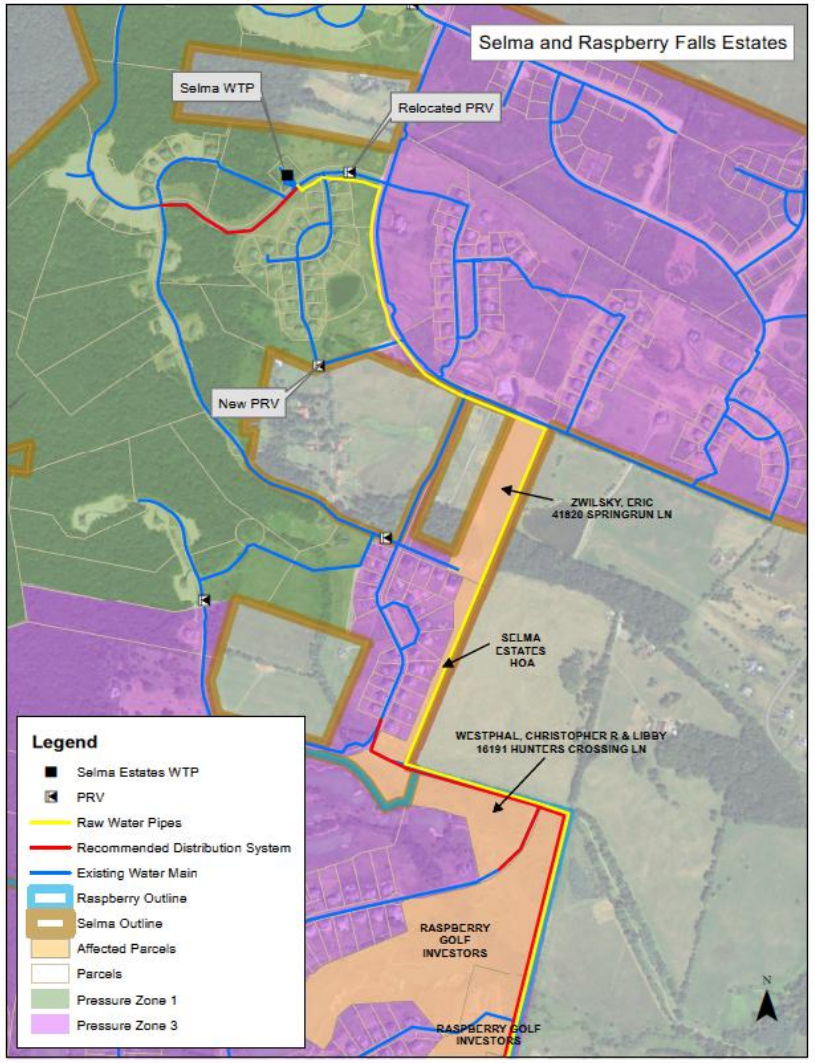
3/16" = 1'-0"

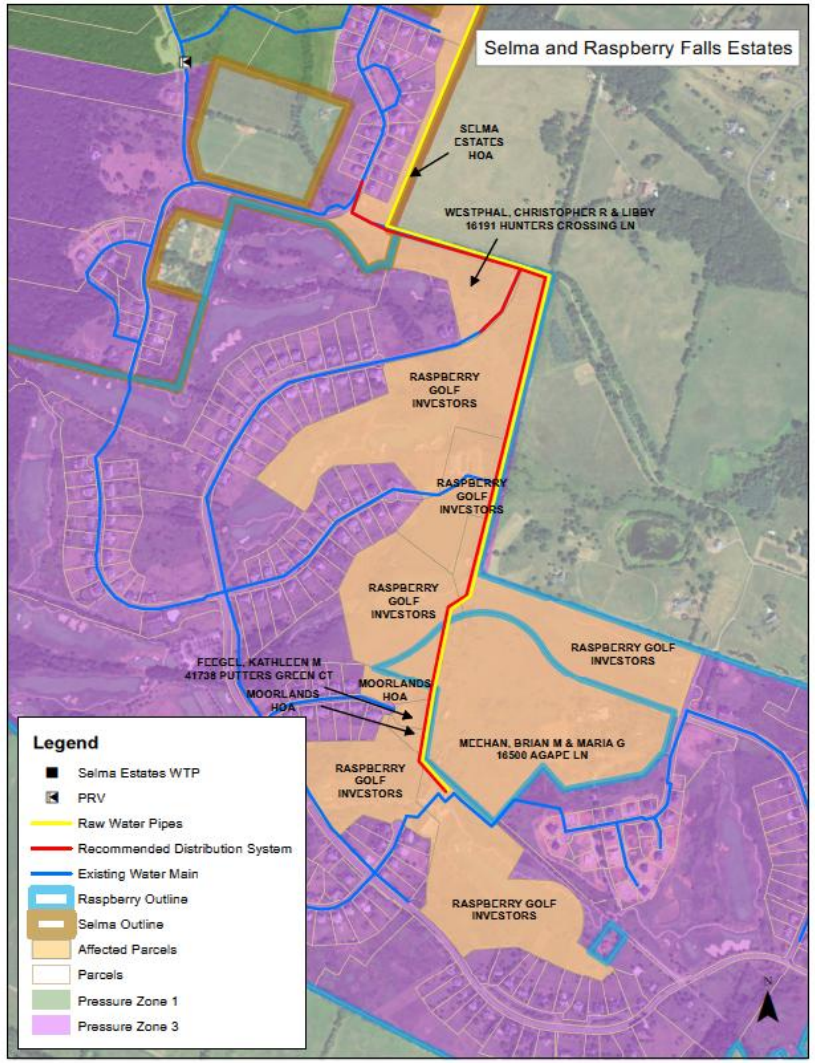
Facility Rendering

Existing Water Treatment Building

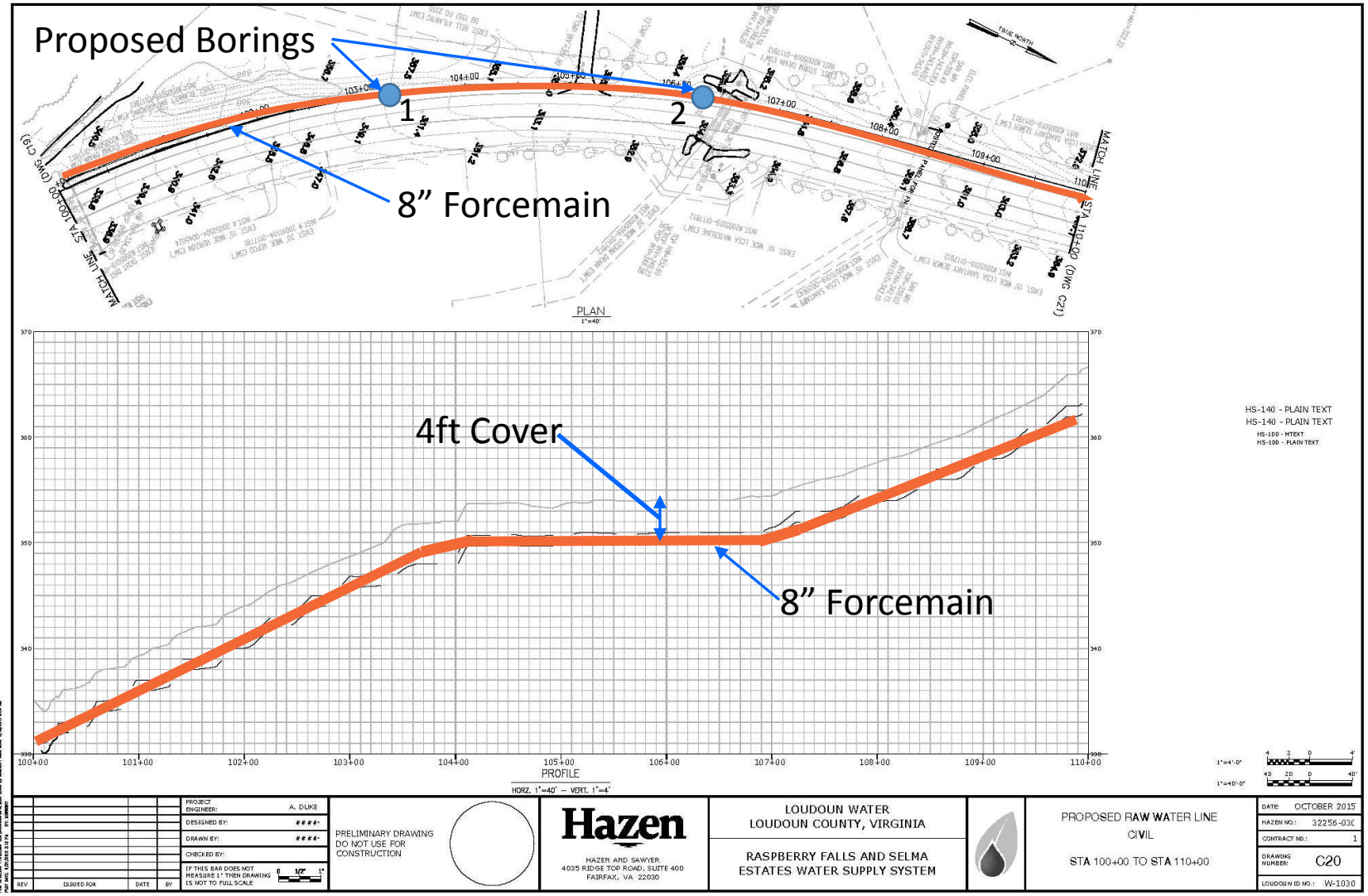
Proposed Water Treatment Building

Raw Water Transmission Main & Distribution System Improvements

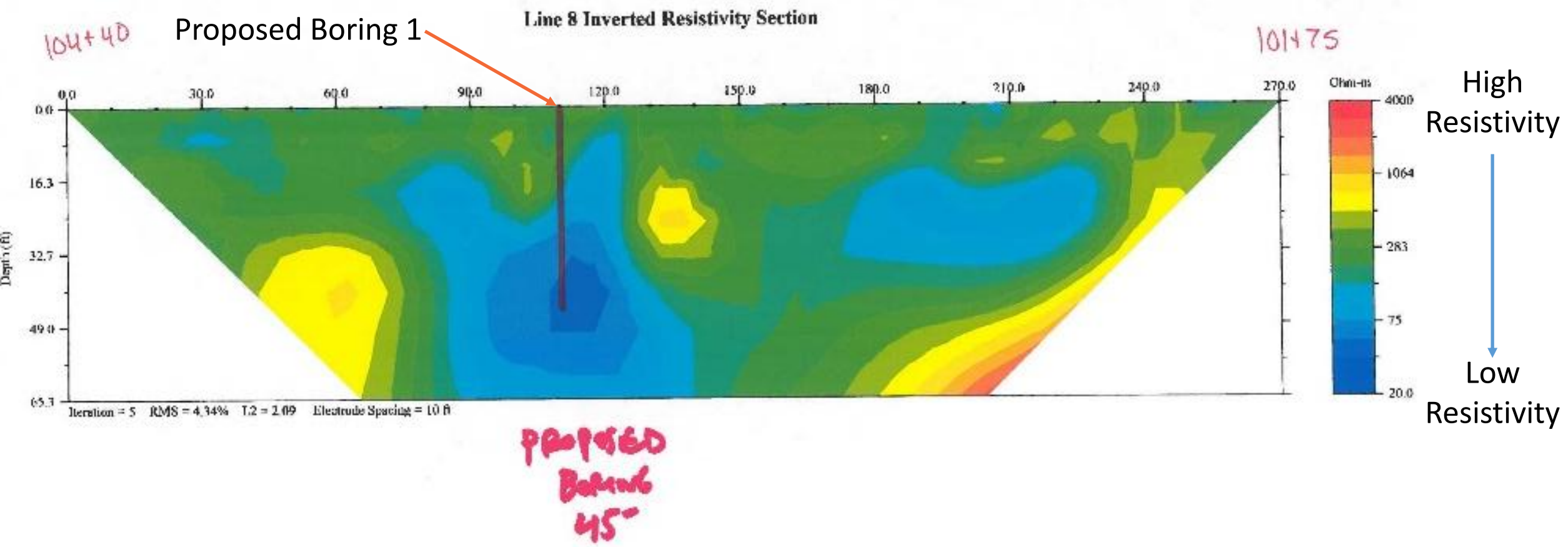




Raw Water Transmission Main Alignment Segment

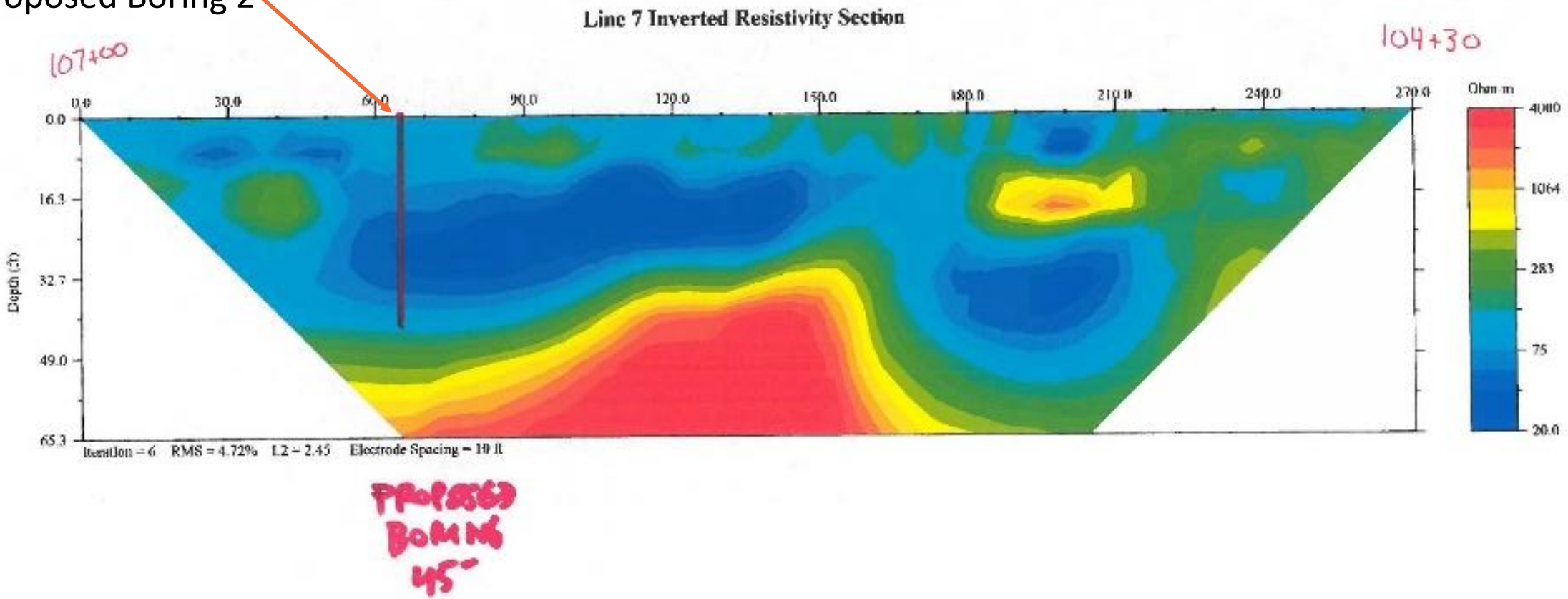


Proposed Alignment Borings



Proposed Alignment Borings

Proposed Boring 2



High Resistivity

Low Resistivity

Permitting

- **Virginia Department of Health (VDH)**
  - Pre-Submittal Meeting on August 27, 2015
  - Preliminary Engineering Report (PER) under review by VDH
- **Planning Commission Public Hearing is scheduled for October 20th**

Date:	October 20, 2015
Time:	6:00 PM
Location:	Board Room, 1st Floor, Government Center
Address:	1 Harrison St. SE, Leesburg, VA 20175

Project Schedule

ID	Task Name
1	Raspberry Falls and Selma Estate Water Supply System
2	NTP
3	Prepare Draft Preliminary Engineering Report (PER)
4	Review and Revise PER
5	Submit PER to VA Department of Health
6	Pre-Submittal Review Meeting with VDH
7	VDH Approval
8	Select Membrane Filtration Equipment Manufacturer
9	Prepare 50% Plans and Specifications
10	Prepare 90% Plans and Specifications
11	Obtain Permits
12	Prepare Final Plans and Specifications
13	Solicit Bids
14	Award Contract
15	Construct Raspberry Falls Selma Estates Water System Improvements