

**COMMUNITY WATER SYSTEM STANDARDS  
LOUDOUN COUNTY SANITATION AUTHORITY  
LEESBURG, VIRGINIA**

**January 8, 2003**

These Community Water System Standards (Community Water Standards) have been authorized by the "Statement of Policy concerning Community Water and Sewer Systems" as adopted by the Loudoun County Sanitation Authority (the Authority) Board of Directors on December 15, 1989. As such, this document provides requirements and standards for water systems designed and constructed on behalf of the Authority. These standards are not intended to be all-inclusive. The Authority will consider alternative means and methods to accomplish its objectives, based upon good engineering practice and demonstrated technical effectiveness, reliability, and cost-effectiveness.

The Community Water System Standards presented herein shall supplement the latest edition of the "Waterworks Regulations" as published by the Commonwealth of Virginia, Virginia Department of Health (VDH) (12 VAC 5-590-10 et seq.), i.e., the Waterworks Regulations. The Waterworks Regulations represent the minimum design requirements set forth by VDH. All requirements of the Waterworks Regulations shall be adhered to. As the owner, the Authority may identify and determine the need for standards and requirements that are more stringent than those contained in the Waterworks Regulations. The headings and sub-headings of this document (beginning with Part I below) follow the general format of the Waterworks Regulations. In instances where no additional requirements are specified, headings and sub-headings have been retained to maintain organizational similarity between this document and the Waterworks Regulations.

In addition, waterworks infrastructure shall meet the latest edition of the Authority's "Design Standards". The Authority will grant no exceptions to the requirements of these distribution system standards.

Approved:

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Dale C. Hammes, P.E.  
General Manager

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## **PART I      GENERAL FRAMEWORK**

### **Article 1      Definitions**

#### **12 VAC 5-590-10      *Definitions***

“**Applicant**” means the developer or property owner seeking approval of the Community Water System.

“**Authority**” means the Loudoun County Sanitation Authority, Leesburg, Virginia.

“**Authority Design Standards**” means Authority-approved procedures methods and materials as promulgated in the *Approved Products List – Water and Sewer, Standard Details, Standards and Extensions For Water System and Sewer System*, and all subsequent requirements for the design and construction of LCSA facilities.

“**Community Water System**” means any freestanding system to be owned and/or operated by the Authority. Freestanding systems are not connected to the Authority’s central water system located in eastern Loudoun County.

“**Major Process Equipment**” means mechanically or electrically actuated process equipment requiring routine maintenance and specified in Divisions 11 through 16 of contract specifications formatted in accordance with the Construction Specifications Institute. Major process equipment includes pumping and treatment unit processes and associated electrical controllers.

“**Waterworks Regulations**” means the latest edition of the “Waterworks Regulations” as published by the Commonwealth of Virginia, State Department of Health (VDH) (12 VAC 5-590-10 et seq.)

### **Article 2      General Information**

#### **12 VAC 5-590-40      *Administration of regulations***

6. The Authority, which shall become the owner and operator of the facility that is to be designed and constructed, is responsible for definition and specification of standards, including equipment, materials and design criteria.

### **Article 3      Procedures**

#### **12 VAC 5-590-90      *[Reserved section]***

- A. The service area of any Community Water System shall be as reviewed by the Authority and approved by the Loudoun County Board of Supervisors. The Applicant shall provide a certificate from the Loudoun County Zoning Administrator that the area to be served by the proposed treatment facility has

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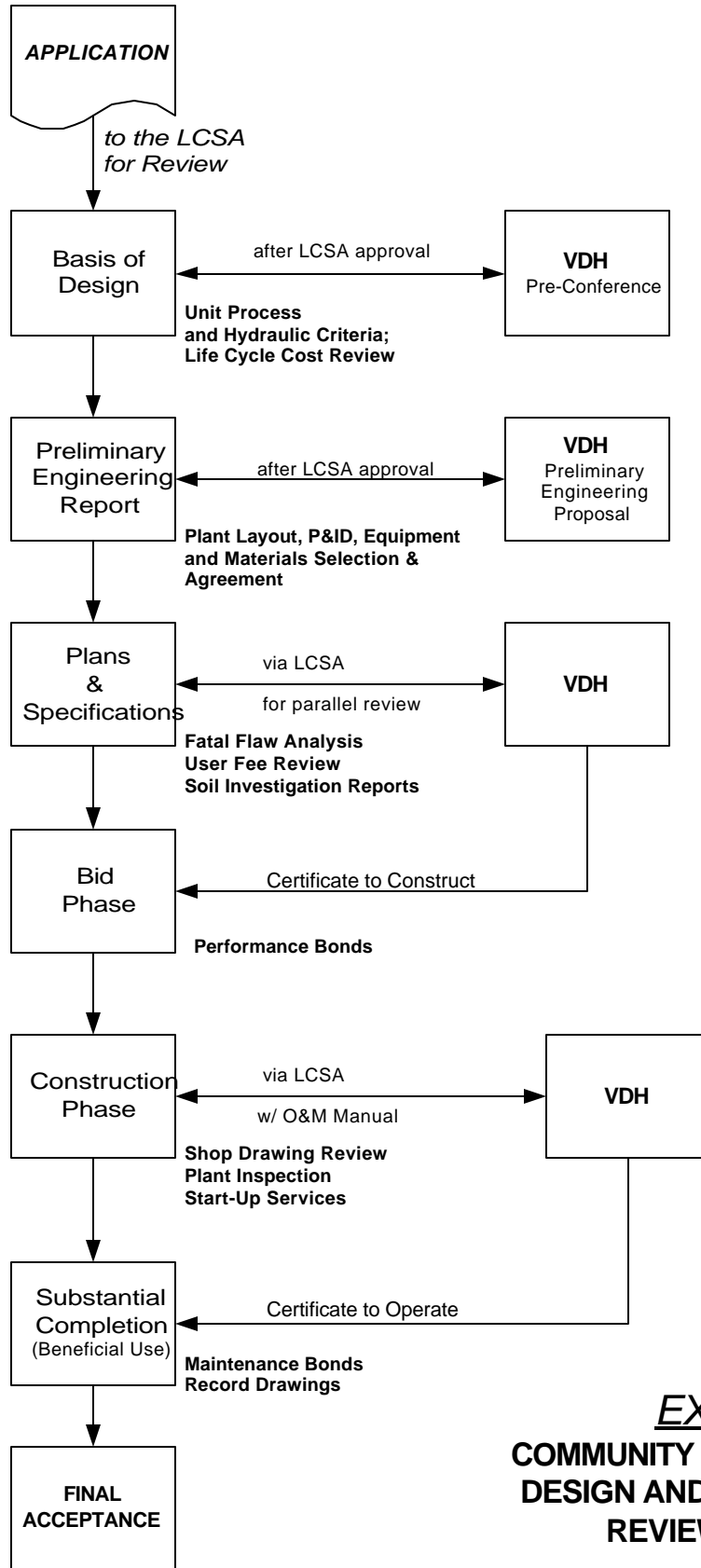
been officially zoned for the particular type, or types, of land use described in the application. A copy of the Site Plan Permit is also required of the applicant. If, in the future determination of the Authority, the system may be connected to another water system, the Authority may do so at its discretion.

B. The Community Water System shall be approved by the Authority. It should be noted that the Authority will only consider for approval groundwater systems not influenced by surface water. As owner and operator, the Authority represents the future customers who will depend on a reliable and durable facility. As such, the Authority reserves the right of approval. Before agreeing to accept any Community Water System, the Authority shall review and approve all design documents applicable to that system; including the Basis of Design, Preliminary Engineering Report, and Plans and Specifications. Said review and approval shall be in accordance with these standards and shall be in addition to, and take precedence over, required approvals by county, state, and federal authorities. The Authority's procedure as shown in Exhibit 1 shall govern all review and approvals. This procedure requires that the Authority approve a "Basis of Design" prior to the Preliminary Engineering Conference required by the VDH. It also requires approval of a "Preliminary Engineering Report" prior to submitting the official Engineer's Report to VDH. Applications to VDH shall be made through the Authority who, acting as owner and operator, shall become the permit holder.

C. Community Water Systems shall be constructed at no cost to the Authority. In order to ensure standardization, reasonable equipment inventories, and compatibility with efficient maintenance procedures, the design and construction shall be in accordance with these standards as well as the following:

- "Waterworks Regulations" as published by the Commonwealth of Virginia, Virginia Department of Health (12 VAC 5 – 590 – 10 et. seq.), latest edition.
- the Authority Design Standards, latest edition.

D. Each Community Water System shall be financially self-sustaining. As such, operating, maintenance, repair and replacement, and upgrade costs shall be borne by the owners of all properties within the service area for said system and a notice to this effect shall be recorded in each homeowner's covenant. In the interest of economy-of-scale, a mandatory connection provision may be required by the Authority Board for inclusion within the homeowner's covenant.



***EXHIBIT 1***  
**COMMUNITY WATER SYSTEMS  
DESIGN AND CONSTRUCTION  
REVIEW PROCESS**

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E. Adequate construction and maintenance easements or access rights-of-way for all Community Water Systems shall be provided for future extensions as well as new infrastructure. Perpetual easements in lieu of fee simple property for pumping stations and treatment facilities shall not be provided unless specifically approved by the Authority.

F. Community Water Systems shall require an Agreement (Water Agreement) between the Authority and the Applicant. The Water Agreement shall require the Applicant to subsidize the operation and maintenance of the waterworks until such time that 90 percent of the units within the development are sold and connected to the system. The Applicant shall agree to perform all construction in accordance with plans and specifications approved by the Authority and in accordance with Authority standards. Applicant shall agree to transfer to the Authority all property and facilities free of debts, liens and/or other legal encumbrances, for ownership, operation and maintenance. The Water Agreement shall be completed prior to acceptance of Plans and Specifications by the Authority. A model Community Water System Agreement is presented in the Attachment. The Authority shall develop all Agreements.

G. A "User Fee Review", consisting of a rate study, shall be provided to the Authority for review no later than the final submission of the plans and specifications. The user fee review shall determine annual costs for a five-year basis, replacement costs for 40 years, and develop a recommended fee structure for the community system based on a basic fee for administrative costs and a metered rate per 1,000 gallons of use.

#### **12 VAC 5-590-140      *Variances***

H. The Applicant may apply to LCSA for variances to these Community Water Standards provided the variance requests are brought to the attention of the Authority prior to the approval of the Preliminary Engineering Report.

#### **12 VAC 5-590-200      *Construction Permits***

G. The Authority must review and approve the construction drawings, plans and specifications for a project pursuant to construction permit issuance and will submit the same to Virginia Department of Health for a Certificate to Construct. The construction permit references the executed Community Water System Agreement between LCSA and the owner/developer and summarizes the terms and conditions between the parties. Complete execution of this agreement is required before the project receives approval by the Authority's Engineer. Virginia Department of Health requires a construction permit to be issued and executed by an engineer certified in the State of Virginia as a Professional Engineer.

Upon approval, the Authority will send notice and a construction permit for execution. Acceptable performance/labor and materials payment bond in the

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amount estimated for the installation of these utilities, as agreed by the developer's consulting engineers; certificate of insurance; payment of inspection fees; submission/approval of associated easement/record plats must be in place prior to issuance of construction permit. Once all necessary items are in place, the Authority will fully execute the permit and send approved plans and permit to Inspections Department for pre-construction meeting.

H. Prior to commencement of construction, a mandatory pre-construction conference shall be held and a list of major process equipment shop drawings to be reviewed by the Authority shall be established. The Applicant shall submit its proposed agenda to the Authority for approval at least seven days prior to the conference.

**VAC 5-590-210      *Formal Requirements for the Submission of Engineering Data***

A. In accordance with Exhibit 1, provide a "Basis of Design" report which shall include:

A1. Proposed Service Area including a detailed vicinity map showing individual lots within the proposed subdivision layout; and the required system capacity based on number of proposed lots and Authority-required flow rates and number of wells.

A2. Treatment Technology to include applicable (and Authority acceptable) treatment technologies; provide a process flow diagram for each unit process.

A3. If necessary, life cycle cost comparisons among competing technologies considering initial and replacement costs, maintenance costs, operational costs and reliability.

A4. For selected treatment technology, provide design criteria, catalog cutsheets of major process equipment, and a detailed process flow diagram showing number of units and capacities of the major process equipment components. Design criteria must meet the more stringent of VDH Waterworks Regulations or LCSA standards. Calculations submitted shall include hydraulics, process chemistry, anti-flotation calculations, and water hammer analyses. Water hammer analyses may be waived by the Authority for booster pumping station capacities less than 500 gallons per minute, or station pressures less than 50-feet total dynamic head. Systems where column separation can occur shall have water hammer analyses conducted.

B. Before the Authority will review the Applicant's plans and specifications, the Applicant must pay applicable engineering review fees as described in the Community Water System Agreement.

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**12 VAC 5-590-260      *Issuance of the Operation Permit***

B. The Applicant shall complete and submit the “Statement of Completion of Construction” to the State upon its satisfaction that the Treatment Works meets the requirements of the approved plans and specifications and only when a final inspection by the VDH is warranted. LCSA shall approve the “Statement of Completion of Construction” prior to the Applicant submitting it to the State.

C. The Applicant shall maintain record drawings of as-built conditions that vary from the work as originally shown on the contract drawings. The Applicant shall submit AutoCAD electronic files of the record drawings to the Authority within 30 days after completion of construction and prior to acceptance of the facility by the Authority. Provide coordinates for field location of valves, manholes, and other buried facilities in accordance with the Virginia State Plane Coordinate System (NAD 83).

D. Draft and Final “Operating and Maintenance Manuals” must be approved by the Authority before substantial completion and prior to submittal to the VDH for approval.

**12 VAC 5-590-270      *Inspection and Correction***

C. The Authority will accept or reject shop drawings for major process equipment and provide inspection of the Community Water Systems in accordance with the Community Water System Agreement. All shop drawing submittals shall bear the stamp of approval of the Applicant as evidence that the Applicant has checked the shop drawings. Submittals without this stamp of approval will not be reviewed and will be returned to the Applicant for resubmission. The Applicant shall cite in the letter of transmittal all shop drawing variances from the requirements of the Contract Documents and the design modifications proposed to accommodate the variances. If variances are not cited, the Applicant will not be relieved of the responsibility for executing the work in full conformance with the Contract Documents even though such submittals have been accepted by the Authority.

D. Pumps and other major process equipment shall be certified by the manufacturer. Certifications shall be provided to the Authority prior to shipping to the site.

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## **PART II OPERATION REGULATIONS FOR WATERWORKS**

### **Article 1 Drinking Water Standards**

No Supplements

### **Article 2 Operation of Waterworks**

No Supplements

### **Article 3 Cross-connection Control and Backflow Prevention**

No Supplements

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## **PART III    MANUAL OF PRACTICE FOR WATERWORKS DESIGN**

### **Article 1    General**

#### **12 VAC 5-590-640    *General***

B.    Surveying shall meet State grid coordinate specifications. Provide four northern Virginia grid coordinates for plan views and two horizontal and vertical control benchmarks per site. All drawings shall be 24 x 36-inches in size. Pipeline profiles shall have a horizontal scale of 1" = 50' or less.

#### **12 VAC 5-590-690    *Capacity of Waterworks***

Comply with paragraphs A through C and the following:

A.    Add: Average daily design flow shall be based upon 500 gpd/connection. Peaking factors shall comply with the Authority's Design Standards. Treatment works shall be sized to match the well pumping capacity

B.    Add: Minimum acceptable effective storage for domestic purposes shall be not less than 400 gallons per equivalent residential connection at minimum working pressure.

C.    Add: Minimum working pressure at service connections shall be 40 psi at peak hourly flow rates under build-out conditions and with system equalization storage at either low levels or pressures.

D.    All groundwater systems shall provide the number of wells that are anticipated to be capable of continuously pumping no less than 1.0 gpm per connection for sixty (60) consecutive days:

D1.   Groundwater systems having more than fifty connections shall have the following number of hydrogeologically independent wells. (All well yield combinations stated below refer to the minimum pumping test rates to be used during a 72 hour groundwater testing program, as described in Article 2 Section A3d of this document):

D1a. Two wells producing a combined total of 1.6 gpm per connection; the smallest of which must produce a minimum of 0.6 gpm per connection.

D1b. Three wells; each producing a minimum of 0.6 gpm per connection. Two wells shall be in service; the third well shall be identified during initial blow tests and reserved as a backup well with the required easements. Once the development reaches 60% of buildout, LCSA will assess whether the backup well must be developed by the applicant and placed in service.

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D1c. Four or more wells, the two smallest of which shall produce a combined minimum of 0.6 gpm per connection and with the smallest well producing at least 0.12 gpm per connection. A standby well shall be identified during initial blow tests and reserved as a backup well with the required easements. Once the development reaches 60% of buildout, LCSA will assess whether the backup well must be developed by the applicant and placed in service. Wells in service shall produce a minimum of 1.2 gpm per connection.

D2. Groundwater systems serving twenty-six to fifty connections shall have at least two wells producing a combined total of 1.8 gpm per connection, the smallest of which must produce a minimum of 0.6 gpm per connection.

D3. Groundwater systems serving twenty-five or fewer connections shall have at least two wells producing a combined total of 2.4 gpm per connection, the smallest of which must produce a minimum of 0.6 gpm per connection.

D4. For Karst geology areas, the risk of well failure is higher. Therefore, all such groundwater systems shall have in addition to what is stated above at least one additional standby well developed and producing at least 0.3 gpm per connection.

#### **12 VAC 5-590-710      *Site Layout***

G. Provide exterior lighting around all major process equipment and controls with illuminance ranging from 10 to 20 foot-candles.

H. Fencing shall be black, PVC-coated (ASTM F668 Class 2b) chain link (8 feet fabric height) with 3 barbed wire strands on top and no top rail. Gateposts shall be 4 inches in diameter and corner posts shall be 2.625 inches in diameter. Provide pad lock per LCSA standard with a shank size of 1/4 inch in diameter.

I. Provide facility address sign at facility entrance in accordance with the Authority's standard detail.

J. Building sites shall have bituminous concrete roadways and parking areas equal to 3-inch intermediate (IM1-A) on 6-inches of 21A bedding. A minimum of three parking spaces shall be provided. A turnaround area shall be provided for delivery trucks. Roadways to treatment and pumping facilities shall be gated. The gates shall have reflectors. In cases where the treatment plant and/or pumping facility are fenced, the gate shall be a fenced gate with pad lock per LCSA standard with a shank size of 1/4 inch in diameter. Where the treatment plant and/or pumping facility is not fenced, the gate shall be constructed in accordance with the Authority's standard detail.

#### **12 VAC 5-590-720      *Building Layout***

Comply with paragraphs A through M of the Waterworks Regulations and the following:

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N. Provide suitable architectural treatment. Brick/block shall be provided. Provide quality interior block paint. Split-faced CMU with foam insulation may also be used. Slope roofs and provide aluminum gutters with leafguards and downspouts. Use standing seam roof for high visibility areas. Soffit and fascia shall be of low maintenance vinyl materials. Provide moisture-resistant painted drywall finish on interior walls; insulate drywall in laboratory and hypochlorite storage areas in accordance with Loudoun County code for residential occupancy.

O. The Authority owns and operates a communal systems regional laboratory. As such, the minimum laboratory space may be waived by the Authority during the "Basis of Design".

P. Floor slabs within all buildings shall be steel reinforced and shall be 6-inches above finished grade and sloped 1/8-inch per foot to a floor drain. Provide industrial grade vinyl tile, or equal, for office and laboratory areas. Floor drains shall be provided in laboratory and lavatory. Well blowoff line and floor drain shall have separate discharge piping to grade (if possible) with a screened or capped discharge end.

Q. Provide 3-foot separation between all equipment and walls or other equipment.

R. Provide standard Authority building inventory to include suitable shelving, desk and chair for operators, as well as file cabinet for on-site record storage.

S. Provide lightning arrestor/protection for each well pump and treatment system control panel.

T. Provide running time meters for all pumps.

U. Doors shall have a closer and wall mounted hook doorstop and keys shall be matched using the LCSA standard.

V. Electrical equipment shall meet the following Authority standards:

- Breakers shall be Square D or Cutler-Hammer.
- Provide automatic reset and startup for all electrical relays.
- Provide electrical receptacles on all walls, a maximum of twelve feet apart.
- Exterior control panels shall be stainless steel NEMA 4X. Interior control panels shall be fiberglass NEMA 4X.
- Do not mount equipment and electrical panels on tanks or wet wells.
- Provide lights over all exterior doors.

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- Provide GFI protected electrical outlets every 30 (horizontal) feet.

W. Treatment facilities shall provide Authority standard equipment, to include laboratory equipment and supplies, flow indicator, totalizer and digital recorder for production flow monitoring, Heat and air-condition laboratory and sodium hypochlorite storage rooms. Provide first aid kits per ANSI Z308.1, and provide fire extinguishers per NFPA 10.

### **12 VAC 5-590-740 Maintenance and Servicing of Equipment**

Add – Specifications for major process equipment shall include provisions for training of LCSA personnel in operation and maintenance of the equipment. Minimum training provided shall include 3 separate days of on-site instruction to allow attendance by different shifts of LCSA personnel. Instructors shall be certified by the equipment manufacturers as competent to provide the required training.

Add – At the option of the Authority, the applicant shall provide a lump sum payment to the Authority equal to three percent of the construction costs of major process equipment in lieu of manufacturer-recommended spare parts. Under this option, the Authority will order and store spare parts.

### **12 VAC 5-590-780 Wall Castings**

Pipe through floors and wall shall have sleeves with Link-Seal or equivalent.

### **12 VAC 5-590-800 Disinfection**

- 1a. Use of liquid chlorine (to be used as a gas) is prohibited.

## **Article 2 Source Development**

### **12 VAC 5-590-840 Groundwater Sources**

Comply with paragraphs A through C and the following:

- A. Add:

Hydrogeological study is required per Loudoun County FSM/LDSO, and shall be approved by Loudoun County Health Department and a copy provided to the Authority for review and comment. All wells shall be Class I construction.

A1a. A 100-foot radial or 200-foot square well lot will be required as a minimum for each well.

A2d. Wells shall not be located within any major 100-year flood plain (per Loudoun County codified ordinance).

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A3d. A 72-hour yield test followed by recovery test must be performed. If more than one well is proposed, the yield and recovery tests must be simultaneous for all the wells. Note that the Authority requires minimum of 1.2 gpm production for each residential connection to the system. Well yield and drawdown information will be subject to disapproval if the information is older than five years, is not performed simultaneously with other nearby proposed wells, or negatively impacts existing nearby potable wells.

A3e. A total of 20 water samples for total coliform analysis using MPN method must be collected from each well. Samples must be collected in accordance with an approved plan starting 8 hours after the yield test has begun. This groundwater sampling plan will be submitted to LCSA as part of Article 2 Section A3i below. If concentration of total coliforms in any sample is greater than 3, the sample must further be analyzed for presence of fecal coliforms.

A3f. Water samples for complete chemical, physical and radiological analyses must be collected towards the end of the yield test, e.g., 70th hour for 72-hour test. List of the parameters to be analyzed must comply with the most recent edition of the Waterworks Regulations and any upcoming federal regulations.

A3g. A daily log of weather conditions during the pumping test program must be kept by the driller. The log must include rain events and their magnitude.

A3h. Results of all sample analyses shall be submitted to the Authority and to the Virginia Department of Health if it so desires, as part of the overall hydrogeologic report (see Section A).

A3i. A written schedule of events shall be submitted to the Authority two weeks prior to start of the above evaluation. The Authority normally will provide comments within five days after receipt.

A3j. Any negative impact to surrounding wells is unacceptable must be addressed by the applicant to the satisfaction of the respective owners of the wells.

A3k. Well house piping shall utilize the following:

- Separate blowoff lines and floor drains (provide blowoff lines downstream of the meter and check valve)
- Concrete headwalls for termination of drain lines; cover flanged discharge opening with #4 mesh stainless steel screen and bolted flange.
- Link Seal or other approved system for all pipe sleeves within slabs or walls
- Dresser couplings

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- Straight pipe at least 5 times the pipe OD prior to meters
  - 12-inches minimum vertical distance between floors and flanges
  - ¾-inch brass ball valves for sample taps

### **Article 3 Processes and Devices**

#### **12 VAC 5-590-850 General**

Comply with section 850 and the following:

- A. Treatment systems shall be based on conventional technology and be supported by references, if required by the Authority, from five similar systems each with at least three years of successful operation at buildout capacity demand. Examples of conventional technology are manganese greensand filters for iron, manganese, and radium removal, hypochlorination for disinfection, sequestration for very low levels of iron and manganese, and addition of VDH-approved chemicals for corrosion control.
- B. Provide a water meter for each commercial and residential connection.

#### **12 VAC 5-590-860 Chemical Application**

Comply with paragraphs A through F of the Waterworks Regulations and the following:

B8. Chemical systems utilizing sodium hypochlorite shall utilize 15% solutions per AWWA B300 standard.

C1. Chemical feed systems shall use liquid solutions or, if approved by the Authority, liquid solutions prepared from dry chemicals. A spare chemical feed pump shall be provided for each system. Adequate facility room and climate control shall be provided for bulk chemical storage and solution day tanks, as the Authority deems necessary.

C3c. The applicant shall provide secondary containment for day solution tanks and raw chemical drums, adequate raw chemical transfer equipment, and calibration tubes for all chemical feeders; size chemical feeders to operate near middle of capacity range; and provide separate chemical storage room and ventilation for highly corrosive chemicals.

C3d. Chemical feed systems shall have the following:

- Peristaltic type feed pumps with an antisiphon valve
- Translucent solution tank with liquid level scale

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- Vacuum breaker on makeup water spigot when hoses are used
  - Temperature control for hypochlorite storage
  - Protective equipment (rubber apron, rubber gloves, combination face shield/head gear, safety shower and eyewash station)

#### **Article 4 Pumping Facilities**

##### **12 VAC 5-590-1030 Groundwater Facilities**

Comply with paragraphs A through E and the following:

- A5. Well meter shall have counter that has readout suitable for RTU service.
- A8. Drawdown gauges and airlines are prohibited. Provide Authority-approved level transducer with data logger.
- A9. Well pumping controls shall be based on storage tank level and shall utilize remote LCD tank level indicators and include provisions for future SCADA transmission utilizing RTUs. Alarm conditions shall include storage tank high water and low water level, well pump failure, system low pressure, and power failure
- C. Add – Electric power cables shall be attached to the pump riser with approved plastic fasteners. Adhesive tapes are prohibited.

##### **12 VAC 5-590-1040 Pump Stations**

Comply with paragraphs A through K and the following:

- A7. Pumping stations shall be protected against lightning.
- I4. Pump motors 20 horsepower and larger shall be 480 volt and shall be equipped with reduced-voltage starters.

#### **Article 5 Finished Water Storage Structures**

##### **12 VAC 5-590-1080 General**

Comply with paragraphs A through O and the following:

- P. Storage tanks for individual community systems shall be glass-lined bolted tanks conforming to AWWA D103. Glass-lined tanks shall have the following:
  - Copolymer caps on all interior and exterior nuts and bolts

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- Fall prevention system equal to Saf-T-Climb, and two climbing harnesses. Provide foldback on ladder to prevent unauthorized entry.
  - Curbed, sleeved and sealed float tube entrance through the roof
  - Drain tank sump within the concrete foundation
  - Ductile iron pipe, Class 52, tank overflow and drain pipes
  - Independently valved tank drain
  - Adequate roof vent area for draining (vacuum) and filling
  - Lightning protection
  - Two lockable access hatches on opposite ends of tank shell bottom
  - Standard cobalt-blue exterior finish unless otherwise approved
  - Brackets on tank roof for future attachment of two communications antennae
  - Contract documents shall include a foundation design, and provisions for blinding and filling of the tank by the contractor.

Q. Provide a valved connection between the well supply and the gravity storage tank suitable for a portable truck hook-up in case the gravity tank is taken off-line for maintenance or repair.

### **12 VAC 5-590-1100 Distribution Storage**

Comply with paragraphs A through C and the following:

D. Gravity storage (elevated tank, reservoir or standpipe) facilities shall be used where practical. If one or more hydropneumatic tanks are required, at least two booster pumps shall be provided for each tank. The maximum-hour domestic demand flow, per Waterworks Regulation 12 VAC 5-590-690, paragraph C, shall be met with the largest pump offline.

E. Elevated tanks and standpipes shall be provided with Saf-T-Climb fall prevention system and separate inlet/outlet lines for standpipes with weephole near bottom of internal inlet. Floats and electrodes are prohibited within tanks; provide ultrasonic level transmitters.

F. Hydropneumatic tank systems shall be provided with lead/lag air compressors. Standby generator (or adequate connection for portable generator) shall be provided with 36 hours of fuel storage and capability to power

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the closest water supply well, booster pumps and air compressors to meet the peak demand.

G. Instrumentation, control and monitoring systems (ICMS) for storage tanks shall include telemetry via autodialer for the following alarms: well pump failure, tank HWL/LWL, low system pressure, power failure, and loss of radio transmitter signal. System shall be adaptable for future SCADA system. Provide LCD readout of tank level at well pump stations.

## **Article 6 Water Distribution Systems**

### **12 VAC 5-590-1110 Materials**

Comply with paragraphs A through E and the following:

F. Piping materials shall be provided in accordance with Table 1 herein.

G. Provide distribution system sample stations per LCSA specifications.

H. Provide LCSA temporary blowoff assembly for pipe sizes less than 6-inches. Do not place blowoff assemblies or valve boxes in unpaved or gravel areas of rights-of-way.

I. Materials shall be listed in the latest edition of the LCSA Approved Products List: Water and Sewer.

### **12 VAC 5-590-1130 System Design**

Comply with paragraphs A through C and the following:

D. Hydraulic analysis

D1. A computerized hydraulic analysis of the distribution system shall be submitted to the Authority for approval.

D2. Water distribution system design shall comply with the Authority's "Design Standards", as applicable.

<b>TABLE 1 Piping Materials</b>		
<b><i>Application</i></b>	<b><i>Size</i></b>	<b><i>Specification</i></b>
Distribution Mains	3-inches & larger	Ductile Iron Pipe AWWA C151, Class 52 minimum, or PVC, AWWA C-900, DR18, w/AWWA C110 or C153 MJ fittings.
Process Piping above grade	3-inches & larger	Ductile Iron Pipe AWWA C151, Class 52 minimum w/AWWA C110 flanged fittings
	2-inches & smaller	Black Steel Pipe ASTM A53, Schedule 40, or PVC, ASTM D2241 Schedule 80 w/sch. 80 fittings
Yard Piping below grade	3-inches & larger	Ductile Iron Pipe AWWA C151, Class 52 minimum w/AWWA C110 or C153 MJ fittings
	2 ½-inches & smaller	PVC ASTM D2241 SDR 13.5*
Water Service	¾-inch & larger	Copper, Type L ASTM B88  * Use VDOT No. 8 stone in lieu of LCSA Standard

**NOTES:**

- 1. Wall clamps shall not be utilized for pipe constraints**

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**ATTACHMENT**  
**Model Water Agreement**