COMMONWEALTH of VIRGINIA

Karen Shelton, MD
State Health Commissioner

Department of Health
P O BOX 2448
RICHMOND, VA 23218

TTY 7-1-1 OR
1-800-828-1120

WATERWORKS CONSTRUCTION PERMIT

Permit No.:	92972	**Subject:**	Louisa County
Effective Date:	September 04, 2025	**Water:**	LA Resort, LLC
Expiration Date:	September 04, 2030	**PWSID:**	2109345

Issued to:
WG Construction Company, INC.
9251 Industrial Court
Manassas, Virginia 20109

ATTN: Mr. Nguyen, nguyenh@wgconstruction.com

This Waterworks Construction Permit is issued in accordance with Title 32.1 of the *Code of Virginia*, and 12VAC5-590 *et seq*. of the *Waterworks Regulations.* This is your authorization from the State Health Commissioner to construct the project in accordance with the approved documents. The plans titled "Lake Anna Resort Water Treatment Plant Louisa County, Virginia" are dated June 11, 2025. The specifications titled "Lake Anna Water Treatment Plant Louisa County, Virginia" are dated June 11, 2025.

A Description Sheet of the proposed construction is enclosed.

This permit does not suspend, minimize, or otherwise alter the waterworks' obligation to comply with federal, state, or local laws and regulations or permits.

Any deviations from the approved documents affecting capacity, hydraulic conditions, operating units, the functioning of the treatment processes, or the water quality delivered, must be approved by this Office before any such changes are made. Pursuant to 12VAC5-590-240 B, revised plans and specifications shall be submitted in time to ODWConstructionPermits@vdh.virginia.gov to allow the evaluation and approval of these plans or specifications before any construction work that will be affected by these changes may begin.

Upon completion of construction:

- In accordance with 12VAC5-590-250, the owner must submit a statement signed by a professional engineer licensed in Virginia certifying that the work was completed in accordance with the approved documents to ODWFieldOffice4@vdh.virginia.gov. If applicable, this certification must include copies of bacteriological analysis results.
- The owner must contact the regional ODW field office to determine if a final inspection is required in accordance with 12VAC5-590-260 A, and to schedule a final inspection if required.

You can find contact information for ODW field offices at: vdh.virginia.gov/drinking-water/contact-us/.

Upon the ODW Field Office's acceptance of the statement of completion of construction and, if applicable, notification of a satisfactory completion of a final inspection by field staff, ODW will notify you that the project may be placed into service. If required, ODW will then issue or amend your waterworks operation permit in accordance with the *Waterworks Regulations*.

If we can be of additional assistance, please contact ODWConstructionPermits@vdh.virginia.gov.

Sincerely,

Aaron Moses

Aaron D. Moses, PE
Field Services Engineer
Office of Drinking Water

Enclosure :

Description Sheet of Proposed Construction
Statement of Completion of Construction

ec:

Consulting Engineer: Mr. David J. Rigby, PE, rigbyd@wgconstruction.com
Blue Ridge Health District, john.mcclelland@vdh.virginia.gov
Louia County Administrator, Info@louisa.org
Louisa County Building Official, jgrubbs@louisa.org
ODW, Richmond Field Office, james.reynolds@vdh.virginia.gov, tanni.sarker@vdh.virginia.gov

VIRGINIA DEPARTMENT OF HEALTH
DESCRIPTION SHEET
of Proposed Construction

PROJECT DESCRIPTION

The purpose of this project is to provide a water supply and water treatment system for a new community, which includes 114 condominiums, a hotel, a restaurant, a swimming pool and marina. The project is located in Lake Anna PUD, Louisa County, Virginia.

The project consists of a community water system including two onsite wells equipped with submersible pumps and controls, an iron removal with a chlorination system, an underground finished water storage tank, three booster pumps for domestic use, two fire flow pumps, a hydropneumatic tank, and a distribution system comprising approximately 2,393 feet of 8-inch diameter, 277 feet of 6-inch diameter main distribution pipe, and 134 feet of 2 -inch diameter pipe feeding all residential and commercial buildings, and approximately seven fire hydrants. All distribution piping and valves will be installed within the subdivision roadways and will be constructed of C-900 polyvinylchloride (PVC) or epoxy-lined ductile iron pipe (DIP). In addition, the project includes the construction of a 87ft by 50ft 6in waterworks building, a 9ft 8in by 26ft 6in electrical room, a 19ft by12ft office/lab room, a 20ft 6in by 12ft 8in chemical room and related appurtenances to provide a fully operational water supply and treatment system.

Raw water is pumped through the Iron and Manganese Treatment System (IMTS) by the individual well production pumps, which are activated based on the water level in the finished water storage tank. The tank level is continuously monitored by the IMTS control panel, which sends call-to-run signals to the two production wells. The IMTS automatically starts and stops according to its pre-programmed operating cycle. Only one filter will backwash at any given time. Chemicals are added to adjust the pH of the incoming raw water, and to provide chlorine for pre-oxidation of minerals in the raw water, and to provide a chlorine residual in the finished water. Finished water is pumped from the finished water storage tank through a 8-inch diameter PVC pipe into the distribution system using system feed pumps to meet water demand and a hydropneumatic tank to control system pressure. Fire flow is provided by fire flow pumps to meet high water demands during firefighting activities, with system pressure controlled by Variable Frequency Drives (VFDs) on the pump motors.

Drilled Wells

The new drilled well Class 2 (Well A) was started on March 6, 2023, and completed on March 7, 2023. The well was drilled to a depth of 400 feet with a 12-inch diameter bore hole from ground level to 45 feet and an 8-inch diameter bore hole from 45 feet to the final depth of 400 feet. The well was grouted with neat cement to 65 feet. The 8-inch diameter PVC casing extends from ground level to 95 feet depth, and 24-inch above ground. Well appurtenances include a watertight and a vented sanitary well cap, 6 ft x 6 ft x 6 inches apron around the well head and pitless adapter. The yield and drawdown test indicated a yield of 70 gpm after a 48-hour pump test on April 5, 2023. The well is equipped with a 10 h_p submerged pump with a 3450 RPM motor. Operating point with a flow control valve adjusted to 38 gpm @ 524ft TDH.

The new drilled well Class 2 (Well D) was started on March 9, 2023, and completed on March 9, 2023. The well was drilled to a depth of 340 feet with a 12-inch diameter bore hole from ground level to 72 feet and an 8-inch diameter bore hole from 72 feet to the final depth of 340 feet. The well was grouted with neat cement to 50 feet. The 8-inch diameter PVC casing extends from ground level to 80 feet depth, and 7-feet above ground. Well appurtenances include a watertight and a vented sanitary well cap, 6 ft x 6 ft x 6 inches apron around the well head and pitless adapter. The yield and drawdown test indicated a yield of 70 gpm

after a 48-hour pump test on April 5, 2023. The well is equipped with a 10 h_p submerged pump with a 3450 RPM motor. Operating point with a flow control valve adjusted to 38 gpm @ 524ft TDH.

Pressure storage tank: One 8,000-gallon hydropneumatic tank, with dimensions of 8ft by 22ft 4in, includes a tank-mounted air compressor, instrumentation, and control system with an effective volume of 952-gallon. The tank will operate within a pressure range of 72 psi to 85 psi.

Underground level finished water storage tank: One 200,000-gallon underground finished water storage tank with dimensions of 48ft by 48ft by12ft.

Pumps: Three pumps rating 150 gpm @ 189 ft TDH, 15 h_p, 3-phase, positive displacement, NPSH (req) 18ft.

Fire flow pumps: Two fire flow pumps rating 1,000 gpm@188ft TDH, 75 h_p, 3-phase with variable frequency drives.

Chemical Feed Systems: For the addition of sodium hydroxide (NaOH) and sodium hypochlorite (NaOCl) to the raw water lines and for contaminant removal and disinfection. Both chemical feeder pumps are adjustable up to 4.5gph (108gpd) and tank size 55 gallon.

GreensandPlus Filters: Two "MGA" iron removal filters with specifications for MGA-48: tank size 48in by 60in, service flow rate of 2-12 gpm/ft^2 and a minimum backwash flow rate of 12gpm/ft^2. Each dual media bed requires a minimum bed depth of 15-inch.

PROJECT CAPACITY EVALUATION

1. Estimated Water Demand:

Design Criteria (Engineer's values based on the number of employees/customers and household connections)

Type of Use	Units	# of Units	Unit Flow (gpd)	Average Daily Demand (gal)
Condominium multifamily residential	Person	399	100	39,900
Extended stay hotel with kitchenette	Room	130	165	21,450
Restaurant	Seating	150	50	7,500
Retails	Employee	20	15	300
Meeting Space	Person	125	5	625
Additional Water Demand				
Swimming pool and washroom (fixed demand)				1,000
Public restroom				4,000

Marina (fixed demand)		1,200
Total		**75,975**

Average daily demand: 75,975 gpd
Maximum daily demand: 75,975 gpd x 1.8(peak factor) = 136,755gpd
Peak hour demand: 75,975 gpd x 2.5(peak factor)/24 (hrs/day) = 7,914 gal

2. Source Water Capacity:

Well Name	Well Yield		Well Pump[1]		Limiting Capacity
Well A	70gpm	100,800 gpd	38gpm	54,720gpd	54,720 gpd
Well D	70gpm	100,800gpd	38gpm	54,720gpd	54,720gpd
Total					109,440gpd

gpd[1] = gpm x 1440 min/day

3. Storage Capacity:
Pressure storage tank – effective volume = 952gal
Underground finished water storage tank= 200,000gal
Total: = 200,952 gal
Available storage capacity at half-day storage = 200,952 gal/0.5 day = 401,904gpd

4. Delivery Capacity:
Booster Pump:
Number of Pumps: 3
Capacity = 3 (150 gpm) (1,440 min/day) = 648,000 gpd

5. Treatment Capacity:
Sodium Hypochlorite:
Chemical concentration: 12.5% = 125,000 mg/L
Metering pump capacity: 4.5gph (108gpd)
Required concentration: 2 mg/L
Capacity = [(125,000 mg/L)(108 gpd)] / 2 mg/L = 6,750,000 gpd

Media filtration:
Number of filters: 2
Total surface area: 2 x $\pi/4(4ft)^2 = 25.12ft^2$
Filtration rate: 2-12 gpm/ft²
Capacity = $(25.12ft^2)$ (10 gpm/ft²) (1,440 min/day) = 361,728 gpd

Backwash
capacity: $(25.12ft^2)$ (12 gpm/ft²) (1,440 min/day) = 434,074 gpd

Conclusion: After the proposed project is constructed and placed in operation, the permitted capacity of the entire waterworks will be evaluated.

STATEMENT OF COMPLETION OF CONSTRUCTION

Date: _____

Waterworks Owner: _____

Licensed PE: _____

For your use in complying with 12VAC5-590-250 of the Virginia *Waterworks Regulations*, I submit the following statement:

The construction work described as Lake Anna Resort Water Treatment Plant Louisa County, Virginia and permitted by the State Health Commissioner under Construction Permit No. 92972 issued on September 04, 2025, was completed in accordance with the approved plans and specifications, revised only in accordance with the provisions of 12VAC5-590-240, as described below, and including successful completion of all specified pressure testing, disinfection, and satisfactory bacteriological analysis results. Copies of bacteriological analysis results are attached to this statement as applicable.

In accordance with 12VAC5-590-250 B, all project specific requirements, including performance validation, process testing and validation, water quality testing, and operator training, are completed and reports and certificates of testing and training are attached to this statement as applicable.

In accordance with 12VAC5-590-240, all deviations from the approved plans and specifications affecting capacity, hydraulic conditions, operating units, the functioning of water treatment processes, or the quality of water to be delivered, were approved by the Virginia Department of Health under the following documents:

Revised Plans and Specifications/Addenda/Change Orders/Field Orders/Engineers Supplemental Instructions		
Number or Title	Execution Date	VDH Approval Date

This statement is based upon inspections of the waterworks during and after the construction.

Waterworks Owner Signature: _____ Date: _____
(Required if the waterworks owner is not the permit applicant)

Consulting Engineer Signature:_____Date:_____
Engineer Seal: