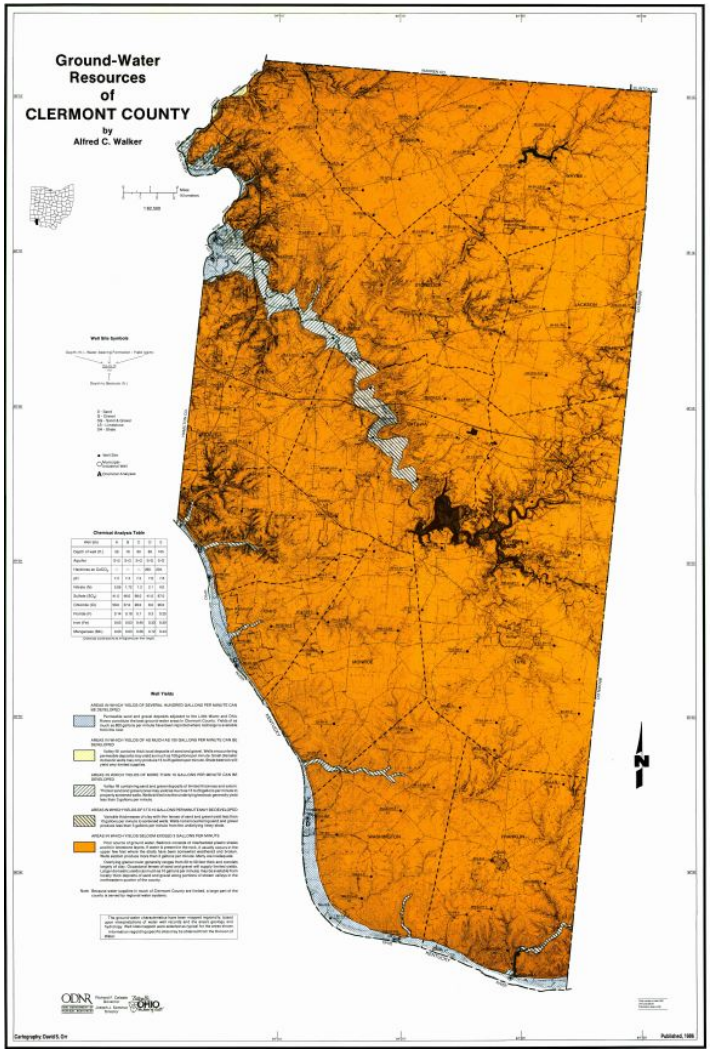
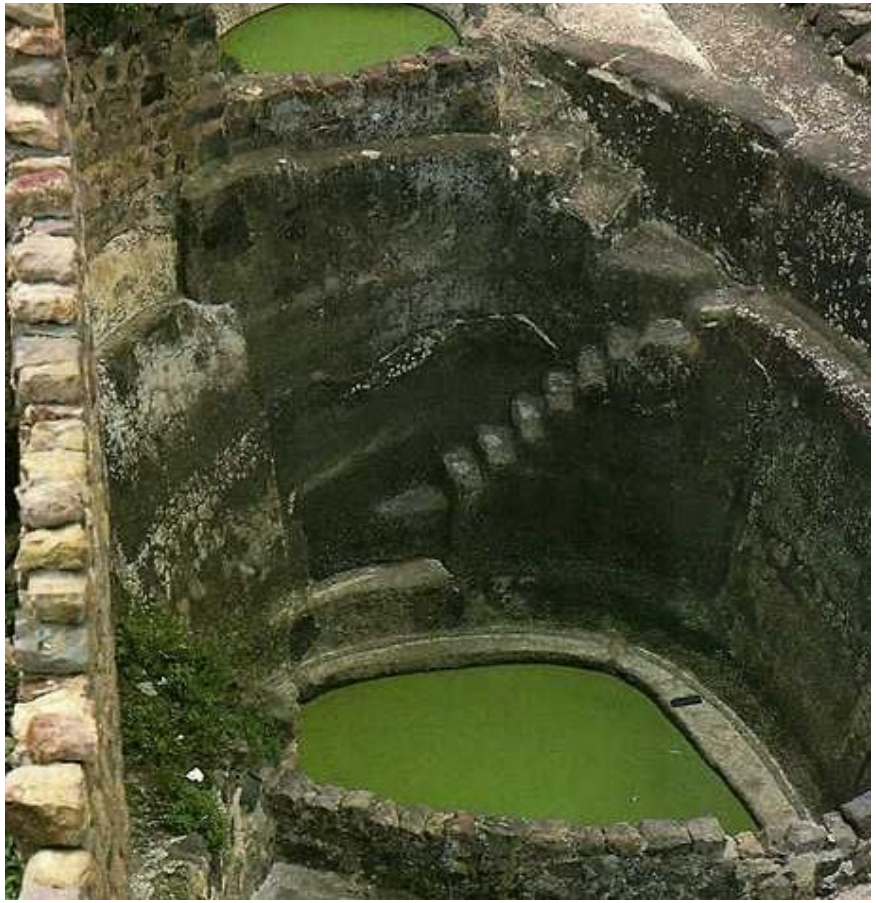
CISTERN CONSTRUCTION & ALTERATION REVIEW & INSPECTIONS

ROBERT WILDEY, FEATURING PAUL SANDERS
CLERMONT COUNTY PUBLIC HEALTH
MIDWEST WORKSHOP MARCH 27, 2019



Why cisterns? This is why.

A LITTLE HISTORY FIRST – ANCIENT CISTERN



Cisterns have been traced back to the Neolithic time period 12,000 years ago give or take a little.

Cisterns are about 4,000 years older than wells.

GREEK AQUEDUCT

Greece was one of the first civilizations known to direct water to cisterns via aqueducts.

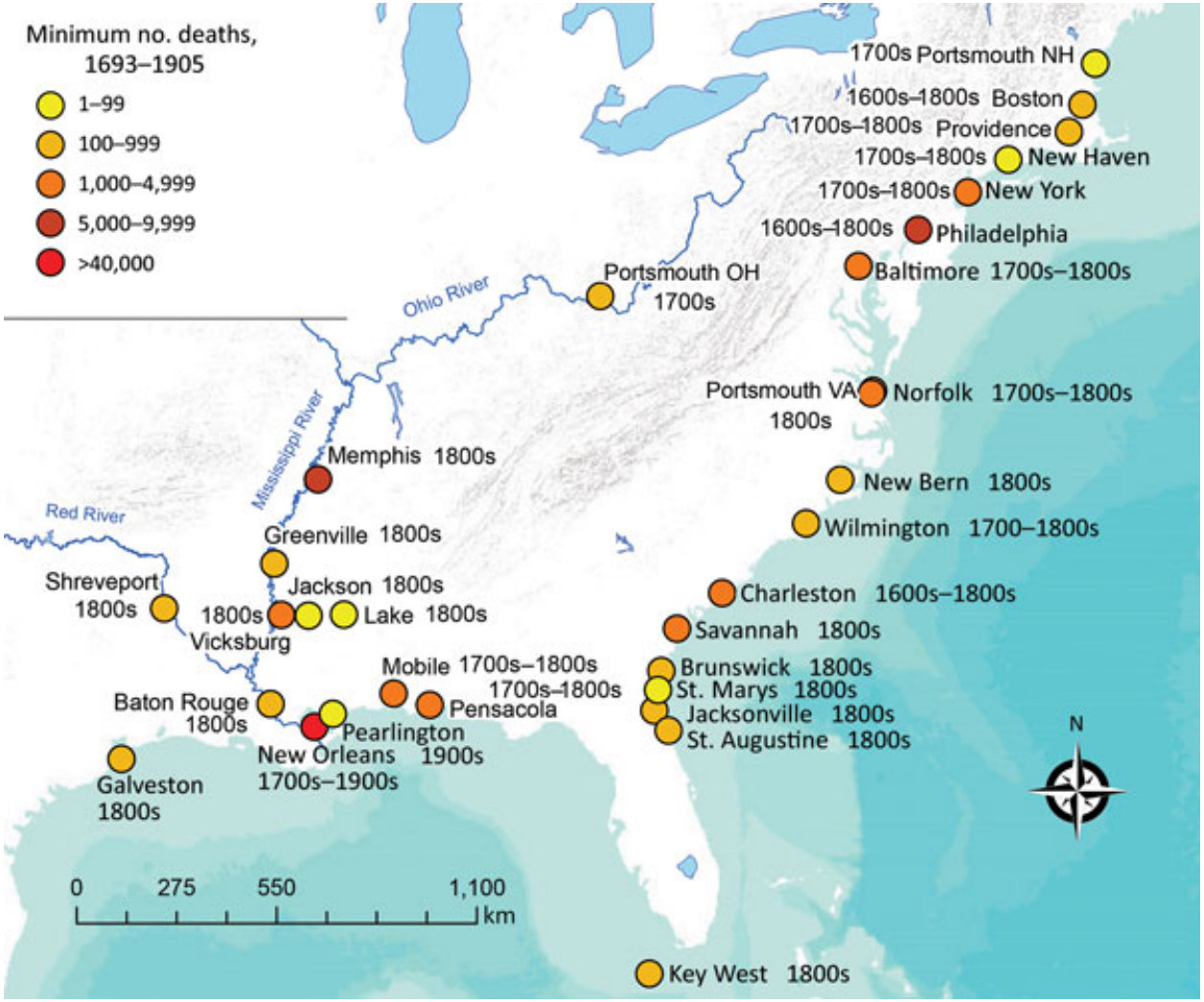
This was perfected by the Romans.

Aqueduct in Greek city of Kavala.

OPEN CISTERN

Image [or content, or "this material"] has been provided courtesy of InspectAPedia.com

In the 1700s there was a Yellow Fever outbreak in Portsmouth, Ohio. There is some speculation that open cisterns, where mosquitos can breed, contributed to these types of outbreaks.


Minimum no. deaths, 1693–1905
1–99
100–999
1,000–4,999
5,000–9,999
>40,000
Ohio River
Mississippi River
Red River
1700s Portsmouth NH
1600s–1800s Boston
1700s–1800s Providence
1700s–1800s New Haven
1700s–1800s New York
1600s–1800s Philadelphia
Baltimore 1700s–1800s
Portsmouth OH 1700s
Portsmouth VA 1800s
Norfolk 1700s–1800s
Memphis 1800s
New Bern 1800s
Wilmington 1700–1800s
Greenville 1800s
Jackson 1800s
Shreveport 1800s
1800s
Lake 1800s
Vicksburg
Charleston 1600s–1800s
Savannah 1800s
Brunswick 1800s
St. Marys 1800s
Jacksonville 1800s
St. Augustine 1800s
Mobile 1700s–1800s
1700s–1800s
Pensacola
Baton Rouge 1800s
Pearlington 1900s
New Orleans 1700s–1900s
Galveston 1800s
N
0
275
550
1,100
km
Key West 1800s

BEAUTIFUL CISTERN

Basilica Cistern, Istanbul, Turkey.
Built in the 6th century.

FUN(ISH)

Rainwater catchment cisterns in Illinois.

NOT PRETTY, BUT FUNCTIONAL

KINDA LIKE COMPARING…

APPLICATIONS

AND SUPPORTING DOCUMENTATION

MAKING THE APPLICATION

In recent years there was a change that required PWS application and all information be submitted at the same time as the STS application.

Application must be made at the same time as the Household Sewage Treatment System app.

Must have all the contractor's information at the time of application.

Must have PWS located on site plan.

Must show water collection system and roof washers.

Must show continuous disinfection system.

APPLICATION EXAMPLE

County	City	Local Fee	State Fee	Total Fee Owed	Receipt #	Permit #
	CLERMONT/ Stonelick TWP.				Miscellaneous - PRVWTR - 2017	111838

10/25/2017 12:54PM
PRIVATE WATER PERMIT (PRVWTR)
424.00
879.00

OHIO DEPARTMENT OF HEALTH

APPLICATION/PERMIT FOR A PRIVATE WATER SYSTEM

NOTE: Read the application instructions on the next page.
Complete form as directed. Form may be completed on the computer then printed or printed and completed by pen or typewriter.

CHECK ALL BOXES, IN THIS SECTION, THAT APPLY TO THE PERMIT REQUEST.

Type of Work:
- [X] New Construction
- [ ] Replacement System
- [ ] Alteration (includes expanding existing systems)
- [ ] Emergency Construction
- [ ] Emergency Alteration
- [ ] Sealing Only
- [ ] Conversion to a PWS
- [ ] Test Well

System will Serve:
- [X] Single family dwelling
- [ ] Two or Three family dwelling
- [ ] Multiple dwelling units* (Includes MHPs / Campgrounds)
- [ ] Building*

Type of PWS or Component:
- [ ] Well
- [ ] Spring*
- [ ] Pond*
- [X] Cistern*
- [ ] Hauled Water Tank
- [ ] Continuous Disinfection
- [ ] Other _____

System being Sealed:
- [ ] Well
- [ ] Cistern
- [ ] Hauled Water Tank
- [ ] Pond
- [ ] Spring

- [ ] Public Water Supply is being connected to the residence
- [ ] Geothermal system exists or is planned for this property

*NOTE: If the private water system will serve other than a one, two, or three family dwelling, detailed plans must also be submitted in compliance with rule 3701-28-03 (E) of the Ohio Administrative Code. See site plan addendums for ponds, springs, cisterns, multiple dwelling units, and buildings.

Top portion of Application.
Cistern box is marked!

APPLICATION MIDDLE SECTION

COMPLETE THE FOLLOWING INFORMATION

Property Street Address or Location (include City and Zip Code)	Parcel # (optional)	Township/City/Village
1791 MacKenzie Trace Batavia OH 45103		Stonelick

Owner's Name	Owner Mailing Address (Street #, Street, City, State, Zip Code)	Phone #
Steve Zanola	126 South 2nd St #2401 Loveland 45140	513-319-2628

☐ Check this box if the Owner and Applicant Information is the same. If checked do not fill in applicant information.

Applicant's Name	Applicant Mailing Address (Street #, Street, City, State, Zip Code)	Phone #
Dan Willig	PO Box 207 Mariemont OH 45039	513-379-5787

All persons, including homeowners, performing work on a private water system must be registered with the Ohio Department of Health as required in Ohio Administrative Code Rule 3701-28-18(A). If the contractor information is not known at time of application, it must be provided prior to the commencement of work as per the requirements in Ohio Administrative Code Rule 3701-28-03(A)(1).

Private Water Systems Contractor	ODH Registration #	Phone #
Sannes Services LLC	003625	(513) 623-6842

Must list the PWS contractor and be sure to verify the contractor is on the approved list at ODH!

BOTTOM SECTION

Notice to Applicant: This application will not be processed until the form bears the signature of the applicant and the date (below). This application must be accompanied by the site plan form(s) and the appropriate fee. This application is not approved until it has the date and signature of a registered sanitarian or sanitarian-in training employed by the local board of health.

I, the undersigned, hereby agree to install, construct, develop or alter the private water system named in this permit application in accordance with the attached site plan and all applicable rules governed by Chapter 3701-28 of the Ohio Administrative Code.

I, the undersigned, also understand that the issuance of this permit is conditioned upon the right of the department to enter upon the premises of the private system named in this permit at any reasonable time prior to, during, or after completion of the work specified in this permit for the purpose of determining compliance with Chapter 3701-28 of the Ohio Administrative Code.

I, the undersigned, agree to contact the local health department upon completion of the private water system in order for the local health department to perform the final inspection and collect the water sample.

I, the undersigned, understand that this permit will expire one (1) year from the date approved and all work must be completed by that date.

APPLICANT'S SIGNATURE	DATE OF SIGNATURE
Dan Willig	10-25-17

READ THE INSTRUCTIONS ON THE NEXT PAGE, THEN COMPLETE THE SITE PLAN FORM

Original w/ audit sticker – Health District Copy – Applicant/Property Owner Copy – Private Water Systems Contractor
HEA 5202 (REV. 3/11)

Be sure the application is signed and dated.

SITE PLAN FORM JOB INFO

County / City CLERMONT / STONELICK TWP.

Permit # 111838

OHIO DEPARTMENT OF HEALTH

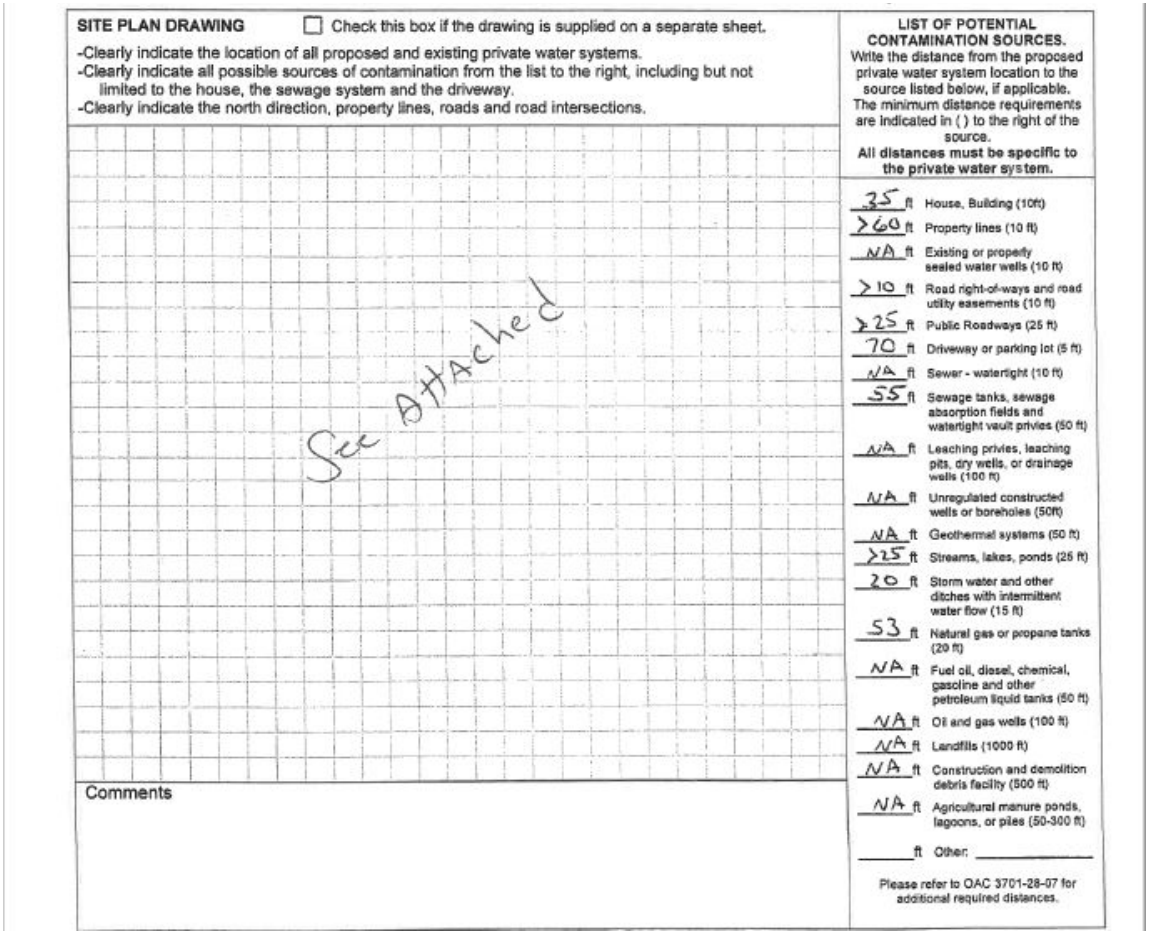
APPLICATION/PERMIT FOR A PRIVATE WATER SYSTEM SITE PLAN

Property Address	
1791 MacKenzie Trace Batavia Ohio 45103	
Owner/Applicant	Prepared by
Randy Sannes	Randy Sannes

A site plan addendum form will be required in addition to this site plan form if this private water system permit request is being obtained for:
1) any private water system servicing greater than a three family dwelling, or a building;
2) any private water system servicing a pond, cistern, spring, or private water system located in an area of known flowing well conditions.

Site plan is completely filled out including permit number.

SITE PLAN DISTANCES



SITE PLAN DRAWING ☐ Check this box if the drawing is supplied on a separate sheet.

-Clearly indicate the location of all proposed and existing private water systems.
-Clearly indicate all possible sources of contamination from the list to the right, including but not limited to the house, the sewage system and the driveway.
-Clearly indicate the north direction, property lines, roads and road intersections.

See Attached

Comments

LIST OF POTENTIAL CONTAMINATION SOURCES.
Write the distance from the proposed private water system location to the source listed below, if applicable. The minimum distance requirements are indicated in ( ) to the right of the source.
All distances must be specific to the private water system.

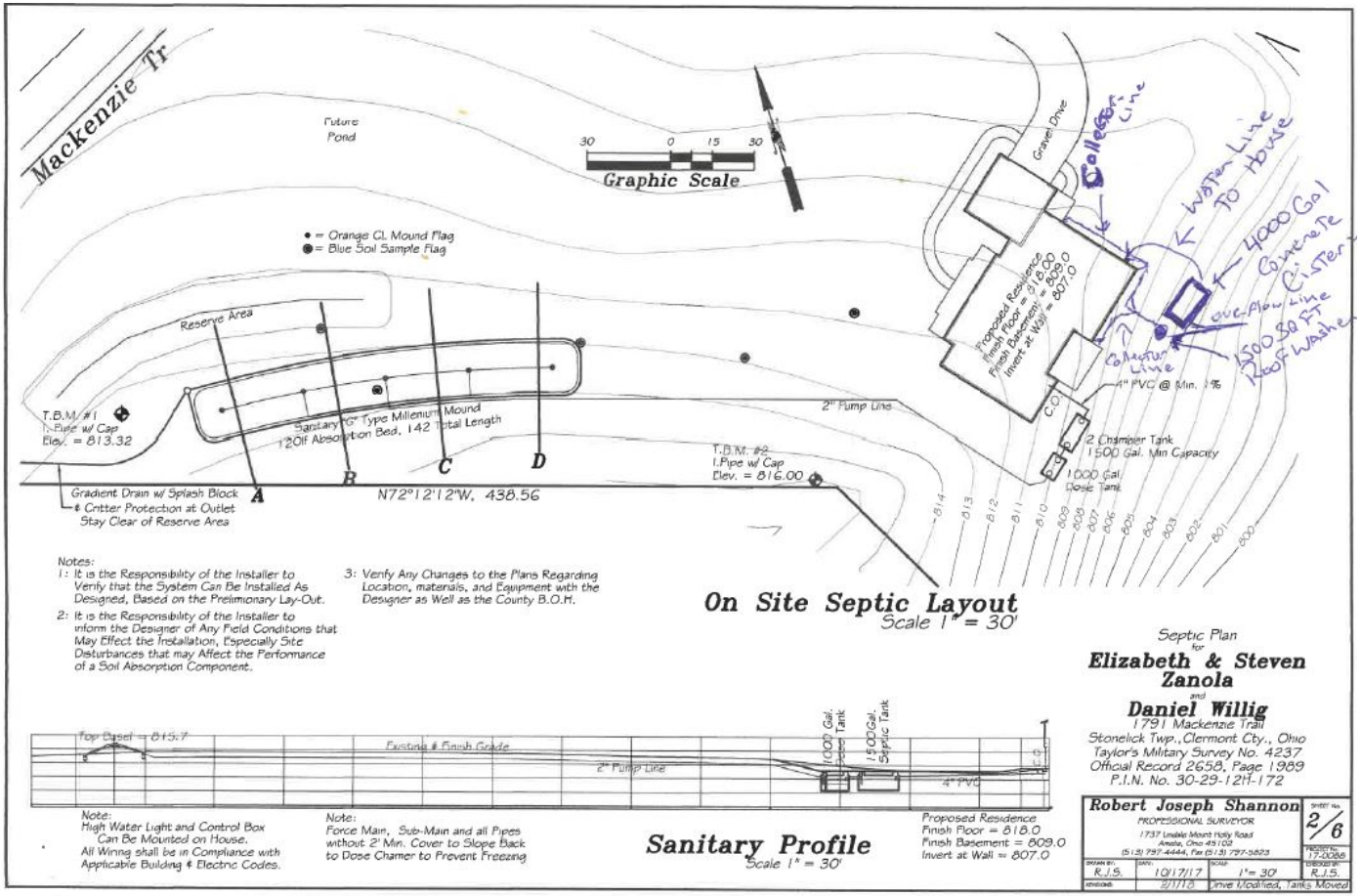
35 ft	House, Building (10ft)
>60 ft	Property lines (10 ft)
NA ft	Existing or properly sealed water wells (10 ft)
>10 ft	Road right-of-ways and road utility easements (10 ft)
>25 ft	Public Roadways (25 ft)
70 ft	Driveway or parking lot (5 ft)
NA ft	Sewer - watertight (10 ft)
55 ft	Sewage tanks, sewage absorption fields and watertight vault privies (50 ft)
NA ft	Leaching privies, leaching pits, dry wells, or drainage wells (100 ft)
NA ft	Unregulated constructed wells or boreholes (50ft)
NA ft	Geothermal systems (50 ft)
>25 ft	Streams, lakes, ponds (25 ft)
20 ft	Storm water and other ditches with intermittent water flow (15 ft)
53 ft	Natural gas or propane tanks (20 ft)
NA ft	Fuel oil, diesel, chemical, gasoline and other petroleum liquid tanks (50 ft)
NA ft	Oil and gas wells (100 ft)
NA ft	Landfills (1000 ft)
NA ft	Construction and demolition debris facility (500 ft)
NA ft	Agricultural manure ponds, lagoons, or piles (50-300 ft)
____ ft	Other: ____

Please refer to OAC 3701-28-07 for additional required distances.

Shows isolation distance information and refers to attached site plan.

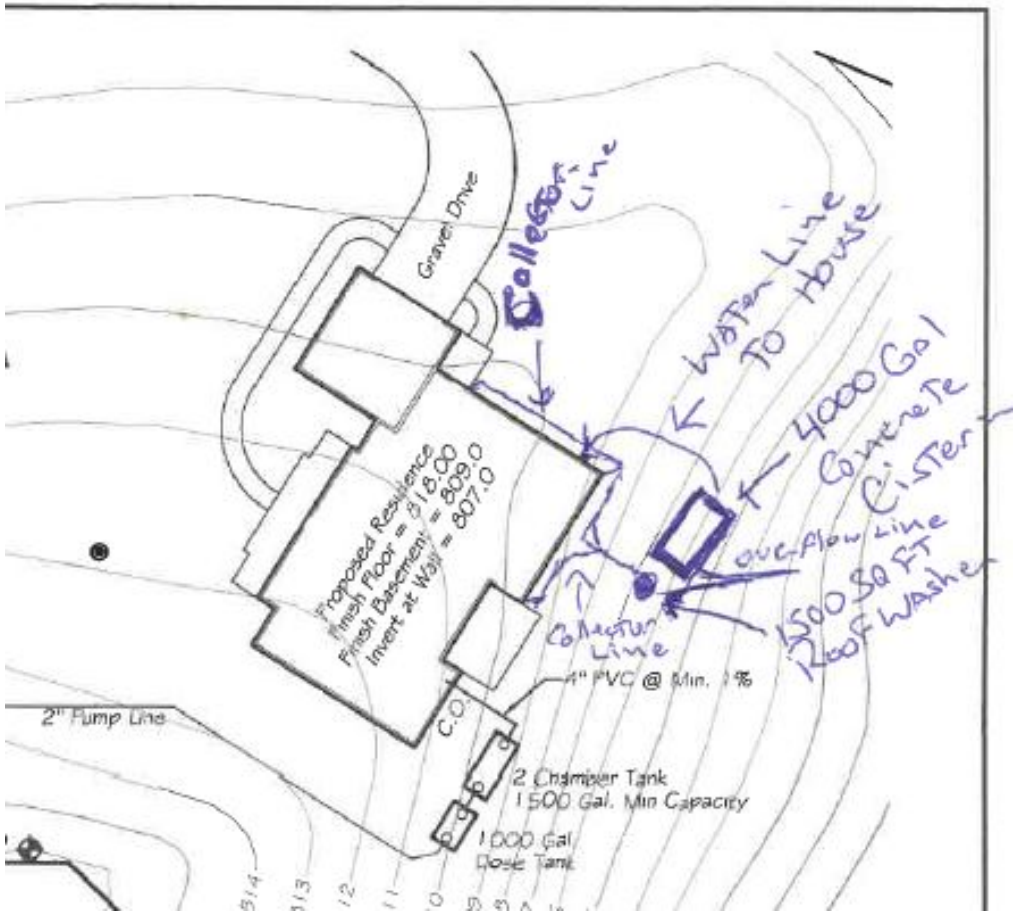
Either list the actual distance or N/A.

ATTACHED FULL SITE PLAN



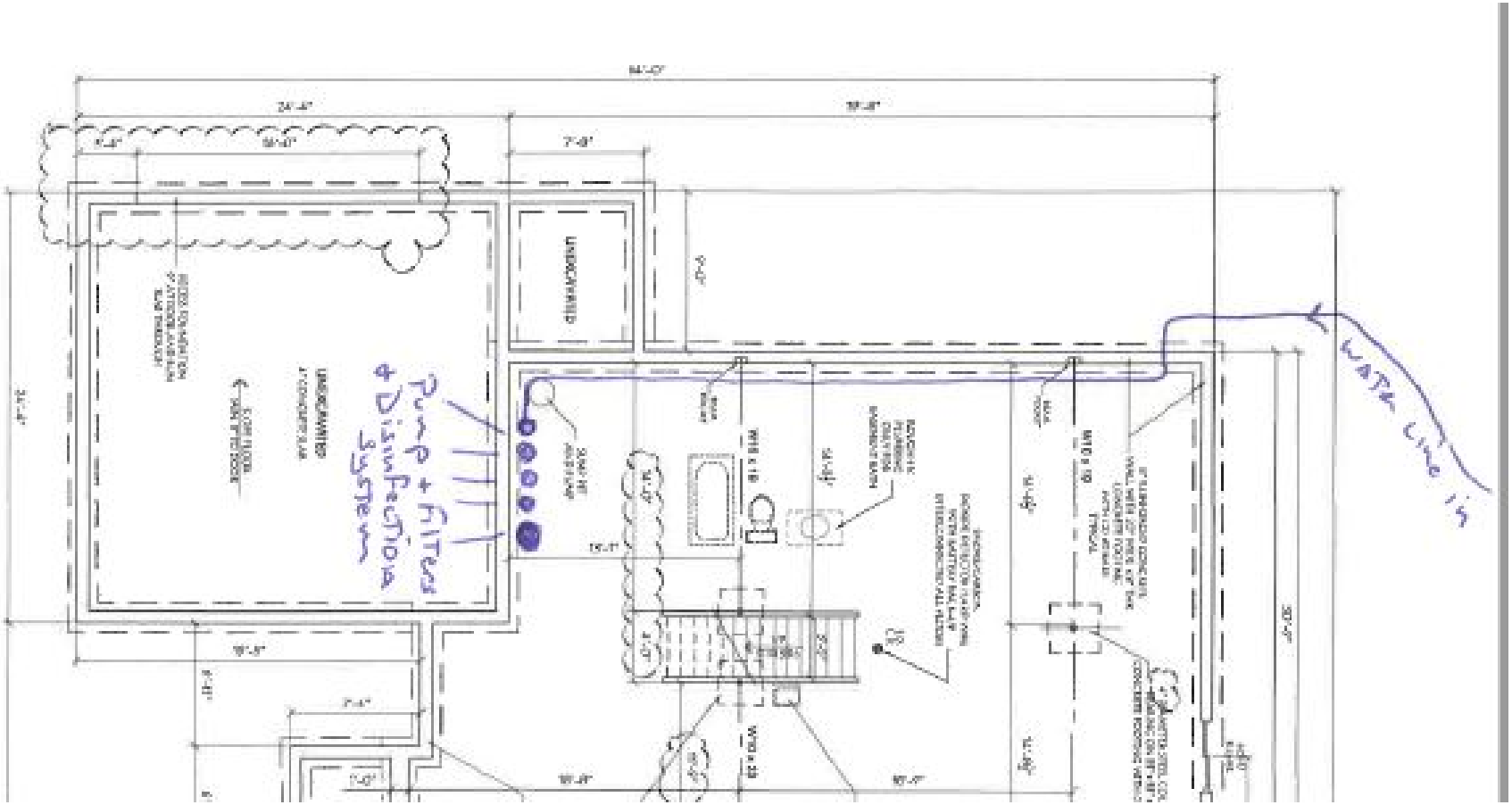
Shows location of STS, cistern, water collection pipes, roof washer and overflow pipe.

CLOSE UP OF PWS AREA



Isolation distances must be site verified.

EQUIPMENT ON FLOOR PLAN

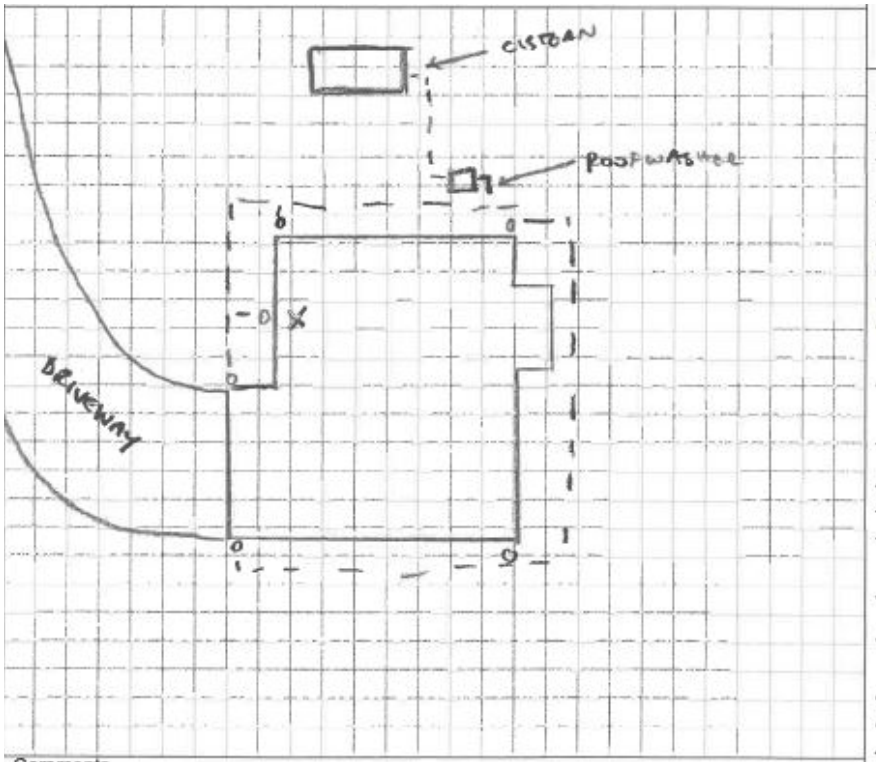


Water line from cistern to disinfection and pumping equipment.

PICTURE OF PLANNED EQUIPMENT LAYOUT

Many times the continuous disinfection system is identical to previous installations.

ANOTHER SITE PLAN EXAMPLE



source.
All distances must be specific to the private water system.

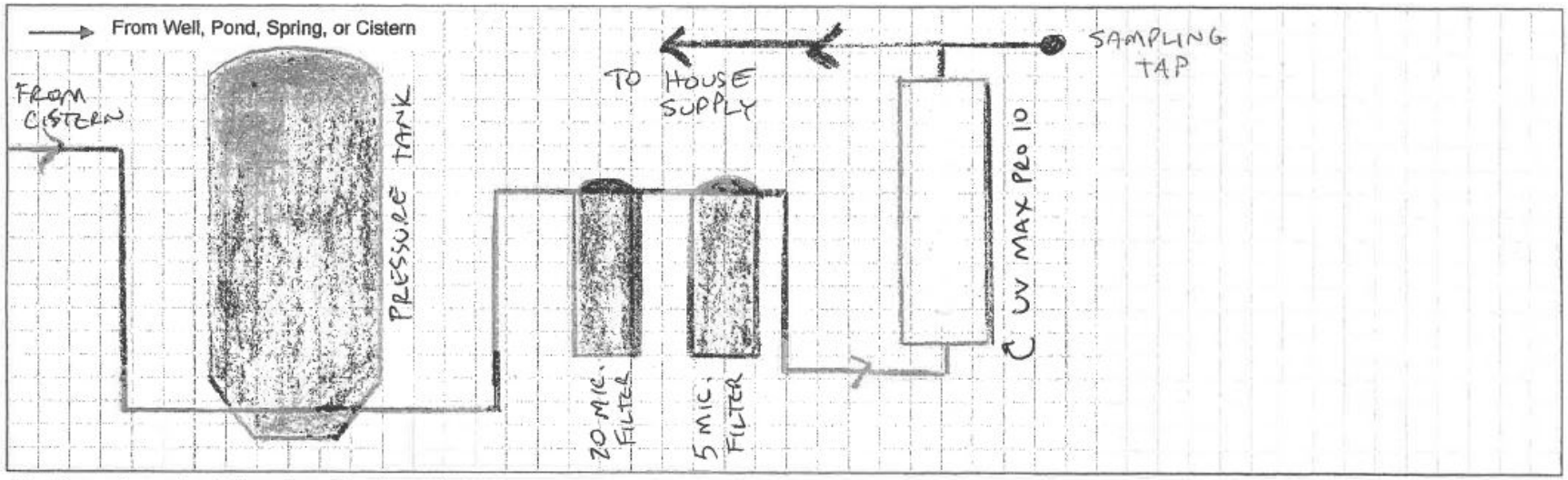
14	ft	House, Building (10ft)
89	ft	Property lines (10 ft)
n/a	ft	Existing or properly sealed water wells (10 ft)
190	ft	Road right-of-ways and road utility easements (10 ft)
190	ft	Public Roadways (25 ft)
42	ft	Driveway or parking lot (5 ft)
14	ft	Sewer - watertight (10 ft)
NA	ft	Sewage tanks, sewage absorption fields and watertight vault privies (50 ft)
n/a	ft	Leaching privies, leaching pits, dry wells, or drainage wells (100 ft)
n/a	ft	Unregulated constructed wells or boreholes (50ft)
n/a	ft	Geothermal systems (50 ft)
n/a	ft	Streams, lakes, ponds (25 ft)
n/a	ft	Storm water and other ditches with intermittent water flow (15 ft)
n/a	ft	Natural gas or propane tanks (20 ft)
n/a	ft	Fuel oil, diesel, chemical, gasoline and other petroleum liquid tanks (50 ft)
n/a	ft	Oil and gas wells (100 ft)
n/a	ft	Landfills (1000 ft)
n/a	ft	Construction and demolition debris facility (500 ft)
n/a	ft	Agricultural manure ponds, lagoons, or piles (50-300 ft)
	ft	Other:

Please refer to OAC 3701-28-07 for additional required distances.

Showing piping, roof washer and cistern.
No onsite system due to sewers.

This was for an alteration.

ADDITIONAL EQUIPMENT PLAN



List the make and model number of each applicable device.

★ Water System Pump	GOULDS MODEL J5S (EXISTING)	Coagulation Chemical	
★ Pressure Tank	WELLMATE UT-80 (EXISTING)	Cyst Reduction Filters	
Floating pond filter		Ultraviolet Light	UV MAX PRO 10 NSF CLASS A
Chemical Pump 1		Ozone Device	
Rapid Sand Filter		Slow Sand Filter	
Chemical Pump 2		Pre-coat Filter	
Other Devices	TWO STAGE 20"x4.5" SEDIMENT REDUCTION FILTERS DOWN TO 5 MICRON.		

UV disinfection unit in plan.

SITE REVIEW

BOOTS ON THE GROUND

The PWS is going to go where….?

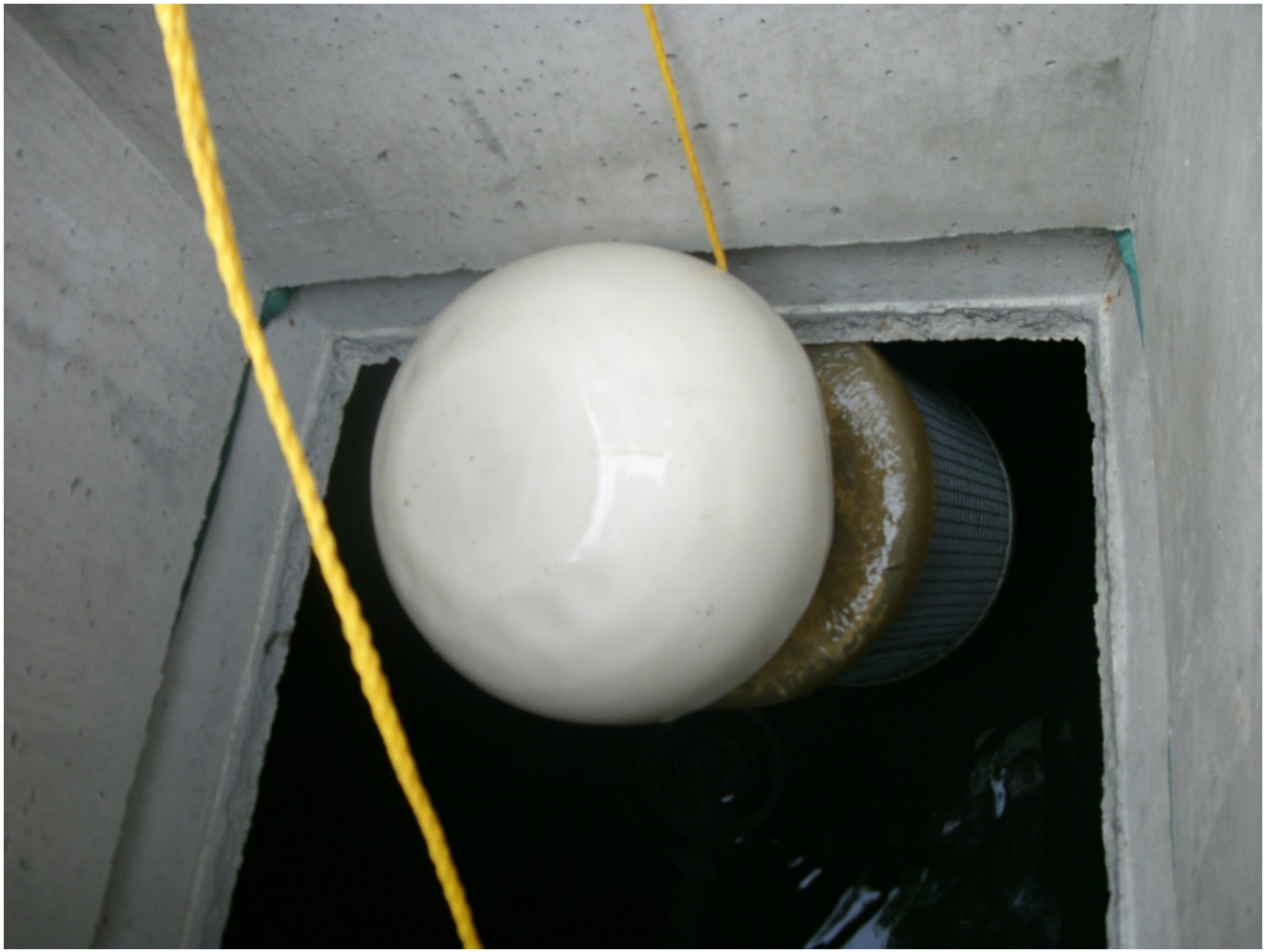
INSTALLATION

EQUIPMENT AND INSPECTIONS

LET THE GAMES BEGIN!

Two 2700 gallon tanks (5400 gallon total) with a low crossover.

Most homeowners install more that the minimum required 2500 gallon system.



Floating filter for the inlet of the water line to the home. Rope attached to anchor on the inside of riser to access the filter for cleaning or replacement.

Water line connected to cast in place brass fitting and deep enough for freeze protection.

Roof washer sized to accommodate the square footage of the roof delivering water to the cisterns.

One roof washer per 1500 square feet.

Inside of a 1500 square foot roof washer.

Overflow discharges to daylight not to cistern.

Pipes are bedded in gravel to keep them on grade.

Collection system fits together tightly to prevent debris from entering system.

Water line should be cased or supported in areas where it will cross an over dig and buried at least 42 inches deep for freeze protection.

Over flow pipe on a neat grade and run to daylight.

Screen installed inside animal guard.

Continuous disinfection equipment installed and labeled.

ANSI/NSF standard 53 cyst reduction filters installed in manifold to provide 10 gpm flow rate.

Components are clearly labeled.


CYST
Replacement
Filter
To be a
Minimum
Of 5
Micron's

Retention tank is a minimum of 120 gallons.

Sampling port on the left. Is placed in a convenient location and easily accessible.

Another example of continuous disinfection. A filter of no larger than 5 microns with an ANSI/NSF standard 55 class A ultraviolet light system.

FINAL APPROVAL

AND SUPPORTING DOCUMENTATION

Ohio Department of Health

JOB STATUS / COMPLETION FORM

Cistern / Hauled Water Storage Tank

PERMIT INFORMATION (must be completed when submitting for the Job Status or the Completion Form portions)

Private water systems contractor	Registration number	Phone #
Sonnes Services LLC	3625	513-623-6842

Address of property	County	Permit #
1791 McKenzee Trace Batavia OH 45103	Clermont	111838

JOB STATUS

The job status portion is used to document the stages of completion for the private water system. The job status form must be completed and submitted in person, by fax, or by email to the local health district within ten (10) business days of completion of the portion of work completed by the private water systems contractor noted above. This job status form is required according to Ohio Administrative Code Rule 3701-28-03 (O) effective April 1, 2011.

Date you completed this portion of the work	Type of System
12-1-2018	☒ Cistern ☐ Hauled Water Storage Tank

Briefly list all work completed - (*Examples: "dug hole for tank"; "set tank", "installed pump"*)

Excavated hole for Tank, leveled gravel, SET TANK, Installed Water Line to House

COMPLETION FORM - Record all information of work completed

The completion form portion documents the specific materials, placement, and installation methods used to complete the work. This form must be completed and returned to the local health district prior to final approval of the private water system. This completion form is required according to Ohio Revised Code 3701.34, 3701.44 and Ohio Administrative Code 3701-28-03(P), and must be submitted within thirty (30) days of completion of work.

Construction Details ☒ Cistern ☐ Hauled Water Storage Tank

Roof Washer / Debris Trap (Cistern)

Roof Area	Manufacturer	Materials
1410 Sq Ft	Water Filtration Co.	Fiberglass

Location	Size					
	Length		Width		Height	
behind House on South Side	34	inches	24	inches	28	inches

Tank

Tank Manufacturer	Materials	Capacity
Coates Concrete Products	Concrete	4000 gallons

Dimensions						Size of Manhole/Riser
Length		Width		Height		
13	feet	7	feet	8.5	feet	24" inches

Method of Water Intake

Type: ☒ Flotation Device ☐ Submersible Pump ☐ Other (specify):

Filter

Type	Location	Size
Filter Cloth	in Cistern	12"x18"

Pump

Location	Capacity
in basement	10 GPM

Continuous Disinfection (UV, Chlorine, Iodine, Ozone Systems must meet the requirements in OAC 3701-28-15)

Installed: ☒ Yes ☐ No If "Yes", complete the Continuous Disinfection Job Status / Completion Form.

Other Water Treatment Components

HEA 5203 (Rev 03/2011)

Ohio Department of Health

JOB STATUS / COMPLETION FORM

Continuous Disinfection and Filtration Systems

PERMIT INFORMATION (must be completed when submitting for the Job Status or the Completion Form portions)

Private water systems contractor	Registration number	Phone #
Sonnes Services LLC	3625	513-623-6842

Permit #	Type of System:
111838	☐ Well ☐ Spring ☐ Pond ☒ Cistern ☐ Hauled Water Storage Tank

Address of property	Health District (City or County)
1791 McKenzee Trace Batavia OH 45103	Clermont

JOB STATUS

The job status portion is used to document the stages of completion for the private water system. The job status form must be completed and submitted in person, by fax, or by email to the local health district within ten (10) business days of completion of the portion of work completed by the private water systems contractor noted above. This job status form is required according to Ohio Administrative Code Rule 3701-28-03 (O) effective April 1, 2011.

Date you completed this portion of the work	Is this installation for:
12-1-2018	☒ New Construction ☐ Alteration

Briefly list all work completed - (*Examples: "installed five micron filter and UV disinfection system"*)

installed Chlorine injection System & .5 micron Filters (2)

COMPLETION FORM - Record all information of work completed

The completion form portion documents the specific materials, placement, and installation methods used to complete the work. This form must be completed and returned to the local health district prior to final approval of the private water system. This completion form is required according to Ohio Revised Code 3701.34, 3701.44 and Ohio Administrative Code 3701-28-03(P), and must be submitted within thirty (30) days of completion of work.

Disinfection System

Type and Design of Disinfection System: ☒ Chlorine ☐ Iodine ☐ Ozone ☐ UV (Ultraviolet Light) – NSF Standard 55 Class A

Required minimum disinfectant residual: ☒ Chlorine 0.4 mg/l (ppm) ☐ Iodine (0.5 mg/l) ☐ Ozone (0.1 mg/l) ☐ Chlorine when supplementing UV systems with multiple service connections (0.2 mg/l)

Appropriate test kit on site: ☒ Yes ☐ No

Manufacturer and Model of each disinfection system component

Manufacturer	Chem Tech	Model	Chem Tech 100 30GPD
Manufacturer		Model	
Manufacturer		Model	

Intakes and Filters

Intakes: ☒ Floating Filters ☐ Suspended Filters ☐ Submersible pump ☐ Other:

Continuous Filtration Type (ponds): ☐ Slow Sand Filter ☐ Pressurized Rapid Sand Filter ☐ Precoat Filter ☐ Other (specify):

Cyst and other Cartridge Filters Type	Micron size rating	Flow rate of filter(s)
(2) PenTek PB Plus 20BB	.5	5 each GPM
		GPM
		GPM

Comments

Retention or Mixing Tank

Make	Model	Capacity
CLACK	RT 120	120 Gallons

List all additional filters or treatment systems installed on system (i.e. cartridge filters, slow sand, rapid sand, carbon filter, water softeners, anion exchange, other)

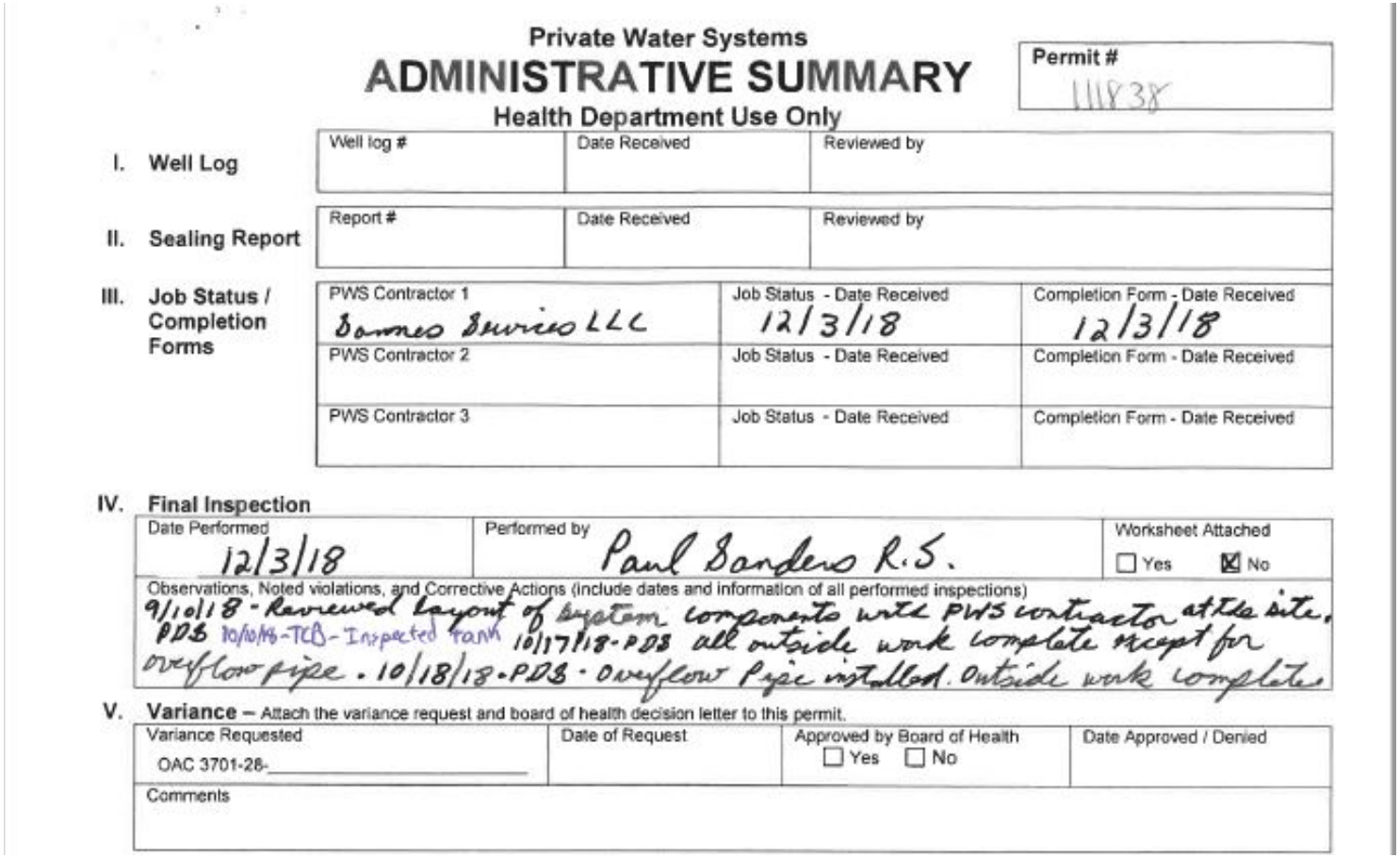
Sediment 5 micron Cartridge Filter

In conjunction with HEA Forms 5203, 5237, 5238, 5239 REV (03/2011)

Job status/Completion forms filled out and submitted at or before final inspection.

Water sample collected at the time of final inspection.

ADMINISTRATIVE SUMMARY



Private Water Systems

ADMINISTRATIVE SUMMARY

Health Department Use Only

Permit # 11838

I. Well Log

Well log #	Date Received	Reviewed by

II. Sealing Report

Report #	Date Received	Reviewed by

III. Job Status / Completion Forms

PWS Contractor 1	Job Status - Date Received	Completion Form - Date Received
Barnes Service LLC	12/3/18	12/3/18
PWS Contractor 2	Job Status - Date Received	Completion Form - Date Received
PWS Contractor 3	Job Status - Date Received	Completion Form - Date Received

IV. Final Inspection

Date Performed	Performed by	Worksheet Attached
12/3/18	Paul Sanders R.S.	☐ Yes ☒ No

Observations, Noted violations, and Corrective Actions (include dates and information of all performed inspections)

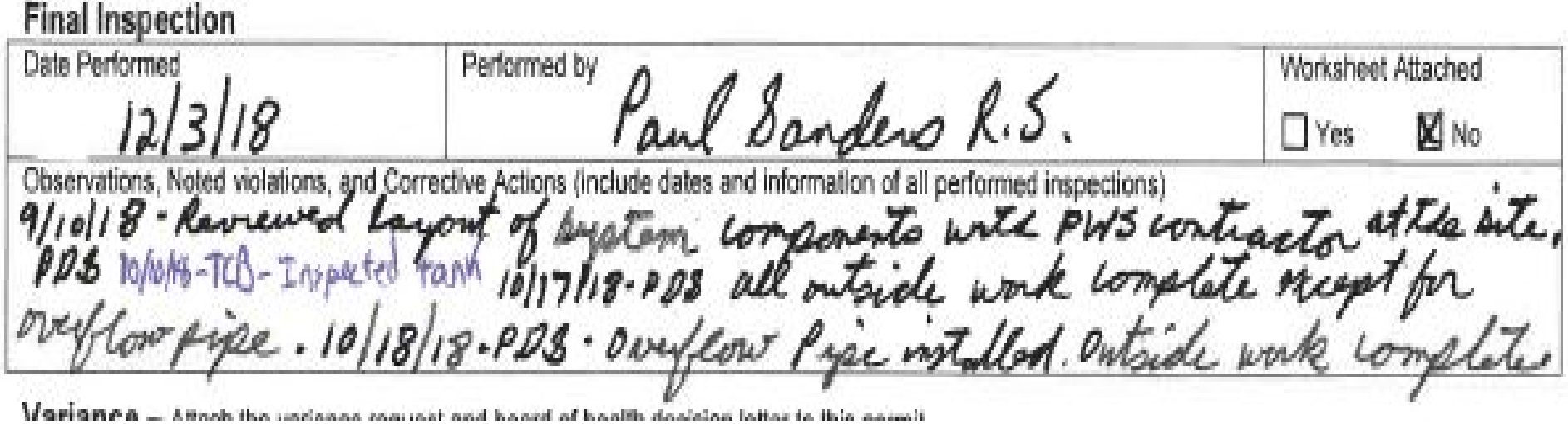
9/10/18 - Reviewed layout of system components with PWS contractor at the site. PDS 10/10/18-TCB-Inspected tank 10/17/18-PDS all outside work complete except for overflow pipe. 10/18/18-PDS - Overflow Pipe installed. Outside work complete

V. Variance – Attach the variance request and board of health decision letter to this permit.

Variance Requested	Date of Request	Approved by Board of Health	Date Approved / Denied
OAC 3701-28-_____		☐ Yes ☐ No	

Comments

Top portion of administrative summary.



Final Inspection

Date Performed	Performed by	Worksheet Attached
12/3/18	Paul Sanders R.S.	☐ Yes ☒ No

Observations, Noted violations, and Corrective Actions (Include dates and information of all performed inspections)

9/10/18 - Reviewed layout of system components with PWS contractor at the site, PDS 10/16/18 - TCB - Inspected trash 10/17/18 - PDS all outside work complete except for overflow pipe. 10/18/18 - PDS - Overflow Pipe installed. Outside work complete.

Variance – Attach the variance request and board of health decision letter to this permit

Close up of comments and notes.

We have plans to develop an as-built form to make it easier to document inspections.

VI. Water Samples

Bacteria Sample One	Collected by Paul Sanders R.S.	Date 12/3/18	Sample Collection Point Sample Port	Results NEGATIVE
Bacteria Sample Two	Collected by	Date	Sample Collection Point	Results
Bacteria Sample Three	Collected by	Date	Sample Collection Point	Results
Water Sample Comments				

Nitrates

Nitrate Pre-screen Results	Collected by	Date	Sample Collection Point	Results
Nitrate Laboratory Analysis / Results	Collected by	Date	Sample Collection Point	Results

VII. Private Water System Approval / Disapproval

☒ System approved	Sanitarian Signature Paul Sanders R.S.	Date of approval 12/6/18
☐ System disapproved	Sanitarian Signature	Date of disapproval
Reason for Disapproval		
Enforcement action taken		

Sample and final approval sections.

Clermont County Public Health

Prevent. Promote. Protect.

December 6, 2018

Steven & Elizabeth Zanola
126 S 2nd Apt 2401
Loveland OH 45140

Re: Private Water System Permit Approval for 1791 Mackenzie Trace
Permit #: 111838

Dear Mr. & Mrs. Zanola,

On October 30, 2017 a private water system permit was issued for 1791 Mackenzie Trace. The private water system installation at this property has been completed in accordance with the Ohio Administrative Code 3701-28. In addition, the private water system was sampled and is considered safe and is acceptable for potable use.

Sincerely,

Paul Sanders R.S.

Paul Sanders
Registered Sanitarian

ALTERATIONS

CHA CHA CHA CHANGES…

Where’s that cistern?

Low profile riser added to a cistern in a garage.

Close up view.

Original steel cast in lid is still in place underneath riser.

Failed loan inspections drive most alterations.

UV installed in tight space on an alteration.

OBJECTIVE: CLEAN, POTABLE WATER

REALIZED!!

Because, who doesn’t like a cool drink from the faucet?

DISCUSSION AND QUESTIONS

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THANK YOU!