SAN JUAN BASIN
public health

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

ON-SITE WASTEWATER TREATMENT SYSTEMS (OWTS)
DESIGN SUBMITTAL GUIDANCE

This document is intended to assist the homeowner, OWTS designer, and Professional Engineer (PE) by listing the information that is required to pass the design review process and meet Colorado Regulation 43 (Reg. 43) design requirements. The sections in Reg. 43 related to design information submittal mandates have been provided as well as narratives summarizing details required of all submittals to help guide a designer's understanding of the quality and detail of information that is expected. Adding more information and convoluting the presentation but not supplying the mandatory minimum of required details does not increase the likelihood of passing the review process. A quality design submittal with accurate and concise information with details specific to the project can frequently be submitted within 3 to 4 pages of information.*

A design/report must at a minimum include the following topics.

I) Project Narrative

Provide overview description of property, landscape, home scope-of-work, existing OWTS if relevant, generalized plans for OWTS alteration/repair and or new construction.

II) Field Investigation Report/Soils Profile Pit Report

a) Visual & Tactile Soil Test Results
b) Soil Layer Descriptions & Long-Term Acceptance Rate (LTAR) Determinations
c) Description of 2 profile pits w/ identified locations and limiting layers if relevant.
d) A visual depiction, cross-section, of the soil horizons encountered including depth, type, LTAR, etc.

III) *A Sizing Calculation Sheet*

This portion should demonstrate the gallons per day assigned to the discharge flows and provide the mathematical proof applying the soil's defined LTAR along with any sizing multipliers or allowable reductions.

IV) Detailed Site Plan

A visual map/representation of the project drawn to-scale providing at a minimum all the information listed in the checklist at the end of this document.

V) System/Component Schematics and Detail Sheets Specific to System and Site

Provide close-up view of constructed components, defined angles/elevations when necessary, specifics to flow distribution, listing of specific details required by manufacturers or when necessary for intended function and to meet regulatory standards.

***** *Due to the volume of work the Health Department receives, submittals deemed insufficient or incomplete will be returned and not accepted for review if quickly thrown together and offering information in a format that is hard to understand and interpret.*

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

References;

The latest version of Colorado law dictating OWTS requirements is Regulation 43 and can be found at; https://sjbpublichealth.org/septic/ (Regulation last updated 2018)

Site and Soil Evaluations – Reg. 43.5
Setback Requirements – Reg. 43.7 (Table 7-1)
Design Criteria General – Reg. 43.8
Design Criteria Components – Reg. 43.9

It is important to note that all OWTS design submittals will need to be completed by a Professional Engineer (PE) registered in Colorado if any of the following conditions exist.

1) OWTS is a pressurized system
2) OWTS is a mounded above grade system
3) Soil LTAR is less than .35 gallons per square foot per day
4) Proposed OWTS is an Evapotranspiration & Absorption design (ETA)
5) OWTS requires a sand filter
6) OWTS is being built on a slope greater than 30%
7) OWTS is designated a higher-treatment-level system (HTL)

Scope & Purpose

Colorado requires a thorough and detailed OWTS design/report is submitted with every septic permit defined as either a construction, alteration, or a change-of-use permit. Repair permits tend to have a simpler scope-of-work so do not require the level of planning and evaluation that is required by new construction or modifications and expansion of treatment to existing systems, but this isn't always the case. The sections in Reg. 43 related to design information submittal requirements have been provided as well as examples and narratives summarizing details required of all submittals to help a designer understand the quality and detail of information that is needed. With increased access to technology and publicly available GIS overlay information current standards of expectation require a design report that verbally and visually shows all required information in a clean and easy to interpret format. Design formats and templates used in the 90's and early 2000's and once acceptable for permit issuance rarely provide the detail and accuracy now standard and designers should expect to update their formats and templates if they intend to pass the review process without additional information requests or correction notices which can delay construction authorization.

Each report/design section must include the following information and may require more than what is listed depending on the complexity of the system or other factors specific to each project.

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

Project Introduction Narrative

(*Submittals include 2 paragraphs to 2 pages of description depending on author's style)*

1. Property: Description of the property to include size of parcel, geographic features, topography, general vegetation composition, slopes, and any other features or history of note or concern related to the planned OWTS work.

2. Dwelling(s)/Facilities: Description of the home(s)/structures, dwelling(s), or facilities including locations, number of bedrooms and/or number of employees, and any other features of note related to the planned OWTS work.
Intended uses: Private home, commercial, seasonal, VRBO, etc.

3. OWTS: Description of ways to meet sewer treatment requirements. This is a narrative sharing in general terms as it relates to the expansion, alteration, replacement, or construction of a new OWTS without providing technical specificity.

Reg. 43.5 Site & Soil Evaluation

(*Site evaluation reports must have the following information – complete section from Reg. 43)*

1. **Preliminary investigation:** (Property Info, historical OWTS information, geography, land's physical features, etc.)
2. **Reconnaissance:** (Landscape topography, vegetation, land use)
3. **Detailed soil investigation:**
   - **a)** visual & tactile soil test results
   - **b)** soil layer descriptions & LTAR determinations
   - **c)** Description of 2 profile pits w/ identified locations and excavation outcomes and discovered limiting layers if relevant.
4. **Report and site plan:** Including a minimum of the following topics with submitted report, requirements listed in 43.5.F:

   a) Project Summary/Narrative

   b) Calculation Sheet - quantified flows applied to the OWTS and formulas demonstrating the required STA. This section is to show the math used including multipliers and sizing reductions applied to meet Colorado Regulation 43 for soil treatment areas (STAs)

   c) Soils Report – describing soil horizon characteristics at various depths AND a graphic soil log

   d) Site Plan (43.5.F.1.g) – A drawing or representation of the project site TO SCALE providing dimensions, a north arrow, graphic scale, benchmarks, setback information, utility locations, utility distribution path locations (electric, water, gas, sewer), land contours, OWTS and STA component locations, existing/neighboring OWTS and/or water components of concern, etc.

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

e) Design Document (43.5.G) – component details, system layout, functional details and installation descriptions, aggregate lifts, and setback details to consider, etc.

Section 43.5.F

(Report and site plan - Complete section from Reg. 43)

A written report must describe the results of the preliminary investigation, reconnaissance, and detailed evaluations. The report may be in text and/or tabular form and must include a drawing locating features relative to the proposed OWTS location and test locations. The report may be included as part of the OWTS design document. The report must include, but is not limited to:

a) Company name, address, telephone number, e-mail address, and name of individual, credentials and qualifications of the individual conducting the site evaluation

b) Preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation

c) Dates of preliminary and detailed evaluations

d) A graphic soil log, to scale, indicating depth of the soil test pit excavation, soil description and classification, depth to any limiting layer encountered, type of equipment used to excavate the soil profile test pit and date of soils investigation.

e) Setback distances to features listed in Table 7-1

f) Setback distances to features listed in Table 7-2, existing on the site or within applicable setback limits, whichever is greater

g) A drawing created to a scale that provides the complete property boundary lines. The minimum drawing size is 8.5-inches by 11-inches. If the property is too large to adequately indicate and label the profile test pits and percolation test holes, a detail of the portion of the site containing the soil profile test pits and percolation test holes must be submitted. If the property is too large to adequately show site evaluation information, a detail drawing that includes the information required from the site and soil evaluation that will impact the location of the OWTS must be submitted. Drawings must indicate dimensions, have a north arrow and graphic scale and include:

- Fixed, non-degradable temporary or permanent benchmark, horizontal and vertical reference points of the proposed soil treatment area; soil observations; percolation testing results and pertinent distances from the proposed OWTS to all required setbacks, lot improvements, easements; ordinary high-water mark of a pond, creek, stream, lake, wetland or other surface waters, and detention or retention ponds, and property lines
- Contours or slope direction and percent slope
- The location of any visible or known unsuitable, disturbed, or compacted soils
- The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

- The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark)

h) Anticipated construction-related issues, if applicable

i) An assessment of how known or reasonably foreseeable land use changes are expected to affect the system performance, including, but not limited to, changes in drainage patterns, increased impervious surfaces and proximity of new water supply wells, if applicable.

j) A narrative explaining difficulties encountered during the site evaluation, including but not limited to identifying and interpreting soil and landform features and how the difficulties were resolved, if applicable.

Section 43.5.G

(Design Document/Site Plan – Complete Section from Reg. 43)

1. The report and site plan may be attached to the design document, or the report and site plan may be combined with the design information as a single document.

2. The design document must include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.

3. The design document must contain all plan details necessary for permitting, installation and maintenance, including:

a) Assumptions and calculations for each component, including total dynamic head (TDH) and gallons per minute (GPM) for all dosing systems

b) A fixed, non-degradable temporary or permanent benchmark, (North America Vertical Datum or assumed elevation is acceptable)

c) A scale drawing showing location of each OWTS component and distances to water supplies, surface water, physical and health impact features on both the subject and adjacent properties requiring setbacks

d) Layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used

e) Elevation or depth of infiltrative surface of the soil treatment area, the septic tank invert, and all other components of the OWTS

f) Special structural design considerations, as applicable to ensure the long-term integrity of each component

g) References to design manuals or other technical materials used

h) Installation procedures, as applicable

i) Operation and maintenance manuals or instructions

j) Other information that may be useful such as photos and cross-section drawing.

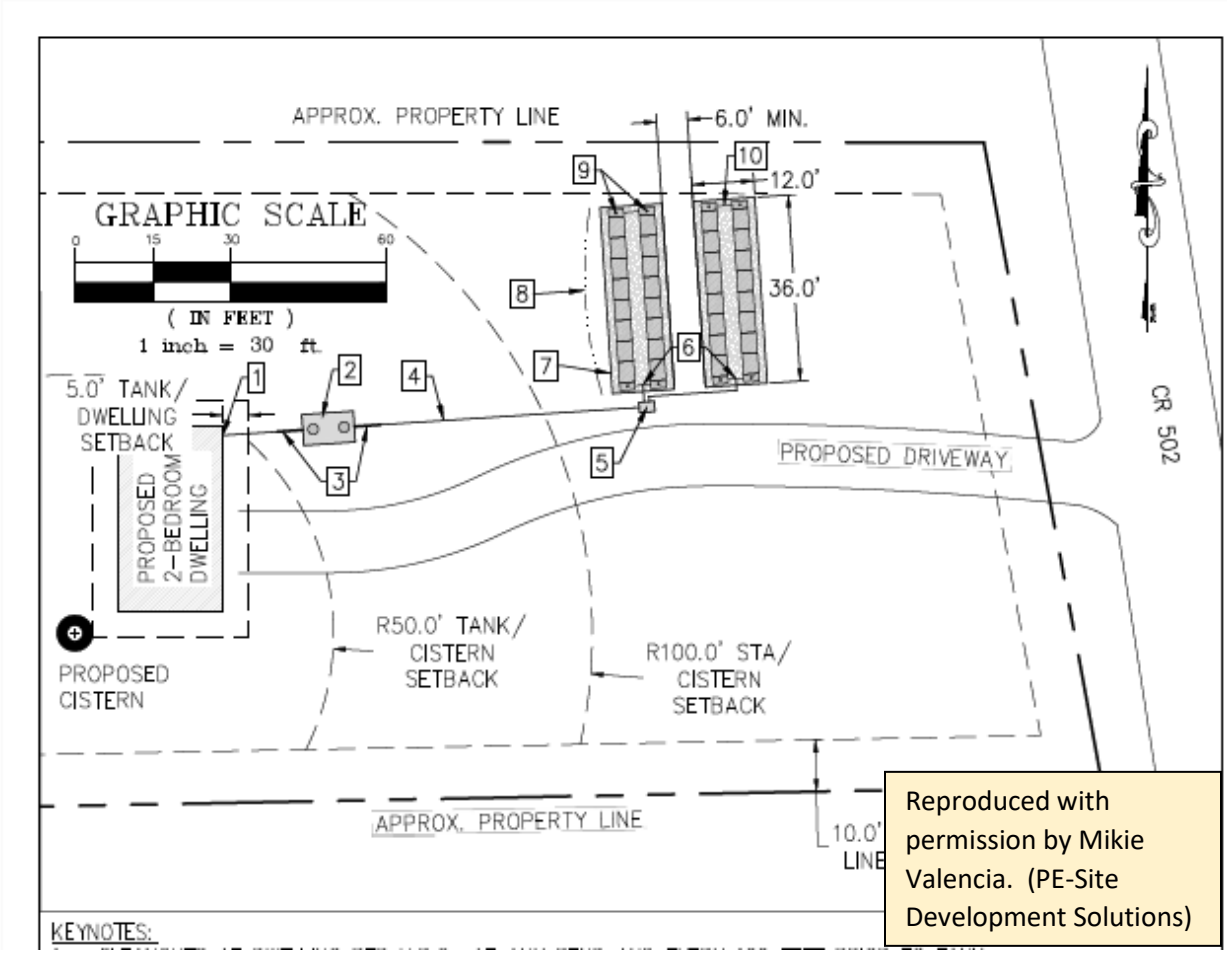
SAN JUAN BASIN
public health

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

Provided below is a checklist of specifics that will always be required on a submitted site plan.

- ☐ Site Orientation (i.e., North Arrow)
- ☐ Any other relevant setback(s)
- ☐ Locations of clean-outs
- ☐ Location of cistern and or well
- ☐ Setbacks to water distribution lines
- ☐ Property lines
- ☐ Any other relevant setback(s)
- ☐ Distances between structures
- ☐ List all structures with designating labels
- ☐ Location of STA(s)/Lagoon(s)
- ☐ Draw in water service lines
- ☐ Distance from well/cistern to septic tank
- ☐ Location of tanks
- ☐ Landscape contours
- ☐ Distance to any wells, cisterns, streams, water features, water lines, irrigation ditches, or other setbacks of concern located on the parcel of the project or on neighboring parcels if relevant.

Below is an example of a comprehensive site plan.

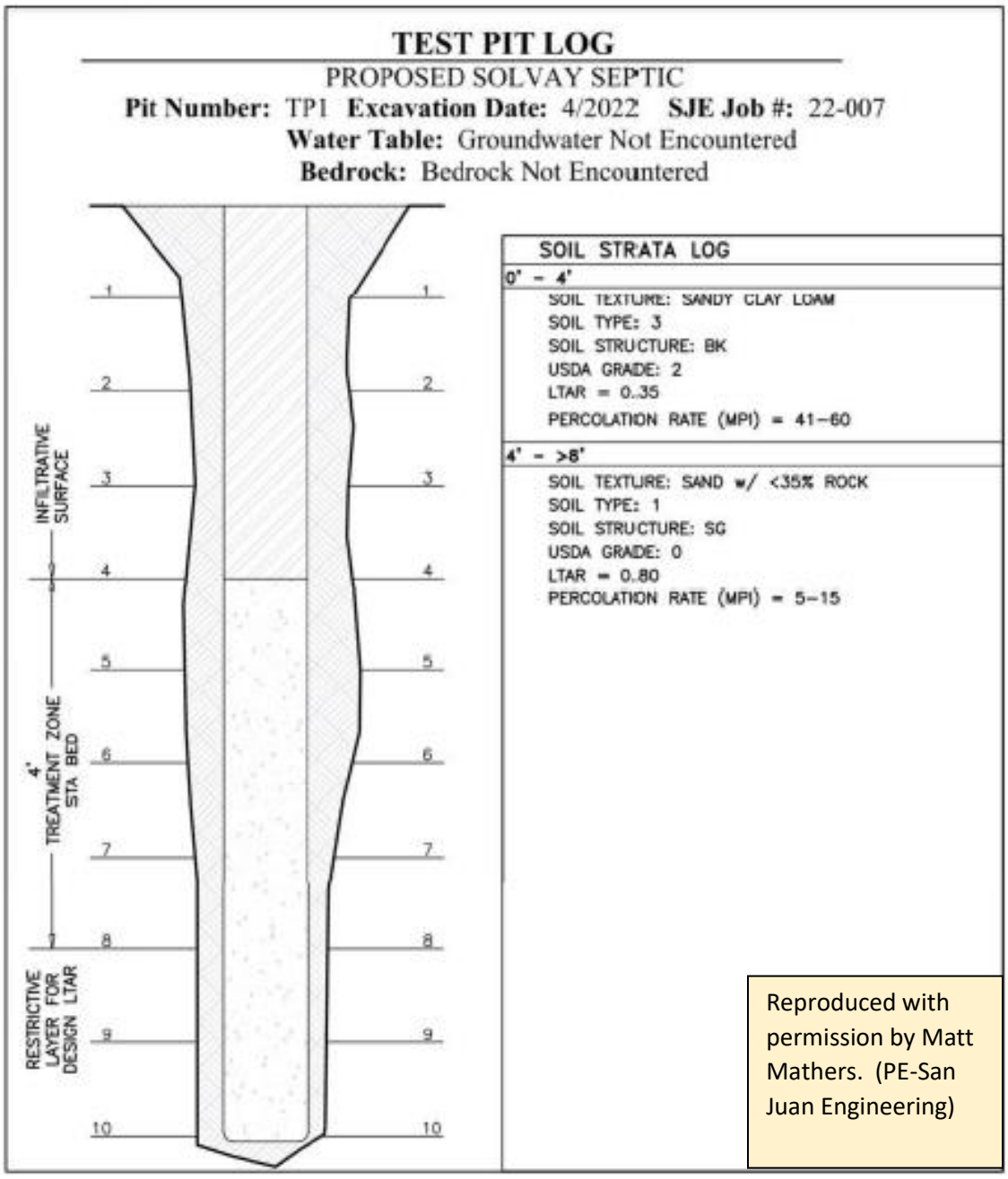


Reproduced with permission by Mikie Valencia. (PE-Site Development Solutions)

SAN JUAN BASIN
public health

281 Sawyer Drive | Ste. 300
Durango, CO 81303
970 247 5702 | sjbpublichealth.org

Following is an example of a graphic soils log.



Reproduced with permission by Matt Mathers. (PE-San Juan Engineering)