# I.S.D.S. PERMIT •

# AN INDIVIDUAL SEWAGE DISPOSAL SYSTEM TO INSTALL, CONSTRUCT, ALTER OR REPAIR

Permit: EH-09-022

New:

Alteration:

ROUTT COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH • Repair: N
Alteration: N
Addition: N STEAMBOAT SPRINGS, CO • 970-870-5588

P.O. BOX 770087

Environmental Health Specialist:	The above individual sewage disposal system installed by	Environmental Health Specialist: Havelex	Comments: Notice: All Sewage <i>HOLDING</i> Tanks must be Concrete. Inspections required (24 hour	Minimum Septic Tank Capacity: 1000 gallon Tank Material: $\underline{Y}$ Concrete $\underline{N}$ Polyethylene Design: 1: Engineer shall certify that construction complies with permitted design.	Y Residential N Commercial Other (Describe)	Systems - Revised 1988 - Colorado State Board of Health, 5 CCR 1003-6. This permit expires one year from date of issue.  SPECIFICATIONS	As authorized and required by Chapter 25, Article 10 C.R.S., permission is hereby granted to the owner or a Routt County licensed ISDS installer to construct or repair an I.S.D.S. system at the property indicated above. All work must comply with the specifications on this permit and the Guidelines on Individual Sewage Disposal	Phone: 970-846-2194	Address: PO BOX 770961 STEAMBOAT SPRINGS CO 80477	Owner: WILLE, ROD	This permit effective only on premises located at: 23400 TOBIANO TRAIL C Legal description of property: TRS IN NE4NW4, NW4NE4, S2NE4 SEC \( \subseteq 36 \) Parcel Id.: 946313002
Date $/ \circ / \langle / \circ \circ \rangle$ Fee: Percolation \$0.00 Permit \$252.00	,ep	Date of Issue: $C/g/09$	uired (24 hour advanced notice required).	ted design.	Number of bedrooms: 3	it expires one year from date of issue.	anted to the owner or a Routt County licensed ISDS installer to construct or repair ecifications on this permit and the Guidelines on Individual Sewage Disposal	Phone: 970-879-2235	Address: 2570 S. COPPER FRONTAGE UNIT 7 STEAMBOAT SPGS CO 80487	Applicant: CRYSTAL PEAK COMBINED	This permit effective only on premises located at: 23400 TOBIANO TRAIL C  Legal description of property: TRS IN NE4NW4, NW4NE4, S2NE4 SEC \$\square\$ 36-5-86, TRS IN SW4NW4, N2SW4, \$\square\$ NW4SE4 SEC \$\square\$ 11-5-85 TOTAL: 35.02 A  Parcel Id.: 946313002

## RECEIPT

### RECEIPT NUMBER:

R090000720

# Routt County Environmental Health Department P.O. Box 770087 Phone 970-870-5588 Steamboat Springs, CO 80477

APD #: EH-09-022

TYPE: EH-Ind. Sewage Disp Sys

SITE ADDRESS: 23400 TOBIANO TRAIL C

PARCEL: 946313002

### May include fees collected within the jurisidiction.

TRANSA	CTION D	$ATE \cdot$	06/17/2009

TOTAL PAYMENT:

275.00

TOTAL PAID FROM TRUST:

.00

TOTAL PAID FROM CURRENCY:

275.00

### TRANSACTION LIST:

Туре	Method	Description		Amount
Payment	Check	#1055		275.00
4		Τ	TOTAL:	275.00

### ACCOUNT ITEM LIST:

Description	Account Code	Current Pmts
		0.00.00
I.S.D.S. Permit Fee	01-20-22-000-568	252.00
State Surcharge for ISDS	01-20-22-000-546	
	TOTAL:	275.00

RECEIPT ISSUED BY: SG

ENTERED DATE: 06/17/2009

INITIALS: SG

TIME: 05:08 PM

APPLICATION FOR INDIVIDUAL SEWAGE SYSTEM PERMIT Lender Surabef BUILDING PERMIT # C13-09-142
PERMIT PD 375.00 CK 1055 EH-09-022 Chyptal Beach Const.

NEW NEW COSE REFAIR ENERGENCY OSE
Name of Owner Rod Wille Mailing Address POBOX 77096 (Phone 846-2194
Name of Applicant Crystal Feat Construction Mailing Address 2570 5. Coper Phone 879-2235
vision if applicable)
Size of Lot 35 (X)Residential ( )Commercial ( )Other (Describe)
Number of: Bedrooms 3
Water Supply: (X) Private Well ( ) Public (give name of supply)
An appropriate plot plan must accompany this application showing required information. Pervision must be arranged with the Routt County Department of Environmental Health with payment of the required fee.
Application for an individual sewage disposal system is hereby submitted. The individual sewage disposal system is hereby submitted. The individual sewage disposal system. (*Hot tubs and Jacuzzis shall not be connected on-site sewage disposal systems.)
Signature of Applicant 12 Date 6/9/09

PLOT PLAN

	Name
Address	Rod
	زیا

Location of proposed system:

Street Address 33400 Legal Address NE/4 S

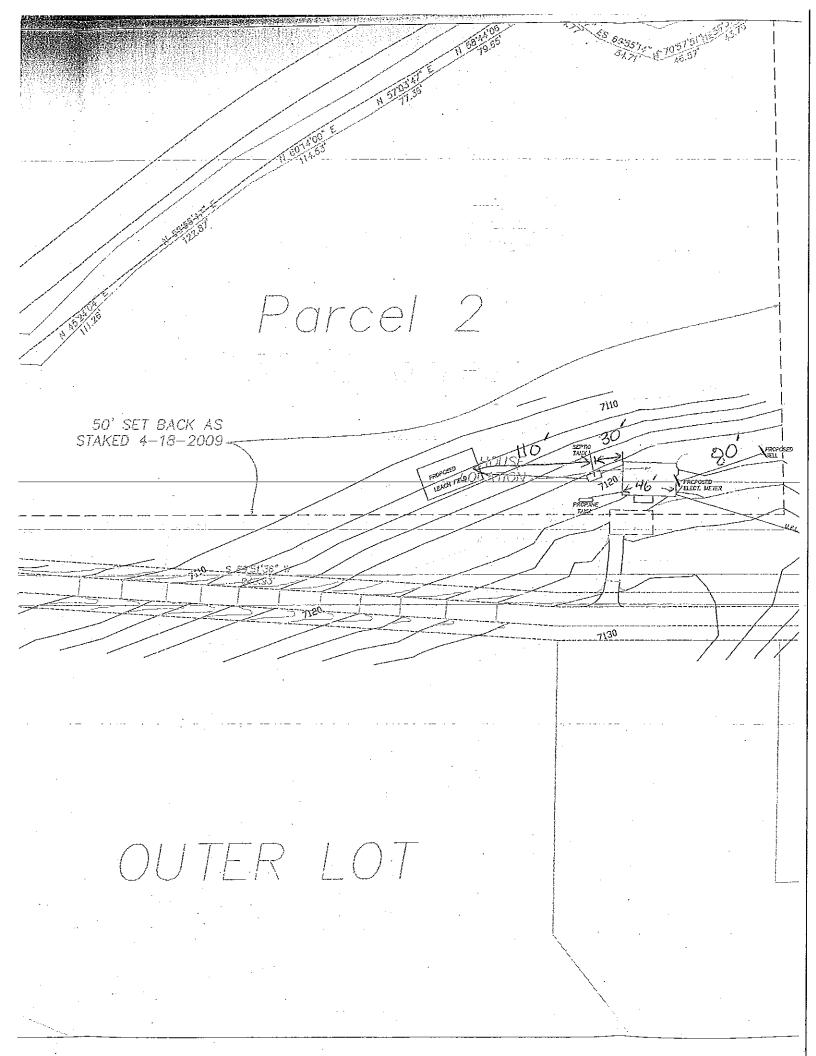
obiano Oak Crock

PLOT PLAN MUST INCLUDE THE FOLLOWING INFORMATION: Property lines and dimensions. 151/286 W

(LOCATE BY MEASURED DISTANCES)

- Proposed and existing water wells on subject property and adjacent property. Domestic water service lines.
- Proposed and existing building, driveways and other structures.
- Streams, lakes, ponds, irrigation ditches and other water courses,
- Proposed and existing waste disposal facilities.

SUBMIT A REVISED PLOT PLAN TO CONSTRUCTION IF INSTALLATION IS TO BE CHANGED FROM ORIGINAL PLAN.





June 11, 2009

Crystal Peak Construction, LLC 2570 S. Copper Frontage Road, Unit 7 Steamboat Springs, CO 80487

Job Number: 09-8331

Subject: On-site Wastewater System Design, Proposed Wille Residence, 23850 Tobiano Trail, Routt County, Colorado. 23400

Ladies and Gentlemen:

As requested, NWCC, Inc. has completed the design of an On-site Wastewater System (OWS) for the Proposed Wille Residence to be constructed at 23850 Tobiano Trail in Routt County, Colorado. This design was conducted in accordance with generally accepted guidelines for the industry, the Routt County Department of Environmental Health (RCDEH) Individual Sewage Disposal System Regulations and within budget limitations. Enclosed are three copies of the OWS design report and an invoice for the work completed as of this date. It should be noted that a copy of this report and an application must be submitted to the Routt County Department of Environmental Health to obtain a permit.

As noted in the attached report, this office must complete periodic inspections during the construction of the system, and a final summary/as-built construction report must be submitted to RCDEH at the completion of the project by NWCC, Inc.

If you have any questions regarding this report, or if we can be of further service, please contact this office.

Sincerely,

NWCC, INC.,

Brian D. Len, P.E.

President



June 10, 2009

Crystal Peak Construction, LLC 2570 S. Copper Frontage Road Unit #7 Steamboat Springs, CO 80487

Attn: Ron Davies

Job Number: 09-8331

Subject: On-Site Wastewater System Design, Proposed Wille Residence, 234612 Tobiano Trail, Routt County, Colorado.

### Ladies and Gentlemen:

This report presents the results of an On-site Wastewater System (OWS) design for the proposed Wille Residence to be constructed at 23<sup>400</sup> Tobiano Trail in Routt County, Colorado. NWCC, Inc. previously completed a Subsoil and Foundation Investigation at this site under this job number in a report dated May 15, 2009.

<u>Proposed Construction</u>: NWCC, Inc. has not received or reviewed the building plans for this project. Based on our conversations with the client, it is our understanding that the residence will be constructed with a total of three bedrooms when completed. The absorption field for the OWS will be located northwest of the proposed residence.

<u>Site Conditions:</u> The proposed residence is located south of Tobiano Trail in Routt County, Colorado. The vegetation in the area of the proposed OWS site consists of grasses, weeds, and deciduous brush. A seasonal drainage is located to the north of the proposed OWS.

The topography in the vicinity of the proposed OWS site is variable and typically slopes gently to moderately down to the north on the order of 3 to 5 percent.

<u>Subsurface Conditions:</u> A profile pit was advanced approximately 150 feet west-northwest of the proposed residence at the time the field investigation was completed for the Subsoil and Foundation Investigation. The subsurface conditions encountered in the profile pit generally consisted of a layer of topsoil and organics overlying natural clays to the maximum depth investigated, 5 ½ feet.

The topsoil and organics layer encountered in the profile pit was approximately 24 inches in thickness. Natural clays were encountered below the layer of topsoil and organic materials and extended to the

maximum depth investigated. The natural clays were nil to slightly sandy with occasional gravels, moderately to highly plastic, medium stiff to stiff, moist and orangish brown in color. Groundwater seepage was not encountered in the profile pit at the time of excavation and no evidence of a seasonal high groundwater table was observed in the profile pit.

Percolation testing was conducted in the area of the proposed OWS site on June 5, 2009. The percolation tests indicated that the upper 12 to 18 inches of topsoil and organic materials exhibited percolation rates ranging from 25 to 80 minutes per inch (mpi) with an average percolation rate of 40 mpi. However the deeper natural soils exhibited percolation rates in excess of 120 mpi.

<u>System Design:</u> Due to the topography of the site and the limited depth of pervious soils, we recommend that the on-site wastewater system leach field consist of a mounded seepage bed absorption system. The design consists of a minimum of 24 inches of approved granular fill materials placed over the existing ground surface and topsoil, and under the absorption bed.

The system design is based on the residence containing a total of three bedrooms with occupancy of two persons/bedroom. Using these facts, we have calculated a maximum peak effluent flow of 788 gallons per day (gpd) for the system. Based on the percolation test results completed by our firm, an average percolation rate of 40 minutes per inch for the natural topsoil materials and an assumed percolation rate of 15 minutes per inch for the granular fill materials were used in the design of the mounded system.

Based on the design values given above, we have calculated a minimum absorption bed area of 611 square feet and a minimum mound basal area of 997 square feet. The granular fill material placed under the seepage bed should consist of a clean, well-graded sand approved by this office prior to placement. The fill materials placed beneath the seepage bed should be constructed at a minimum 1 (H):1(V) slope to meet the minimum basal area requirement.

A septic tank with a minimum capacity of 1,000 gallons is required for the three-bedroom residence. Due to the subsurface conditions encountered, we recommend that a concrete septic tank be used. We also recommend that an effluent filter be installed in the outlet of the septic tank.

We also recommend that a dosing system be used to distribute effluent to the seepage bed. The dosing system should consist of either a float activated pump system or an automatic dosing siphon, if sufficient grade is available. The pump or siphon dosing system should be installed in a minimum 400 gallon concrete dosing tank installed downstream of the septic tank. An alternate would be to use a FLXX 1,250-gallon three-compartment septic tank with the pump or siphon installed in the last compartment. The effluent pump should consist of an approved commercial grade, float-activated effluent pump installed in the dosing tank. The dosing siphon should consist of a Fluid Dynamics FD417 automatic dosing siphon. Either system should have a high water alarm system installed in the residence to warn the owner in the event of a pump or siphon malfunction. A secondary or backup pump installed in the dosing tank is also recommended in the event of a pump failure.

It is our understanding that there is a possibility of an additional two bedrooms being constructed in the future bringing the total number of bedrooms to five. A septic tank with a minimum capacity of 1,500

gallons is required for a five-bedroom residence. An alternate would be to use a FLXX 2,000-gallon three-compartment septic tank with the pump or siphon installed in the last compartment. It should also be noted that this report was designed for a total of three bedrooms; if any more bedrooms are constructed in the future the size of the absorption field must be increased to meet minimum sizing requirements.

The mounded system design and general layout are shown in Figures #1 through #3 and the design calculations and specifications are given in Appendices A and B, respectively.

<u>Operation and Maintenance:</u> Observing the operation and performing routine maintenance of the OWS is essential to allow proper, long term functioning of the system. We recommend that the operation be monitored and a qualified, licensed maintenance contractor performs maintenance of the system.

- 1) <u>Septic Tank</u>: The scum and sludge accumulation in the septic tank should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows used in this design; however, depending on use, pumping may only be required every 3 to 7 years.
- 2) <u>Effluent Filter and Pumping System</u>: The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required. The effluent pumps should be checked semi-annually to ensure the pumps are functioning properly. If the high water alarm sounds, the pumps and floats should be inspected and serviced immediately.
- 3) <u>Absorption Field</u>: The absorption field should be fenced off to vehicular traffic and livestock. The surface area around the absorption field should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels in the seepage bed should be observed through the inspection pipes.
- 4) <u>Treated Water</u>: We do not recommend that the water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWS.
- 5) <u>General Notes</u>: The owner should be aware that the operation of the OWS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctions. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No plastic or landscaping that requires additional irrigation should be placed over the absorption field.

<u>Limitations:</u> The procedures and design criteria used in this design were obtained from the EPA "Design Manual - On-site Wastewater Treatment and Disposal Systems", 1980, as well as the Colorado Department of Health "Guidelines on Individual Sewage Disposal Systems", revised 2000, and the Routt County

Individual Sewage Disposal Regulations, February 1999. The OWS design presented is based on currently accepted design procedures, the proposed structures and usage of the facilities. If the usage of the structure or addition of new facilities to those currently planned in the building changes, the OWS design will also most likely change. It should also be noted that all on-site wastewater systems require periodic maintenance as noted above. The failure of the owner to provide periodic inspection and maintenance of the system can lead to premature system failure.

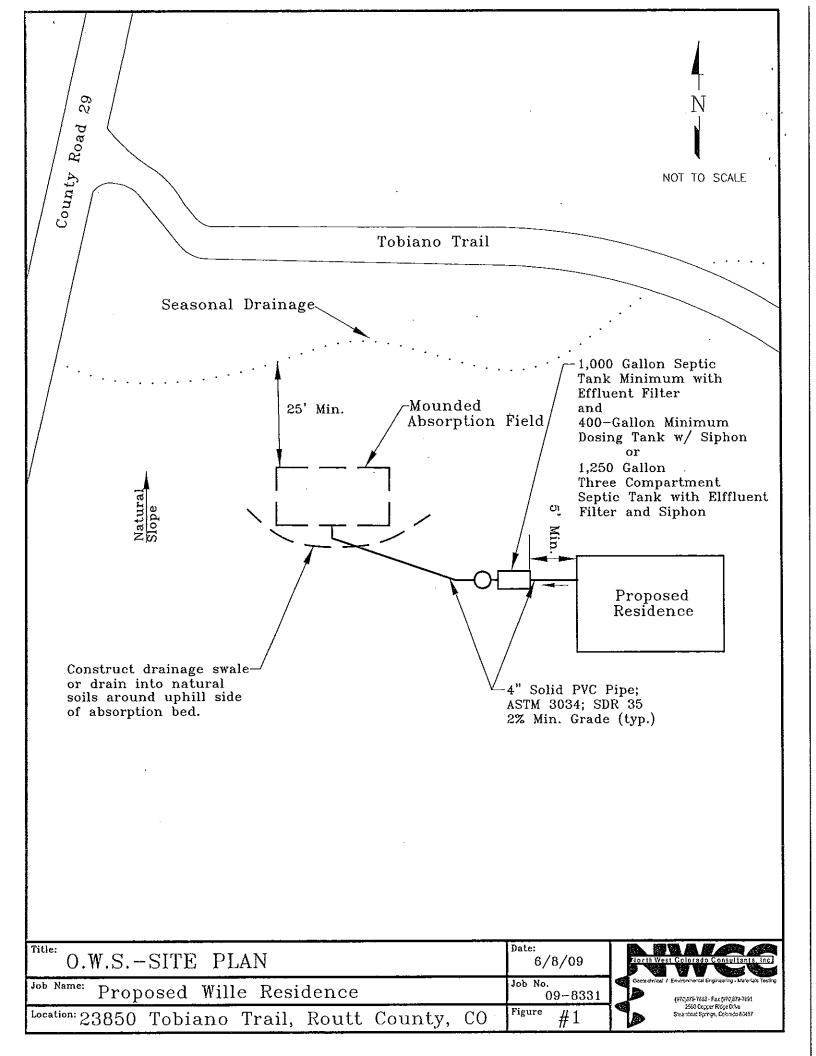
Please be advised that Colorado law requires that a permit must be obtained prior to construction, alteration or use of an on-site wastewater system. In addition, this office must be retained by the client to observe the construction/installation of the OWS and to provide an as-built report to the Routt County Department of Environmental Health. If you have any questions concerning this report, or if we may be of further service, please contact this office.

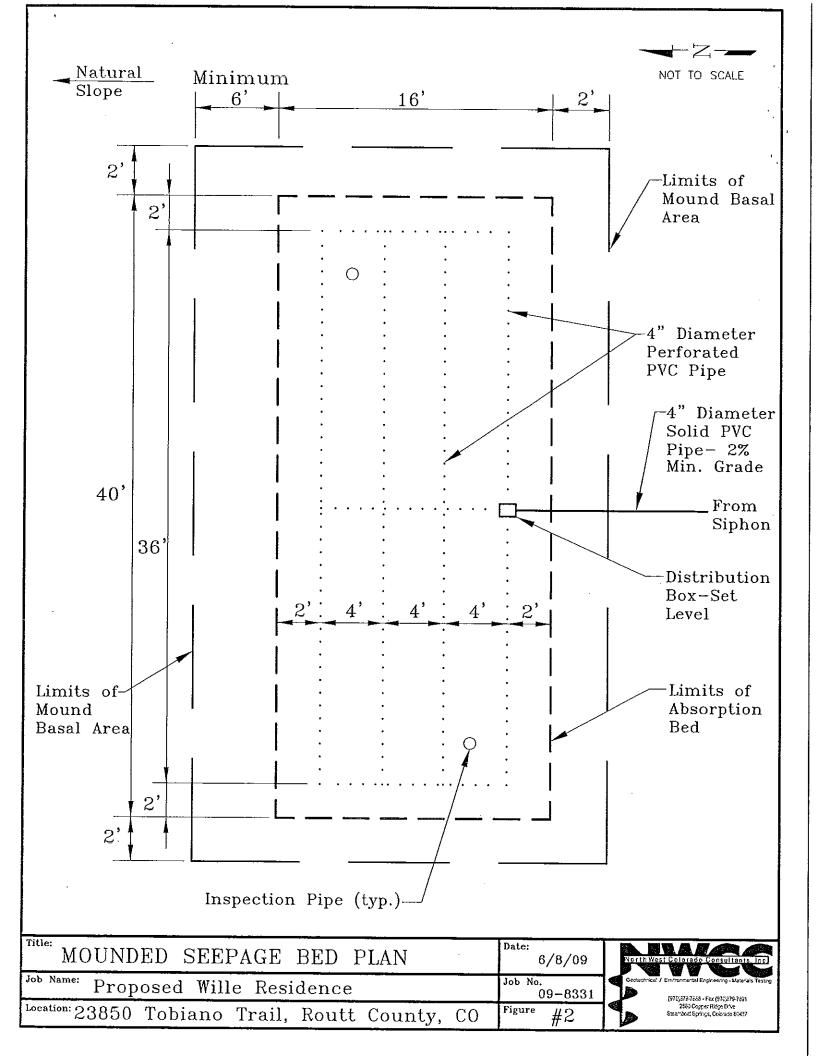
Sincerely,

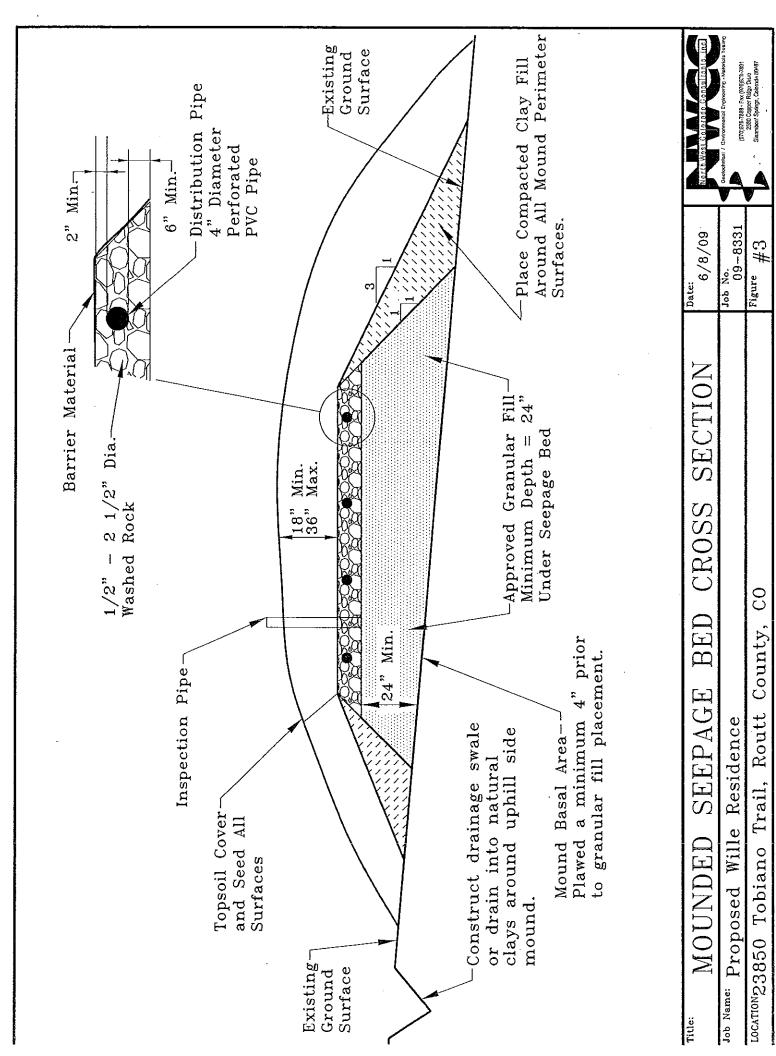
NWCC, INC.

Josh P. Frappart, E.I.T.

Reviewed by Brian D. Len, P.E.







### APPENDIX A

### SUMMARY OF DESIGN CALCULATIONS

Α.	Sewage Volume Calculations
	1) Residence
	2) Total Average Flow450 gpd
	3) Peak Factor
	4) Peak Flow for DesignQ = 788gpd
В.	System Sizing
	1) Minimum bed area = $(Q)$ (perc rate of mound materials) <sup>0.5</sup> /5 = $(788)(15)^{0.5}$ /5 = $611$ ft <sup>2</sup>
	2) Minimum basal area = $(Q)$ (perc rate of natural soils) <sup>0.5</sup> /5 = $(788)(40)^{0.5}$ /5 = 997 ft <sup>2</sup>
	3) Designed bed area = 16' x 40' = 640 $\text{ft}^2$
	4) Designed basal area = $(16^{\circ} + 8^{\circ}) \times (40^{\circ} + 4^{\circ}) = 1,056 \text{ ft}^2$
	5) Septic Tank - three-bedroom residence => Use a 1,000-gallon minimum tank.
	6) Minimum well, irrigation ditch and open water setback = 100 ft per Routt County Regulations
	7) Minimum seasonal drainage setback = 25 ft per Routt County Regulations
	8) Minimum property line setback = 10 ft per Routt County Regulations

### APPENDIX B

- 1) The regulations of the Routt County Department of Environmental Health and the Colorado Department of Health must be complied with during the construction/installation of the system.
- 2) Periodic inspections must be made by the Design Engineer from NWCC, Inc. at the following points during Construction:
  - a. After subgrade excavation and septic tank installation.
  - b. After mound fill, washed rock and pipe placement, but before pipes or mound are covered.
  - c. Upon final completion of the project.
- 3) The PVC pipe, perforated or non-perforated, shall conform to ASTM 3034 or better quality. The perforated pipe shall be set level.
- The soils beneath the pipes entering and leaving a septic or dosing tank, which has been excavated, shall be backfilled in 6-inch lifts and mechanically compacted to a minimum of 95% of the maximum standard proctor density. Cast iron pipe or pvc pipe meeting ASTM 3034 SDR 35 or schedule 40 shall be used for 5 feet on either side of the tanks.
- Provide a minimum of 12 inches of soil cover over the septic tank and 24 inches of soils cover over all pipes. Any piping placed under a driveway or other plowed areas should have a minimum of 48 inches of soil cover or be protected from freezing using insulation or other approved means. A layer of compacted clay fill materials should be placed along the sides of the mound that are constructed above the existing ground surface. The clays should be compacted to at least 95% of the maximum standard Proctor density and have at least 70% passing the No. 200 sieve. Special care should be taken when backfilling the system to prevent disturbance/crushing of the distribution lines. In addition, the distribution lines should be carefully bedded to minimize the settlement in these lines.
- The surface drainage shall be ditched and diverted away from sewage disposal areas.
- 7) The disturbed surfaces, mounds and berms shall be covered with topsoil and heavily seeded.
- 8) The washed rock shall be covered with straw and untreated building paper or synthetic filter fabric before overlying soils layers are placed.
- 9) The washed rock will consist of gravel from 0.5 to 2.5 inches in size.
- Inspection pipes to be constructed of PVC pipe with the portion of the pipe penetrating the gravel bed being perforated. Cleanouts must be placed in the solid distribution line at maximum intervals of 100' downstream of the septic tank and at a maximum interval of 50' upstream of the septic tank.
- 11) It is the responsibility of the owner and the installer to comply with all of the minimum setback requirements.
- 12) The mound fill materials should be approved by the design engineer prior to use and consist of a clean, well graded sand or sand and gravel mixture with less than 7 percent passing the No. 200 sieve.



September 30, 2009

Crystal Peak Construction, LLC 2570 S. Copper Frontage Road, Unit 7 Steamboat Springs, CO 80487

Job Number: 09-8331

Subject: On-Site Wastewater System Observations, Wille Residence, 23850 Tobiano Trail, Routt County, Colorado.

Ladies and Gentlemen:

As requested, NWCC, Inc. visited the project site on September 21 and 28, 2009 to observe the On-site Wastewater System (OWS) being constructed for the Wille Residence under construction at 23850 Tobiano Trail in Routt County, Colorado. NWCC, Inc. previously designed the OWS for the residence under this job number and dated June 10, 2009. The system design incorporates a mounded fill sewage disposal system with a minimum of 24 inches imported granular fill materials placed under the absorption bed and over the natural topsoil and organic materials.

At the time of our site visit on September 21, 2009, the owner, Rod Wille, had set a FLXX 1,250-gallon three-compartment septic tank with a siphon installed in the last compartment to the west of the residence, currently under construction. The inlet and outlet "T" connections to the septic tank visually appeared to have been constructed properly. An effluent filter had been placed in the outlet "T" of the septic tank. The contractor had also placed 4-inch diameter solid PVC pipe (ASTM 3034; SDR35) from the septic tank to a plastic distribution box in the mounded absorption bed. The piping appeared to meet the minimum grade requirement. The inspection pipes had not yet been installed during our first visit. The owner informed us that the inspections pipes would be installed prior to backfilling.

The contractor had also placed the mounded fill materials, approximately 6 to 8 inches of washed rock for the seepage bed and the 4-inch diameter perforated pipe in the washed rock. The mound basal area appeared to have been constructed to the proper dimensions. The mounded fill materials appeared to be constructed at a 1(horizontal):1(vertical) slope. The seepage bed had been constructed to the proper dimensions. The contractor was in the process of constructing the clay berm around the exposed sand and gravel fill materials. We advised the contractor that washed rock should be placed to a minimum of 2 inches over the perforated piping.

During our second visit to the site on September 28, 2009 we noted that a minimum of 18 inches of soil cover had been placed over the seepage bed after the clay berm; washed rock and barrier material had been placed. It appears that a minimum of 18 inches of soil cover had been placed over all of the piping. We

also observed that the inspection pipes had been installed. We advised the owner that excess topsoil found on his property could be placed on the downhill side of the mound increasing the topsoil cover in this area.

Based on our part time observations, it appears that the portions of the system, which were completed at the time of our site visits, had been constructed in general accordance with the design previously completed by our firm. We believe that the system should function properly with proper care and maintenance, as outlined below, if the components not completed or backfilled at the time of our visits are properly constructed. An as-built drawing taken from field measurements of the system is presented in Figure #1.

Operation and Maintenance: Observing the operation and performing routine maintenance of the OWS is essential to allow proper, long term functioning of the system. We recommend that the operation of the OWS be periodically monitored and a qualified, licensed maintenance contractor performs maintenance of the system.

- 1) <u>Septic Tank</u>: The scum and sludge accumulation in the septic tank should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows. Depending on use, pumping may only be required every 3 to 7 years.
- Effluent Filter: The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required.
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- 4) <u>Treated Water</u>: We do not recommend that the water softeners or water treatment systems be connected to the OWS. The chemical and hydraulic loading from the backwash of these treatment systems may be detrimental to the OWS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWS.
- 5) General Notes: The owner should be aware that the operation of the OWS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctions. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No plastic or landscaping that requires additional irrigation should be placed over the absorption field.

If you have any questions regarding this report, our observations or recommendations or if we may be of further service, please contact this office.

Sincerely, NWCC, INC.,

Josh P. Frappart, E.I.T.

Reviewed by Brian D. Len, P.E.

