Civil Engineering Report

To: **Pitkin County Department of Community Development**

From: **Roger Neal, PE**

Date: **August 7, 2020**

Project: **Lot 14, Shield-O-Terraces Subdivision**

Address: **51 Shield-O-Road, Pitkin County, Colorado**

Parcel No.: **2645-224-00-022**

Subject: **Application for Building Permit**

HCE Project: **2201011.00**

I. Purpose

The purpose of this report is to address the access, water supply, wastewater disposal, other utilities, storm water drainage, and public services, for Lot 14, Shield-O-Terraces, Pitkin County, Colorado. The applicants, David and Susanne Eckelberger, intend to build a new single-family residence and access driveway.

II. Location

The lot is located on 51 Shield-O-Road, and is described as Lot 14, Shield-O-Terraces Subdivision/PUD, as platted in Book 235, Page 137 and Amended Plat filed as Reception No. 483213 of the Pitkin County Clerk and Recorders Office, as shown in Figure 1.

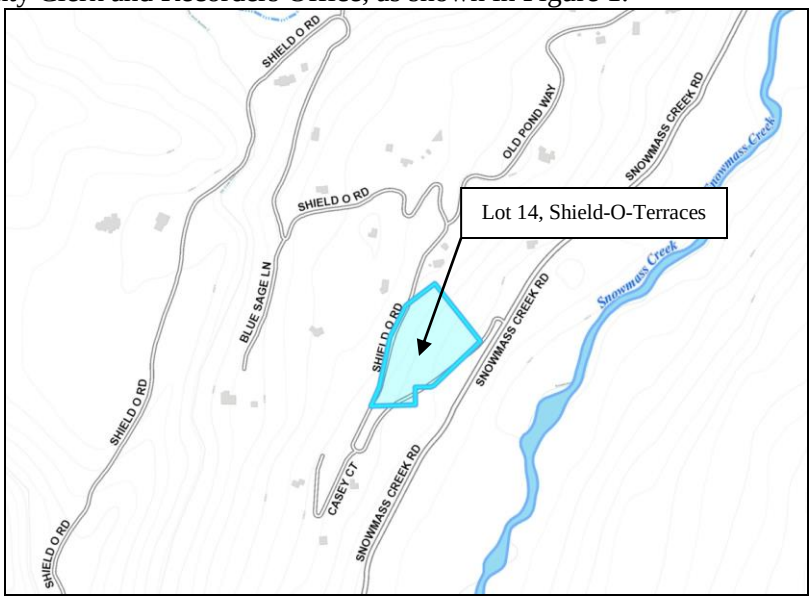

Figure 1: Vicinity Map

III. Access

A proposed access drive provides vehicular access towards the proposed residence from Shield-O-Road, which is situated within a 60-foot Ingress and Egress Easement, as recorded under Book 220, Page 190. The access drive to the proposed residence is approximately 215 feet long. Excluding the parking area in front of the garage, the access drive is approximately 175 feet long. The proposed parking area has sufficient space to provide a fire truck turn around for the smaller fire truck based on the parameters provided by Roaring Fork Fire Rescue. A dirt road entering the site near the east corner of the property boundary currently provides vehicular access to the site. Shield-O-Road intersects Snowmass Creek Road, approximately 600 feet northeast of the proposed access drive. The proposed drive will follow the requirements of the Pitkin County Road Maintenance and Management Plan.

IV. Slope Stability

HCE has reviewed the proposed envelope including the access with respect to slope stability. The envelope includes a couple areas of areas with slopes steeper than 30%. These areas show up in several locations and stick out from the contiguous slope areas or are small islands within the flatter slopes. There are also some steeper slopes immediately adjacent to the existing Shield-O Road. All of the areas are located such that there are no steep slopes above or below the anomaly areas. None of these areas will have any issues with slope stability, primarily because there is almost no slope above these areas that could impact the stability. The section by the road is there only because the construction of the road created the steeper slopes with the road cut. The driveway will simply cut through the slope and gently lay back the cut slope as the drive comes into the property. The steeper slopes at the drive location are also located in a flat area of the lot with minimal grade (less than 5') above the steeper slopes.

Based on my experience in the field as a registered professional engineer, there is no concern that the slopes within the envelope are prone to instability and that the proposed development of the residence and the associated improvements will not cause instability or increase the potential for slope failure.

V. Water Supply

Water for domestic use will be, for the proposed development, supplied by a proposed well onsite. There is an existing well onsite that will be abandoned. Water for fire protection will be provided via fire storage tank.

VI. Wastewater Disposal

The proposed single family residence will need to provide an onsite wastewater treatment system (OWTS). A design of this these systems will be provided by CBO, Inc.

VII. Other Utilities

According to the Improvement Survey Plat of Lot 14, dated December 5, 2019 by High Country Engineering, Inc. there is an existing 15-foot Holy Cross Energy easement (reception #628807) leading to an electric transformer located near the southeast property corner and on the south side of Shield-O-Road. The proposed residence will utilize this transformer for electric service. Telephone pedestals are located off Snowmass Creek Road and will likely provide service to the proposed residence. The proposed residence will likely use a propane tank onsite for gas utility.

VIII. Storm Water Drainage

The site is approximately 5.3 acres in size (as measured), according to the "Improvement Survey Plat, Lot 14, Shield-O-Terrace". The terrain slopes downward from the west to the east. The site is currently undeveloped with the exception of the existing site utilities, as mentioned previously. A dirt access drive enters the lot near the east property corner.

The applicant intends to construct a new single-family residence, access driveway, attached garage and landscape as necessary. The applicant also intends to construct storm water improvements. These proposed storm drainage improvements include storm drainage swales, culverts and one or more drywells. The proposed drywells are intended to detain the increased 25-year volume, and also provide storm water quality enhancement.

According to the Soil Survey of Aspen-Gypsum Area, Colorado published by the U.S. Department. Of Agriculture, Soil Conservation Service, there one surface soil type within the development area as follows:

Unit 107: Uracca, moist-Mergel complex, 25 to 65 percent slopes, hydrologic soil group B.

According to the Precipitation-Frequency Atlas of the Western United States Volume III, published by the National Oceanic and Atmospheric Administration, the 2-year 24-Hour precipitation is 1.26 inches, the 25-year 24-Hour precipitation is 2.09 inches, and the 100-year 24-Hour precipitation is 2.69 inches.

The peak runoff rates from the entire site have been calculated using the methods contained in *Urban Hydrology for Small Watersheds, Technical Release 55*. The site has been analyzed as one existing drainage basin and two proposed drainage basins. The analyzed on-site storm water runoff from the entire development is tabulated in Table 1 below:

Table 1

Analyzed Drainage Condition	Drainage Basin Designation	Basin Area (Ac.)	Runoff Curve Number	Time Concentration (hr)	Peak 25-Yr (cfs)	Peak 100-Yr (cfs)
Historic	EX-1	0.94	63	0.38	0.03	0.17
Proposed	PR-1+PR-2	0.94	69	0.1	0.31	0.80
Increase					+0.28	+0.63

The tabulated increases in the storm water runoffs are due to increased impervious areas within the site. These increases are to be mitigated by construction of one or more proposed drywells split between the proposed sub-basins. The drywells are intended to retain the increased 25-year volume, determined to be approximately 357 CF with these preliminary calculations, by capturing the collected runoff within graded swales. The captured runoff will have an opportunity to infiltrate into the soil, through perforated drywells, as well as transpire through the vegetated ground cover by overland sheet flow and graded swales, thereby mitigating runoff flood hazards.

The proposed drywells are also intended to provide storm water quality enhancement, by sequestering any water-borne pollutants within the drywell chamber, thereby preventing water-borne pollutants from reaching sensitive aquatic habitats within down-stream waterways.

IX. Public Services

No new public services are anticipated as part of this project.

X. References:

Improvement Survey Plat, Lot 14, Shield-O-Terraces, High Country Engineering, December 05, 2020

Web Soil Survey of Aspen-Gypsum Area, U.S. Dept. of Agriculture, Natural Resources Conservation Service, 2020

Precipitation - Frequency Atlas of the United States, NOAA Atlas 14 Volume 8 Version 2, National Oceanic & Atmospheric Admin, 2013

Urban Hydrology for Small Watersheds, TR 55, Natural Resource Conservation Service, 1986

Sincerely,

Roger Neal, P.E.
For and On Behalf of
High Country Engineering, Inc.