TAHOE REGIONAL PLANNING AGENCY

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STAFF REPORT

Date: May 16, 2024

To: TRPA Hearings Officer

From: TRPA Staff

Subject: Chesler Land Capability Challenge
179 Mason Court, Douglas County, NV
APN: 1418-34-304-011; TRPA File #: LCAP2023-0289

Proposed Action:
Hearings Officer review and approve the proposed Land Capability Challenge.

Staff Recommendation:
Staff recommends the TRPA Hearings Officer approve the Land Capability Challenge on the subject parcel. This challenge results in a change from Capability Class 2 (10,632 sq. ft., 88 percent of parcel) to Capability Class 4 (8,076 sq. ft., 67 percent of parcel) and Class 6 (2,556 sq. ft., 21 percent of parcel). A portion of the parcel (1,500 sq. ft., 12 percent, is paved sewer and access easement).

Background:
The subject parcel is shown as Class 2 on TRPA Land Capability Overlay Maps (*i.e.*, Bailey Land Capability maps). The Soil Conservation Service *Soil Survey of Tahoe Basin Area, California-Nevada* (Rogers, 1974) places the subject parcel in the CaE, Cagwin-Rock outcrop complex, 15 to 30 percent slopes. A Land Capability Verification completed in 1996 verified this parcel as Class 2- CaE, Cagwin-Rock outcrop complex, 15 to 30 percent slopes. The updated Soil Survey of Tahoe Basin Area, California and Nevada (NRCS, 2007), places this parcel in mapunit 7422, Cassenai gravelly loamy coarse sand, 15 to 30 percent slopes. This parcel has a geomorphic mapping of C1- Stream cut granitic mountain slopes, strongly dissected lands (moderate hazard lands). The Cagwin soils are moderately deep, somewhat excessively drained soils that formed in material weathered from granitic rock. Cagwin soils have loamy coarse sand textures in the A-horizon, with loamy coarse sand or coarse sand subsurface textures in the upper 27 inches. Weathered granitic bedrock (grus) is encountered between 20 and 40 inches below ground surface. The Cassenai soil series was established during the soil survey update of the Lake Tahoe Basin (NRCS 2007). It is a soil similar to Cagwin but is very deep to weathered granitic material. The Cassenai soils are very deep and have loamy coarse sand or gravelly loamy coarse sand textures. Weathered granitic bedrock is greater than 60 inches below the surface.

This Land Capability Challenge was filed with TRPA on October 13, 2023. Gordon Consulting is representing the owner, Andrew Chesler. Phil Scoles of Terra Science, Inc. was hired as a private soil consultant for this project and provided a land capability assessment report (See

Attachment B). TRPA consultant, Marchel Munnecke visited the site with Mr. Scoles on October 13, 2023. One pit was excavated by a backhoe and was fully described.

Findings:

One soil pit was excavated by backhoe. It was located 20 feet northwest of the residence and 20 feet south of the Mason Court pavement. The soil has a surface horizon composed of mixed fill material and topsoil, with a fine sandy loam texture. Native soil is below the surface horizon and has loamy sand textures from 7 to 60 inches. This soil is developed in colluvium over residuum from granitic or mixed parent materials, is somewhat excessively drained, and is Hydrologic Soil Group A. The soil taxonomy is Mixed, frigid Dystric Xeropsamments. The vegetation is a Jeffrey pine and incense cedar forest, with an understory composed of ornamental and native landscaping.

The soil at this site is dissimilar to the Cagwin soils that were mapped on this parcel in 1974, because they are deeper than 40 inches to weathered bedrock. This soil is dissimilar to the Elmira and Gefo soils because the parent material differs. The Elmira and Gefo soils formed in glacial outwash and this soil formed in colluvium and residuum. This soil does not meet the range and characteristics of any soils mapped in the 1974 Soil Survey; thus, this soil is an unmapped, XXX soil. This soil is very deep, in HSG A, with slopes between 13 to 24 percent. Using Table 4 in the *Land Capability Classification of Lake Tahoe Basin, California-Nevada*, this soil is Land Capability Class 4- XXX and Class 6- XXX. This soil is similar to the Cassenai soil that was mapped on this parcel in the 2007 *Soil Survey of the Tahoe Basin Area, California and Nevada* (NRCS 2007). The Cassenai soil is very deep and a high capability soil.

The table below summarizes the changes in land capability as concluded by this land capability challenge.

Land Capability District	**Area (sq. ft.) 1996 LCV**	**Area (sq. ft.) 2024 LCC**
Class 2 (CaE, 15 to 30 % slopes)	10,632	0
Class 4 (XXX, 16-30 % slopes)	0	8,076
Class 6 (XXX, 0-16% slopes)	0	2,556
Paved easement[1]	1,500	1,500
Total Parcel Area	12,132	12,132

[1] Area of mason Court that encroaches on the property. This area is subtracted from the parcel for purposes of calculating base allowable coverage.

Contact Information:

This memorandum was jointly prepared by TRPA Senior Planner Julie Roll and Marchel Munnecke. If you have questions on this Hearings Officer item, please contact Julie Roll, 775-589-5247, or email at jroll@trpa.gov To submit a written public comment, email publiccomment@trpa.gov with the appropriate agenda item in the subject line. Written comments received by 4 p.m. the day before a scheduled public meeting will be distributed and

posted to the TRPA website before the meeting begins. TRPA does not guarantee written comments received after 4 p.m. the day before a meeting will be distributed and posted in time for the meeting.

BAILEY LAND CAPABILITY CHALLENGE FINDINGS

Site Information	
Assessor's Parcel Numbers: (APN)	1418-34-304-011
TRPA File No. / Submittal Date:	LCAP2023-0289/ 11/13/2023
Owner or Applicant:	Gordon Consulting Jennifer Quashnick
Address:	PO Box 4470 Stateline, NV 89449

Environmental Setting	
Bailey Soil Mapping Unit[1] / Hydrologic Soil Group (HSG) / Land Class / Geomorphic Hazard Unit	CaF, Cagwin-Rock outcrop complex, 30 to 50 percent slopes/ HSG C/ C2- Stream cut granitic mountain slopes, strongly dissected (moderate hazard lands).
Soil Parent Material	Granitic colluvium over residuum
Slopes and Aspect	13 to 24 percent; sloping to the east.
Elevation and Datum	HWL 6,320 to 6,354, Google Earth - approximate.
Rock Outcrops and Surface Configuration	There are no rock outcrops on this parcel.
SEZ and Hydrology Source	There is no SEZ on the parcel.
Vegetation	The vegetation is a forest Jeffrey pine and incense cedar with an understory of ornamental and native landscaping.
Ground Cover Condition	Good (vegetation 65%, duff/mulch 50% cover)
Site Features	Residence, driveway, parking, rock wall, rock and dirt walkways, and rock pad.

Field Investigation and Procedures	
Consultant and Address	Terra Science, Inc. Phil Scoles PO Box 2100 Portland Oregon 97208-2100
TRPA Staff Field Dates	October 13, 2023
SEZ Mapping / NRCS Hydric Soil	None present
Number of Soil Pits or Auger Holes and Description Depth	1 pit was excavated by backhoe to 60 inches.

[1] TRPA currently relies upon the Soil Survey of Tahoe Basin, California-Nevada (Rogers and Soil Conservation Service, 1974), upon which the Bailey Land Capability system is predicated.

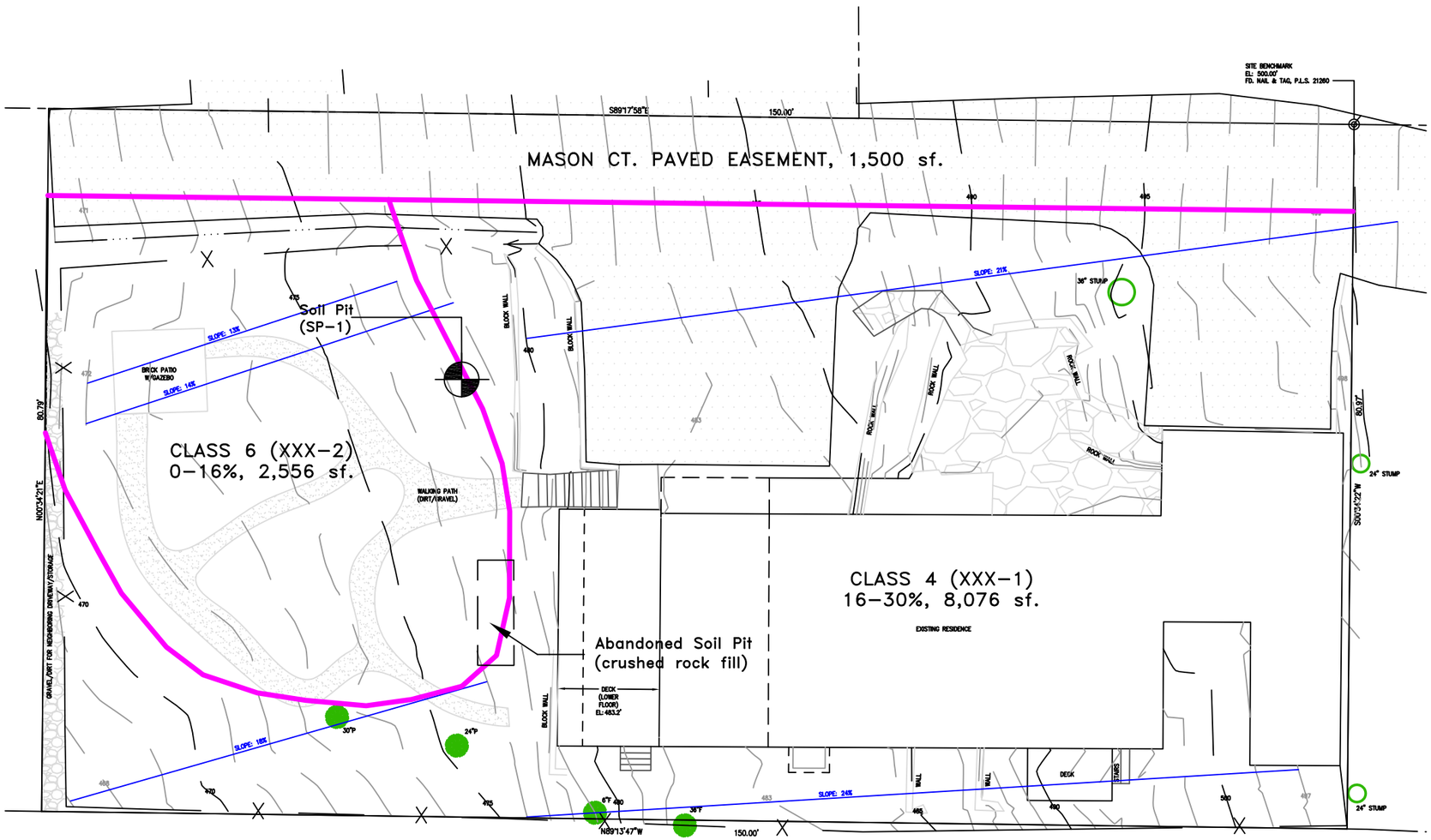
Additional or Repetitive TRPA Sample Locations	NA
Representative Soil Profile Descriptions	See Attachment B
Areas Not Examined	Residence, driveway, parking, rock wall, rock and dirt walkways, and rock pad.

TRPA Findings	
2006 Soil Survey Map Unit	7422- Cassenai gravelly loamy coarse sand, 15 to 30 percent slopes (Class 4)
Consultant Soil Mapping Determination and Rationale	Based on slopes and soil characteristics, this parcel is Class 4- XXX- 16 to 30 percent slopes and Class 6-XXX, 0 to 16 percent slopes. The soil at this site is dissimilar to the Cagwin soils that were mapped on this parcel in 1974, because they are deeper than 40 inches to weathered bedrock. This soil is dissimilar to the Elmira and Gefo soils because the parent material differs. The Elmira and Gefo soils formed in glacial outwash and this soil formed in colluvium and residuum. This soil does not meet the range and characteristics of any soils mapped in the 1974 Soil Survey; thus this soil is an unmapped, XXX soil. This soil is very deep, in HSG A, with slopes between 13 to 24 percent. Using Table 4 in the *Land Capability Classification of Lake Tahoe Basin, California-Nevada*, this soil is Land Capability Class 4-XXX and Class 6- XXX. This soil is similar to the Cassenai soil that was mapped on this parcel in the 2007 *Soil Survey of the Tahoe Basin Area, California and Nevada* (NRCS 2007). The Cassenai soil is very deep and a high capability soil.
Slope Determination	13 to 24 percent slopes
TRPA Conclusion(s)	TRPA concurs with consultants' determination and rationale above.
Applicable Area	See parcel map

Attachments:

A. Site Plan
B. Land Capability Analysis for Andrew and Ellen Chesler Parcel, 179 Mason Court, Zephyr Cove, Douglas County, NV (APN 1418-34-304-011)

Attachment A
Site Plan



LAND CAPABILITY FINDINGS -- See Notes Below

LOT AREA = 12,132 S.F. (0.276 AC.), APPLICABLE AREA = 10,632 S.F.

LAND CAPABILITY CATEGORY	APR. 12, 1996 LCV (From TRPA)	APRIL 2024 LCC (TERRA SCI.)
CLASS 2 (CaE-Cagwin-Rock outcrops 15-30% slope, HSG-C)	10,632 SF.	0 SF.
CLASS 4 (Unnamed XXX-1), 16-30% slope, HSG-A	0 SF.	8,076 SF.
CLASS 6 (Unnamed XXX-2), 0-16% slope, HSG-A	0 SF.	2,556 SF.
Mason Ct. Paved Easement	1,500 SF.	1,500 SF.
TOTAL	12,132 SF.	12,132 SF.

NOTE 1: Land Capability Analysis conducted by soil scientist, Phil Scoles on October 13, 2023. The higher capability soil (Class 4 and Class 6) has loamy coarse sand textures in the upper and lower layers (colluvium and residuum). These soils are similar to the Cagwin series, but extended deeper than that soil series. The 1974 Soil Survey of Tahoe Basin, California and Nevada indicated presence of deeper inclusions, but did not separate them as different map units. The observed soil is consistent with the Cassenai soil series described in the 2006 soil survey update. This high capability soil does not resemble other soils mapped nearby, including Elmira, Gefo, or Jabu series. Consequently, the unnamed (XXX) soils was evaluated in accordance with Table 4 of the Land-Capability of Lake Tahoe Basin, California- Nevada (Bailey, R.G.). Specifically, slightly flatter portion of the backyard (west end) has slopes 0-16% slopes, which qualifies as Class 6. The remainder of the parcel has slopes 16-30% and qualifies as Class 4. See land capability analysis report for additional discussion and soil profile descriptions.

NOTE 2: The developed portions of property include 2-story residence, decks, driveway, patio and gazebo. From Cory Kleine PLS AutoCAD file, the existing coverage is 4,646 sf. Due to the >10% slopes, some grading evident for the undeveloped areas (likely associated landscaping and past house construction). For land capability purposes, the undeveloped land evaluated on a pre-disturbance basis, as interpretated by existing contours. Slopes calculated using four or more contour lines.

NOTE 3: The paved portion of the driveway easement (aka Mason Court roadway) not designated for land capability analysis since TRPA considers it a transportation corridor.

NOTE 4: Surveyor's AutoCAD file provided by property owner's owners consultant -- no changes made to topographic contours, tree locations, landmarks, or structures. Some layers, text and shading were turned off to simplify the base graphic. This report added layers and text to the AutoCAD file for each land capability class delineation, soil pit location, and labels.

SOURCE: Adapted from Cory Kleine, PLS, topographic survey with 1-foot contours, July 25, 2022.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
7.5 0 7.5 15 30
(IN FEET)
1 inch = 15 ft.

LAND CAPABILITY ANALYSIS FOR
ANDREW AND ELLEN CHESLER PARCEL
179 Mason Court (Lakeridge Vicinity)
Zephyr Cove, Douglas County, Nev.
APN: 1418-34-304-011

April 2024

EXISTING CONDITIONS AND
LAND CAPABILITY CLASSES

AGENDA ITEM NO. V. A.

FIGURE C-1

Attachment B
Land Capability Analysis for Andrew and Ellen Chesler Parcel, 179 Mason Court, Zephyr Cove, Douglas County, NV (APN 1418-34-304-011)

LAND CAPABILITY ANALYSIS FOR ANDREW AND ELLEN CHESLER PARCEL 179 MASON COURT, ZEPHYR COVE, DOUGLAS COUNTY, NEV. (APN 1418-34-304-011)

Prepared for

Andrew Chesler
179 Mason Court
Zephyr Cove, CA. 96150

Prepared by

TERRA SCIENCE, INC.
Post Office Box 2100
Portland Oregon 97208-2100

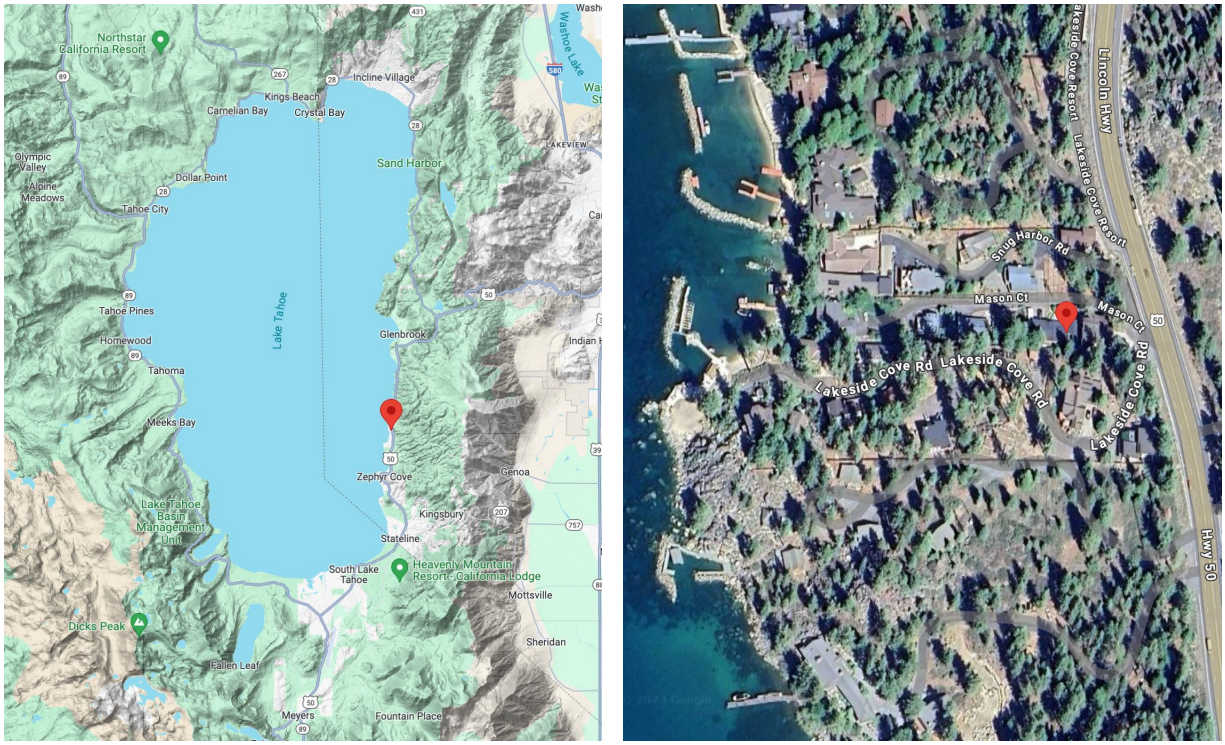
TSI PROJECT 231013-1

APRIL 2024

LAND CAPABILITY ANALYSIS FOR ANDREW AND ELLEN CHESLER PARCEL 179 MASON COURT, ZEPHYR COVE, DOUGLAS COUNTY, NEV. (APN 1418-34-304-011)

Introduction and Purpose

At the request of property owners Andrew & Ellen Chesler and Gordon Consulting, Terra Science conducted a land capability analysis of a residential property located at 179 Mason Court, in the Lakeridge vicinity of Zephyr Cove, California. This 0.28-acre (12,132 sf.) property consists of a single-family residence, driveway, patio, decks, gazebo and landscaping. The north edge of the property also includes a paved segment of Mason Court. The property slopes from east to west (toward Lake Tahoe), with slopes ranging from 13 to 24%. Elevations change 32 feet from the west (lower) edge of the property to the east (upper edge). An arbitrary elevation datum was utilized by Professional Land Surveyor Cory J. Kleine PLS (467 to 499 ft., July 25, 2022). Native vegetation consists of Jeffrey pine, white fir, incense cedar, wild currant and greenleaf manzanita. A significant portion of the undeveloped land is vegetated with ornamental trees, shrubs, and forbs.



Vicinity map (above left) and shaded relief map (above right) for 179 Mason Court, Douglas County, Zephyr Cove, Nev. Subject parcel slopes west toward Lake Tahoe, with slopes 13 to 24%.

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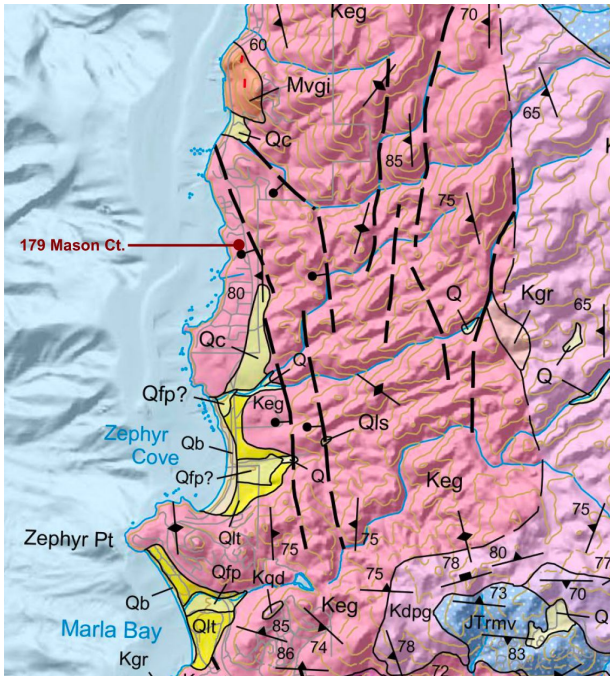
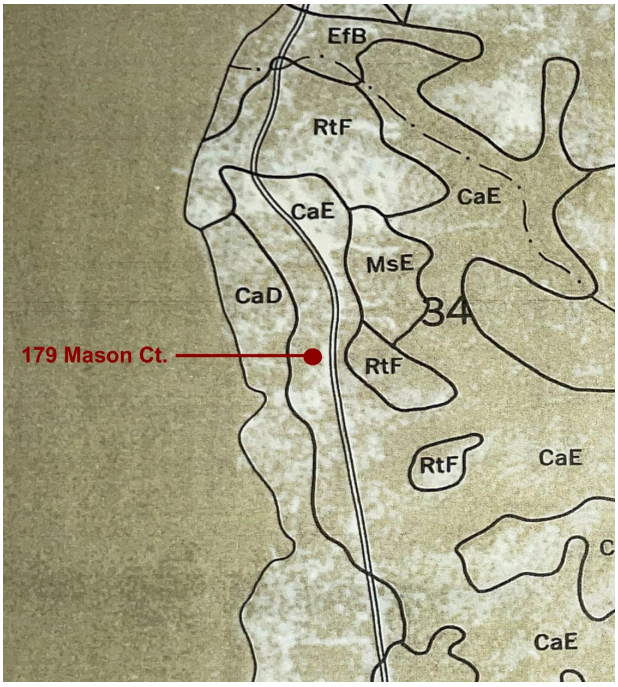
Land Capability Analysis For 179 Mason Court, Zephyr Cove, Douglas County, Nev.
Andrew and Ellen Chesler Parcel (APN 1418-34-304-011)

Given the moderate slope to the west, as well as terracing with retaining walls and boulders, it is likely past construction involved excavation and filling immediately around the residence. The west portion of the parcel has a somewhat smooth appearance, which infers only minor grading for landscaping. No portion of the property supports Stream Environment Zone (SEZ) vegetation or exhibits seasonal high water table (as per observed soil conditions).

Past Mapping and Classification

The subject property is situated on a hillside that slopes westward toward Lake Tahoe. The surface soil conditions, where not previously developed, are mostly fine sandy loam, while the underlying sediment is loamy coarse sand. The surface layer is colluvium, while the subsoil is a mixture of colluvium and residuum. The underlying geology is weathered plutonic granodiorite (see inset below; map by California Department of Conservation, Saucedo, G., 2005). Observed site conditions do not infer any seasonal runoff, based on loamy coarse sand conditions observed in soil pit.





Geologic map (left diagram) indicates vicinity of subject parcel consists of a granite-like plutonic rock (Keg – Granodiorite of The East Peak, Cretaceous) that extends from Lake Tahoe to the crest of the Carson Range. The 1974 soil survey (right diagram) shows presence of Cagwin-Rock outcrops, 15 to 30% slopes (CaE, Class 2), with Cagwin-Rock outcrops, 5 to 15% slopes (CaD, Class 4) closer to Lake Tahoe. The CaE soil type was verified by TRPA for an April 12, 1996 land capability verification (LCV).

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Land Capability Analysis For 179 Mason Court, Zephyr Cove, Douglas County, Nev.
Andrew and Ellen Chesler Parcel (APN 1418-34-304-011)

As shown on the inset on the previous page, the soils for this vicinity were originally described in Soil Survey of the Lake Tahoe Basin, California-Nevada (Roger, J., 1974). Specifically, Soil Conservation Service (now Natural Resources Conservation Service, NRCS) mapped this vicinity as Cagwin-Rock outcrop, 15 to 30% slopes (CaE), and Cagwin-Rock outcrop, 5 to 15% slopes (CaE), for land further west (downslope) of the subject parcel. Such mapping is a predictive tool based on years of field research that correlates soil formation factors like parent material, landform, slope, aspect, mineralogy, depth, drainage, stoniness, age (weathering) and vegetation patterns. Such mapping does not infer that soil conditions were verified for a particular parcel and natural variability is expected (inclusions of similar and/or associated soils).

The Cagwin soils have coarse sandy textures, that formed in-situ from decomposing granodiorite and colluvial material eroded from upgradient slopes (mostly from adjacent slopes to the east for this parcel). The Cagwin series is a shallow soil that often has grus (black and white speckled pebbles/ rock fragments) occurring within 20 to 40 inches of the surface. Below the grus material, the geologic material is hard and less fractured such that little or no root penetration occurs below 40 inches from the surface. The presence of near-surface bedrock reduces the available water holding capacity of the soil and may force downward migrating ground water to be perched. In the Lake Tahoe Basin, such limitations are considered moderate to severe; thus, the Cagwin soil is has a moderate land capability rating for 5 to 15 percent slopes (Class 4) and low land capability rating for 15 to 30 percent slopes (Class 2).

In 2006, the soil survey was updated, which differentiated more soils and utilized digital mapping techniques. The updated soil survey indicated the likely presence of 7422-Cassenai gravelly loamy coarse sand, 15 to 30% slopes (above and below the subject parcel). The addition of the Cassenai series in the 2006 soil survey update addressed the inclusions of deep soil having similar parent material and landform position as the Cagwin series. That is, the 1974 soil survey characterized the Cagwin series as having inclusions of deep soil, but soil survey protocols did not allow for mapping such areas as separate polygons (aka map units). While this survey has not yet been formally incorporated into the TRPA Code of Ordinances and land capability program, it does provide validation that a deeper version of the Cagwin series is present, but not mapped in the 1974 soil survey.

As per Land-Capability Classification of the Lake Tahoe Basin, California-Nevada (Bailey, R.G. 1974), the CaE soil is rated as Class 2, which reflects the soil has severe limitations due to moderate slope and shallow depth to bedrock, occurring on a hillside landform. The April 1997 LCV confirmed site slopes ranged from 15 to 30%, so those lands were recognized as Cagwin-Rock outcrop (CaE, Class 2). The allowable base coverage for Class 2 soil is 1 percent. The TRPA geomorphic group for this location is C-1 (Granitic Foothills), which are rated as high hazard (due to moderate slopes and shallow depths to bedrock).

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Land Capability Analysis For 179 Mason Court, Zephyr Cove, Douglas County, Nev.
Andrew and Ellen Chesler Parcel (APN 1418-34-304-011)

Methods

The purpose of this analysis is to examine onsite soils and determine the land capability classification, as per Tahoe Regional Planning Agency (TRPA) regulations. On October 13, 2023, a backhoe with a standard bucket dug two soil pits 60 inches deep. The first pit contained crushed rock that was unlike natural rock in that vicinity. It was determined such material was a former drain field for a septic system or similar infiltration system (no longer active). The second soil pit, also dug to 60-inch depth, was situated about 30 feet north of the first pit and exposed natural soil conditions lacking any rock materials. The formal soil description was described by soil scientist Phil Scoles (Appendix A).

The observed soil material was evaluated for soil horizons, texture, color, mottles and redoximorphic features, structure, consistence, plasticity, root size/abundance (estimated), pore size/abundance (estimated), gravels (visual estimate), and similar properties. Standards for these field-determined properties are promulgated by the National Cooperative Soil Survey and summarized in Field Book for Describing and Sampling Soils (NRCS, Version 3.0). Slope was measured with a clinometer and adjusted using the Cory J. Kleine, Professional Land Surveyor map (July 25, 2022). Soil horizons were measured, marked with nails/ribbon, then photo-documented prior to backfilling (Appendix B). Land capability delineations were transcribed from the field map to an AutoCAD drawing of the project map (includes topographic contours). This land capability map (Figure C-1) is included in Appendix C.

Findings and Conclusions

Compared the 1974 soil survey mapping of Cagwin-Rock outcrops, the field evaluation found deeper soil conditions in the west-center of the parcel (location of the soil test pit). No rock outcrops were evident. Field observations along the south edge of the property and further south on the neighboring parcel does not infer potential opportunity for rock outcrops beneath the residence. The deeper soils have the same granodiorite parent material as the Cagwin series; however, the soil above the bedrock has more than 60 inches of loamy coarse sand and coarse sand above. In contrast, the Cagwin soils typically have 20 to 30 inches of soil material, then grus and bedrock immediately below. Cagwin soils typically have low root penetration into the grus layer and bedrock fractures, while the deeper soil observed onsite has fine to medium roots exploring soil materials in excess of 55 inches. These deeper soils also have more water holding capacity, nutrient retention, and cation exchange due to more soil thickness above the grus and bedrock.

The topsoil documented on the hillside consists of 12 inches of fine sandy loam (A horizon), below 0.25-inch of partially decayed pine needles, twigs and branches (Oi horizon). The topsoil is naturally darkened by organic matter and contains many fine roots and common medium roots. Coarse roots become apparent around 7 inches and extend to approximately 32 inches. The subsoil (cambic horizon) shows a slight change in matrix color (iron enrichment) and subtle formation of subangular blocky structure. These upper layers consist most of colluvial deposited soil eroded from upgradient slopes over thousands of years. The soil textures eventually changes to loamy sand at 32 inches below the surface. Overall soil permeability is moderately rapid. Ground water was not observed, nor any iron redox soft masses in the upper 60 inches. As such, this small area is categorized as ydrologic soil group A (HSG-A).

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Andrew and Ellen Chesler Parcel (APN 1418-34-304-011)

The soil conditions documented by the land capability analysis do not match the soil type mapped by the 1972 soil survey nor the April 1996 LCV. The soil is also dissimilar to the Gefo and Elmira soil series, which are glacial outwash and lake terrace soils (non-rocky, flatter slopes). Instead, the observed soil within the parcel exhibits deeper conditions than the Cagwin series. These deeper soils have loamy coarse sand textures that roots can penetrate to greater than 55 inches. Additionally, these soils lack any indication of seasonal high water table. The slopes for the east (upper) part range from 21 to 24%, while the slopes in the west (lower) part are 13 to 18%. In accordance with Table 4 of Land-Capability Classification of the Lake Tahoe Basin, California and Nevada, these deeper soils qualify as Class 4 for slopes 16 to 30 percent (XXX-1) and Class 6 for slopes 0 to 16 percent (XXX-2). Figure C-1 (Appendix C) shows site features, topographic contours, soil sample location, and land capability delineations.

Land Capability District, Slope Range	1996 TRPA County Land Capability Verification; Area (sq. ft.)	2024 TSI Land Capability Challenge; Area (sq. ft.)	Net Change (sq. ft.)
Class 2 (Cagwin-Rock outcrops, 15-30% slopes), HSG-C	10,632	0	-10,632
Class 4 (Unnamed XXX-1), 16-30% slopes, HSG-A	0	8,076	+8,076
Class 6 (Unnamed XXX-2), 0-16% slopes, HSG-A	0	2,556	+2556
Paved Easement	1,500	1,500	0
Total Parcel Area	**12,132**	**12,132**	

Limitations

Terra Science, Inc. examined soil conditions for the study area using a single backhoe pit, on APN 029-101-018, located at 179 Mason Court (Lakeridge vicinity), Douglas County, Nev. While the property includes a 10-foot wide (1,500 sf.) road/utility, such area is entirely paved and utilized by multiple properties to the west for road access. As such, the easement area was excluded from the land capability analysis. The data presented in this analysis was collected and interpreted using standards of skill, care, and diligence ordinarily provided by a qualified soil scientist following National Cooperative Soil Survey standards and techniques. The land capability classifications followed the parameters set forth by Land-Capability Classification of the Lake Tahoe Basin, California-Nevada (Bailey, R.G., 1974) and Tahoe Regional Planning Agency Code of Ordinances (Amended September 30, 2020). The analysis findings are based on incidental information from the property owner, observations of the project team and

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Land Capability Analysis For 179 Mason Court, Zephyr Cove, Douglas County, Nev.
Andrew and Ellen Chesler Parcel (APN 1418-34-304-011)

limitations of the soil investigation methods. The analysis findings and their significance should not be extrapolated beyond the study area, nor used for geotechnical, stability, or engineering purposes. Terra Science, Inc. shall not be liable beyond the fees paid for its services for errors and omissions.

The analysis was generated for the exclusive use of Andrew & Ellen Chesler, Gordon Consulting (Jennifer Quashnick), and their designates. These parties shall not interpret the analysis findings and/or conclusions any differently than stated without prior discussion with Terra Science, Inc.

Respectfully submitted,

Phil Scoles
Soils and Water Scientist

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APPENDIX A – SOIL PROFILE DESCRIPTION

Soil Pit no. 1 Description

The location of the soil pit is approximately 20 feet northwest of residence and 20 feet south of Mason Court pavement (see site map). Described by soil scientist Phil Scoles on October 13, 2023 from backhoe-dug pit on a hillside (16%, west by southwest toward Lake Tahoe). Somewhat excessively drained. Sandy soil with relatively little soil formation (colluvium over residuum). Vegetation consists of scattered, mixed diameter Jeffrey pine and incense cedar. The understory composed of ornamental and native landscaping (cherry, currant, forbs/flowers).

When described, the soil was dry to 60 inches (no irrigation, seasonally dry). Profile photos included in Appendix B.

Oi—<0.25-inch; pine needles, twigs, abrupt smooth boundary.

AC—0.25 to 7 inches; very dark grayish brown (10YR 3/2) **fine sandy loam (fill mixed with topsoil)**; very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many fine roots and common medium roots; common interstitial pores; <1% gravels; abrupt smooth boundary. Soil texture influenced by organic matter presence and imported topsoil (for landscaping).

A2—7 to 12 inches; very dark brown (10YR 2/2) **loamy sand (no fill material)**; black (10YR 2/1) moist; weak fine granular structure; soft, loose, nonsticky, nonplastic; many fine roots, many medium roots and few coarse roots; many medium interstitial pores; <1% gravels; abrupt smooth boundary.

Bw1—12 to 21 inches; dark yellowish brown (10YR 3/3) **loamy sand**; dark grayish brown (7.5YR 3/2) moist; weak fine granular structure; soft, loose, nonsticky, nonplastic; common fine roots, common medium roots and few coarse roots; many medium interstitial pores; <1% gravels; clear smooth boundary.

Bw2—21 to 32 inches; dark yellowish brown (10YR 3/3) **loamy sand**; dark grayish brown (10YR 3/2) moist; weak fine granular structure parting to weak fine subangular blocky; soft, loose, nonsticky, nonplastic; common fine roots, few medium roots and few coarse roots; many medium interstitial pores; <1% gravels; clear smooth boundary. No redoximorphic features.

C1—32 to 49 inches; olive brown (2.5Y 4/3) **loamy sand**; dark olive brown (2.5Y 3/3) moist; weak fine subangular structure; soft, loose, nonsticky, nonplastic; few fine roots and few medium roots; common medium interstitial pores; <1% gravels; clear smooth boundary. No redoximorphic features.

C2—49 to 60 inches; light olive brown (2.5Y 5/3) **loamy sand**; olive brown (2.5Y 4/3) moist; massive structure; soft, loose, nonsticky, nonplastic; few fine roots and few medium roots; common medium interstitial pores; <1% cobbles; clear smooth boundary. No redoximorphic features.

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Parent material:	Mixed colluvium atop granitic residuum.
Drainage class:	Somewhat excessive drained. Moderately rapid permeability.
Hydrologic Soil Group:	HSG-A (seasonal water table >60 inches from surface).
Soil Taxonomy:	Mixed, frigid Dystric Xeropsamments (from Cassenai OSD)
TRPA Geomorph. Map:	C-1 Granitic foothills (moderate hazard lands, HSG-C)
1974 NRCS Mapping:	CaE-Cagwin-Rock outcrops, 15 to 30% slopes (Class 2)
2006 NRCS Mapping:	7422-Cassenai gravelly loamy coarse sand, 15 to 30% slopes (Class 4).

2023 TSI Determination: Unnamed soil (XXX); The unnamed soil is deeper than the mapped Cagwin-Rock outcrops map unit. This deeper soil is an unnamed inclusion (labeled XXX by TRPA) mentioned in the 1974 Soil Survey of the Lake Tahoe Basin. While associated with granodiorite landforms, these deeper inclusions did not get delineated in the 1974 soil survey due to mapping scale and other soil survey limitations. The soil is also dissimilar to the Gefo and Elmira soil series, which are glacial outwash and lake terrace soils (non-rocky, flatter slopes). As such, the unnamed soil does not match known soil series described in the 1974 Soil Survey of the Lake Tahoe Basin (hence they are considered unnamed, XXX soils). The land capability classes for the unnamed XXX soils were determined from Page 20, Table 4 of Land-Capability Classification of the Lake Tahoe Basin, California-Nevada (Bailey, 1974). Specifically, Class 4 for slopes 16 to 30% and Class 6 for slopes 0 to 16%.

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APPENDIX B – PROJECT PHOTOGRAPHS

Photo 1. Soil Pit no. 1 (Depth = 60 in.)

Photo 2. View south at Soil Pit no. 1. Roots extended to bottom of soil pit with no indication of seasonal high water.

Photo 3. View south by southwest at upper part of backyard, located west of residence (at far left). Residence situated mostly on 21 to 24% slopes, while backyard ranges from 13 to 18% slopes.

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APPENDIX B – PROJECT PHOTOGRAPHS (cont'd).

Photo 4. View northeast by east from west-center of backyard (west portion of property). The observed soil conditions were deep, loamy coarse sand textures, plus no root or water limitations.

Photo 5. Panoramic view from southwest corner. The foreground is several feet lower than the the soil pit (center-background, below retaining wall). The backyard (west of house) is landscaped with ornamental tree and shrubs, plus several pine and fir trees.

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APPENDIX B – PROJECT PHOTOGRAPHS (cont'd).

Photo 6. View west by northwest from residence deck. Soil test pit located at opposite (north) end of backhoe on 16% slope.

Photo 7. View east along south property line. Adjacent parcel to south has similar topographic setting, but less development. Vegetation is Jeffrey pine, white fir, incense cedar, wild currant and greenleaf manzanita. Ground cover consists of fir/pine duff and scattered grasses/forbs.

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APPENDIX B – PROJECT PHOTOGRAPHS (cont'd).

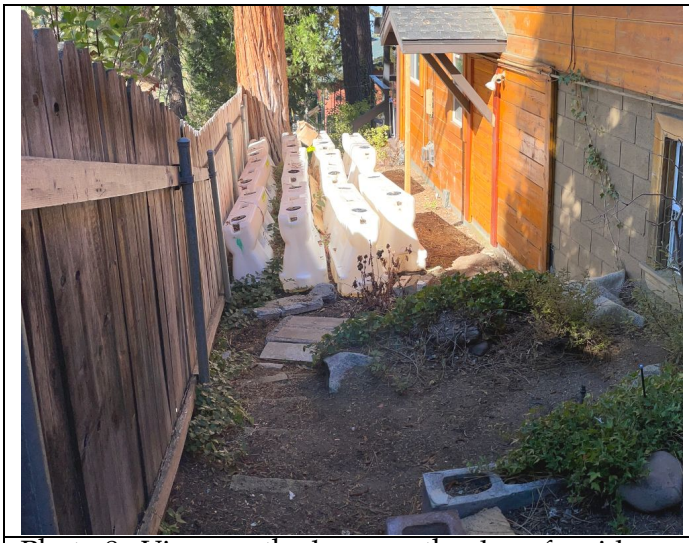

Photo 8. View south along south edge of residence where prior grading occurred.

Photo 9. View southwest at east edge of garage which abuts the property line.

Photo 10. View southwest by west across north side of residence and Mason Court (foreground). A segment of the street is located with subject parcel; however, no land capability rating assigned.

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APPENDIX C – LAND CAPABILITY MAP

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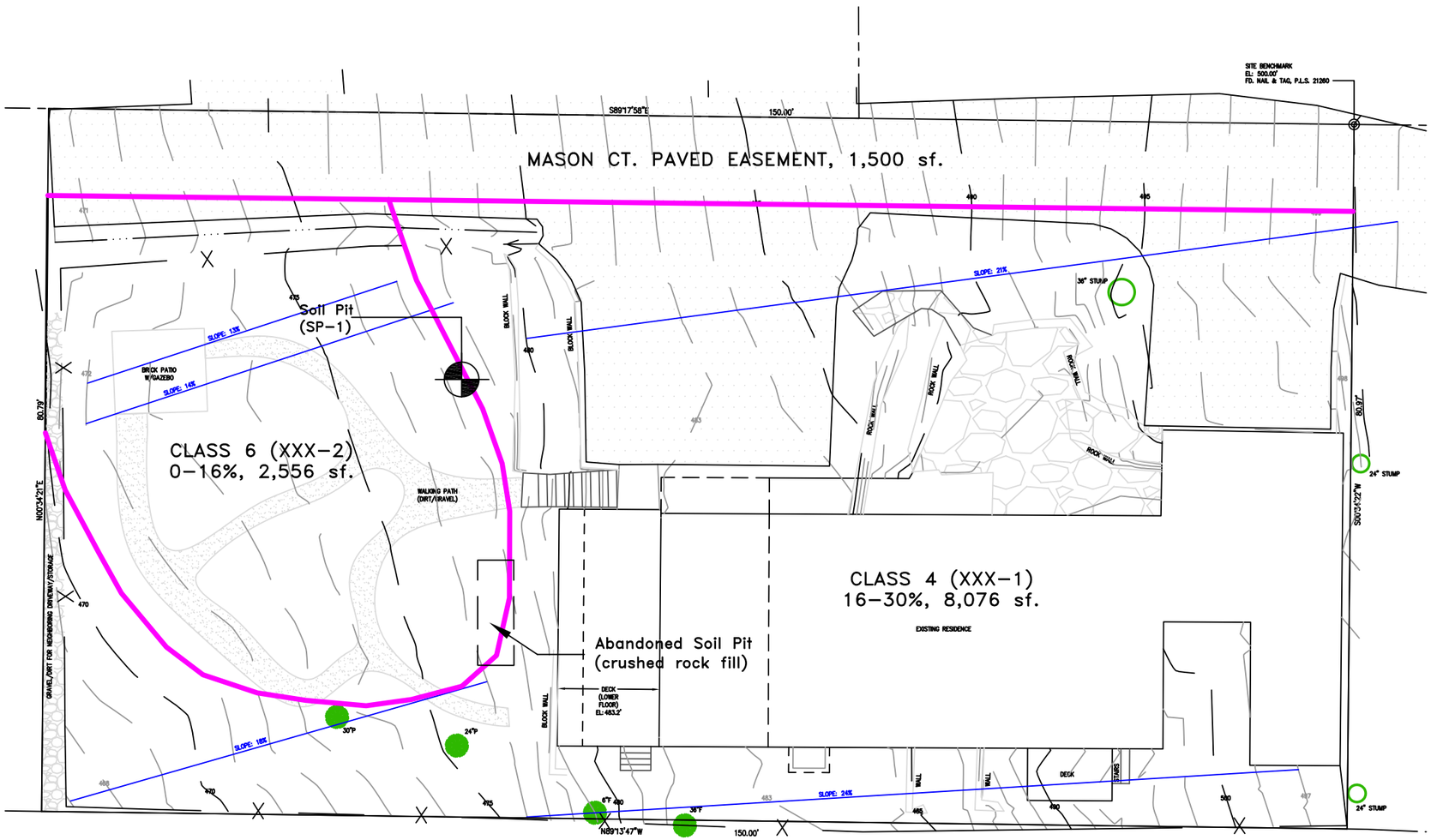

LAND CAPABILITY FINDINGS -- See Notes Below

LOT AREA = 12,132 S.F. (0.276 AC.), APPLICABLE AREA = 10,632 S.F.

LAND CAPABILITY CATEGORY	APR. 12, 1996 LCV (From TRPA)	APRIL 2024 LCC (TERRA SCI.)
CLASS 2 (CaE-Cagwin-Rock outcrops 15-30% slope, HSG-C)	10,632 SF.	0 SF.
CLASS 4 (Unnamed XXX-1), 16-30% slope, HSG-A	0 SF.	8,076 SF.
CLASS 6 (Unnamed XXX-2), 0-16% slope, HSG-A	0 SF.	2,556 SF.
Mason Ct. Paved Easement	1,500 SF.	1,500 SF.
TOTAL	12,132 SF.	12,132 SF.

NOTE 1: Land Capability Analysis conducted by soil scientist, Phil Scoles on October 13, 2023. The higher capability soil (Class 4 and Class 6) has loamy coarse sand textures in the upper and lower layers (colluvium and residuum). These soils are similar to the Cagwin series, but extended deeper than that soil series. The 1974 Soil Survey of Tahoe Basin, California and Nevada indicated presence of deeper inclusions, but did not separate them as different map units. The observed soil is consistent with the Cassenai soil series described in the 2006 soil survey update. This high capability soil does not resemble other soils mapped nearby, including Elmira, Gefo, or Jabu series. Consequently, the unnamed (XXX) soils was evaluated in accordance with Table 4 of the Land-Capability of Lake Tahoe Basin, California- Nevada (Bailey, R.G.). Specifically, slightly flatter portion of the backyard (west end) has slopes 0-16% slopes, which qualifies as Class 6. The remainder of the parcel has slopes 16-30% and qualifies as Class 4. See land capability analysis report for additional discussion and soil profile descriptions.

NOTE 2: The developed portions of property include 2-story residence, decks, driveway, patio and gazebo. From Cory Kleine PLS AutoCAD file, the existing coverage is 4,646 sf. Due to the >10% slopes, some grading evident for the undeveloped areas (likely associated landscaping and past house construction). For land capability purposes, the undeveloped land evaluated on a pre-disturbance basis, as interpretated by existing contours. Slopes calculated using four or more contour lines.

NOTE 3: The paved portion of the driveway easement (aka Mason Court roadway) not designated for land capability analysis since TRPA considers it a transportation corridor.

NOTE 4: Surveyor's AutoCAD file provided by property owner's owners consultant -- no changes made to topographic contours, tree locations, landmarks, or structures. Some layers, text and shading were turned off to simplify the base graphic. This report added layers and text to the AutoCAD file for each land capability class delineation, soil pit location, and labels.

SOURCE: Adapted from Cory Kleine, PLS, topographic survey with 1-foot contours, July 25, 2022.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
7.5 0 7.5 15 30
(IN FEET)
1 inch = 15 ft.

LAND CAPABILITY ANALYSIS FOR
ANDREW AND ELLEN CHESLER PARCEL
179 Mason Court (Lakeridge Vicinity)
Zephyr Cove, Douglas County, Nev.
APN: 1418-34-304-011

April 2024

EXISTING CONDITIONS AND
LAND CAPABILITY CLASSES

AGENDA ITEM NO. V. A.

FIGURE C-1