

Application for Improvement Permit

		APPROVAL CHECKLIST	Initial	Date		
Applicant	Name Andy Gleason		Land Use Administrator			
	Address 705 Kearney St Durango, CO 81301					
	9704036545 Phone		Ownership of Surface			
Owner	Name Andy & Leslie Gleason		Ownership of Minerals			
	Address 705 Kearney St Durango, CO 81301		Vicinity Map			
	Phone		Certified Survey Plat			
Contractor	Name Brian Anderson 9318 Contracting		Monumentation			
	Address Brian@9318contracting.com		Basic Plan Map			
	9707994375 Phone		Plans and Drawings			
Legal Description of Property:		Road System Relationship				
Lot 2 Tract A-1, Ophir Placer M.S. 1124, T41N, R7W, Sec18, New Mexico Meridian Township N, Range W, Section		Zoning Compatibility				
		State Mining Permit				
		Owner Notification				
		Avalanche Hazard				
		Geologic Hazard				
		Floodplain Hazard				
		Wildfire Hazard				
		Mineral Resource Impact				
		Wildlife Impact				
		Historic Site Impact				
Nature of Improvement Planned: New cabin on Lot 2 Tract A-1, Ophir Placer, an existing lot in an existing subdivision. New driveway off existing driveway to 252 CR 6		Watershed Gearance				
		County Building Inspector				
		Building Permit				
		State Electrical Inspector				
		Electrical Permit				
		Land Use Zone:		San Juan Basin Health Unit		
				Sewage Disposal: Test		
				Design		
		Date Application Requested		Central Sewage Collection		
		Date Submitted for Permit		State Division of Water Resources		
Date Permit Issued		Adequate Water Source				
Date Permit Denied		Well Permit				
Reason for Denial		. Central Water Distribution				
		U.S. Forest Service/BLM				
		Access Approval				
		State Division of Highways				
		Driveway Permit				
Receipt		FEE PAYMENT				
		Amount	Date			
Application						
Building Permit						
Subdivision/PUD						
Hearing Notice						
		Subdivision Variance				
		Subdivision Approval				
		PUD Approval				

RECEIPT

6/17/2021

San Juan County

County Treasurer: Deanna Jaramillo

Date: 6/17/2021
Station: 1
Cashier: 1
Receipt: 1034

Paid By: ANDY GLEASON
Description: COUNTY IMPROVEMENT
System: Cash Receipting
Reference:

Payment Method:

Cash:	\$0.00	Wire No.:	
Checks:	\$350.00	Card Type:	
Credit Card:	\$0.00	Account Number:	
Wire:	\$0.00	Expiration Date:	
Amount Tendered:	\$350.00		
Change Returned:	\$0.00		
Total Paid:	\$350.00		

Check No.	Name	Amount
2005	ANDY GLEASON	\$350.00

Receipt	Trans. Code	Fund	Ledger	Description	Operator	Amount
1034	GenRct	(010)COUNTY GENERAL FUND	0100010000	CASH ACCOUNT	D	\$350.00
1034	GenRct	(010)COUNTY GENERAL FUND	0100041804	LAND USE FEES - IMPROVEM	C	\$350.00

Signature

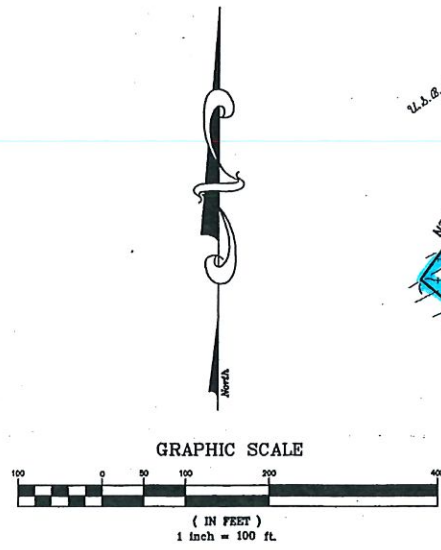
Gleason Subdivision,
of the Boundary
Tract A of the

DR. JUMBER
MAP # 178
SACD PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 0002
PAPER STOCK OF PRINT ON THIS LINE

DRAWING NUMBER
GLEASON SUB
PART OF
MS 1124
SACD PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 0002
PAPER STOCK OF PRINT ON THIS LINE

DRAWING NUMBER
RECEPTION
146172
SACD PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 0002
PAPER STOCK OF PRINT ON THIS LINE

DRAWING NUMBER
NUMBER
SACD PRODUCTS • NEW HOPE, MINNESOTA
REORDER BY PART NUMBER 0002
PAPER STOCK OF PRINT ON THIS LINE



Contour Interval: 10 feet (Digitized from Silverton Base Map prepared for San Juan Regional Planning Commission, October, 1982, by Ute Engineering)

Basis of Bearing is S51°25'00"E between the found monuments at the NE and SE corners of this property.

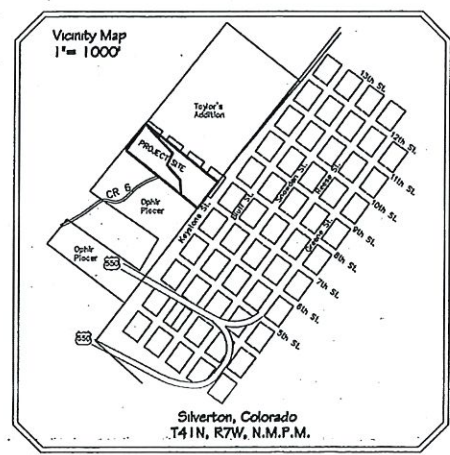
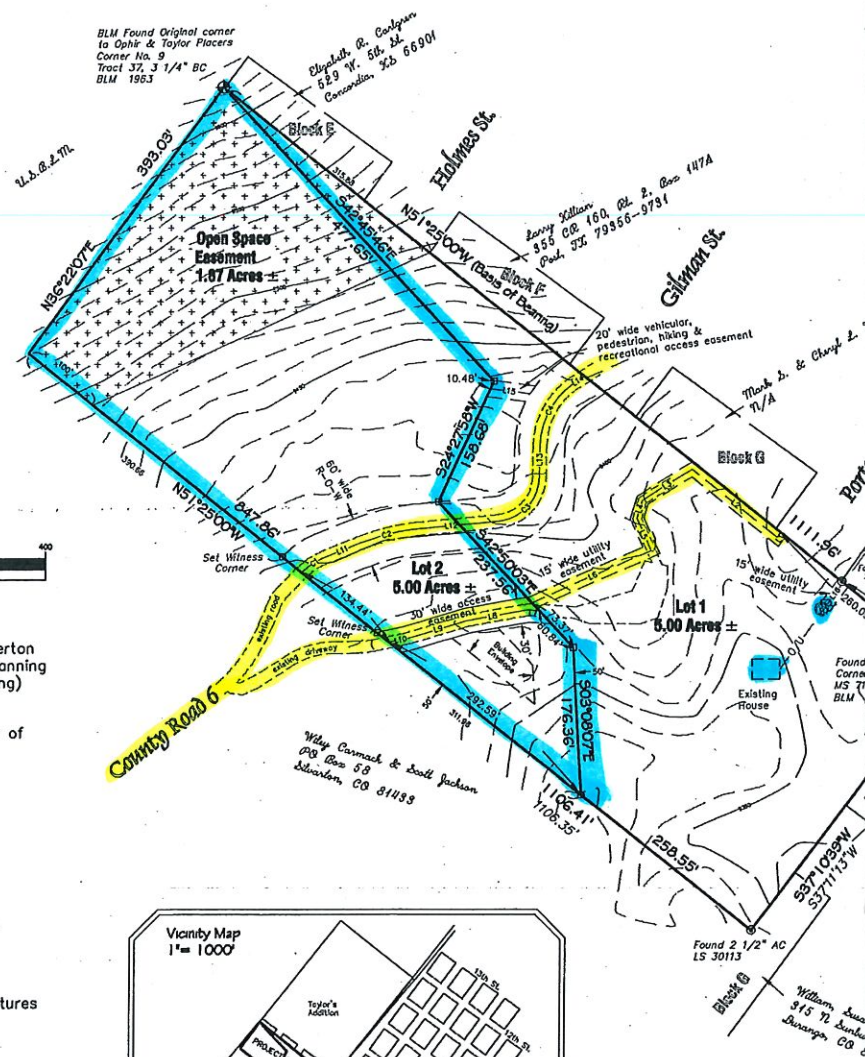
- : Set 1 1/2" AC, LS 23498
- ⊙ : Well
- ⊙ : Utility Pole
- ⊙ : Designated Open Space

Field Dimension: S37°10'39"W 392.81'
Record Dimension: S37°11'13"W 392.85'

NOTICE:
The location of subsurface utilities and features is unknown.

Open Space Usage Table
Total Open Space: 1.87 acres±
Lot 1 Open Space: 0.16 acres±
Lot 2 Open Space: 1.71 acres±
Total Open Space = 18.7% of project

LINE	LENGTH	BEARING
L1	7.19	S36°10'01"W
L2	130.03	N51°25'00"W
L3	69.71	S57°56'53"W
L4	22.55	S16°12'36"W
L5	41.88	S23°59'20"E
L6	154.41	S66°10'30"W
L7	13.54	N86°30'13"W
L8	73.13	S79°45'36"W
L9	74.94	S73°18'03"W
L10	20.94	S77°58'20"W
L11	47.42	S68°08'28"W
L12	93.53	S84°38'51"W
L13	37.24	S00°54'26"W
L14	15.85	S56°42'55"W
L15	47.01	S82°59'25"E
L16	37.82	S36°40'54"W



CURVE	LENGTH	RADIUS	DIRECTION	CHORD
C1	30.84	75.00	S56°21'35"W	30.63
C2	72.02	250.00	S76°23'40"W	71.77
C3	80.38	55.00	S42°46'38"W	73.42
C4	87.66	90.00	S28°48'41"W	84.24

This survey is a resubdivision of Tract A of the Ophir Placer, U.S. Survey, was made to retrace the original townsite survey. Records of prior surveys indicate Townsite boundary. It is unclear if gaps prior surveys.

RECORDING INFORMATION
STATE OF COLORADO
COUNTY OF SAN JUAN
I hereby state that
this day of December
Dorothy Zanoni, Recorder
By: _____

**Re-Subdivision of Tract A-1
Boundary Survey of a part of
Ophir Placer, M.S. 1124**

KNOW ALL MEN BY THESE PRESENTS:

That J. Andrew and Leslie Gleason, whose address is 705 Kearney St., Durango, CO 81301, being the legal and record owner of all that property described as Tract A-1 of the Boundary Survey of a Part of Tract A of the Ophir Placer, M.S. Survey 1124, located in unsurveyed T41N, R7W, N.M.P.M., San Juan County, Colorado, has caused the same to be sub-divided and platted under the name and style the Gleason Subdivision.

DEDICATIONS:

The 20 wide access easement is hereby dedicated for the use and benefit of owners and future owners of Lot 2 in this subdivision for vehicular, pedestrian, hiking and recreational purposes.

The 30 foot wide access easement, under Reception No. _____ is hereby dedicated for the use and benefit of owners and future owners of lots in this subdivision and to public utility providers for the installation, maintenance and replacement of public utilities.

The 15 foot wide utility easements are hereby dedicated to public utility providers for the installation, maintenance and replacement of public utilities to lots in this subdivision.

The 60 foot wide right of way easement is hereby dedicated to San Juan County for road purposes and to public utility providers for the installation, maintenance and replacement of public utilities. No dedication or statement of purpose was made for the 60 foot Right of Way shown on the record plat of the "Boundary Survey of a Part of Tract A of the Ophir Placer, M.S. Survey 1124." The dedication of the Right of Way hereon replaces the prior, undedicated right of Way.

The designated Open Space Easement is hereby dedicated to the public for pedestrian, hiking and recreational purposes.

PLAT NOTICE:

County Road 6 does not necessarily receive winter maintenance and will not receive improved or additional maintenance. Emergency services may not be available in a timely manner and perhaps not at all.

CERTIFICATE OF OWNERS

ACKNOWLEDGEMENT

by: J. Andrew Gleason by: Leslie Gleason

STATE OF COLORADO)

) SS

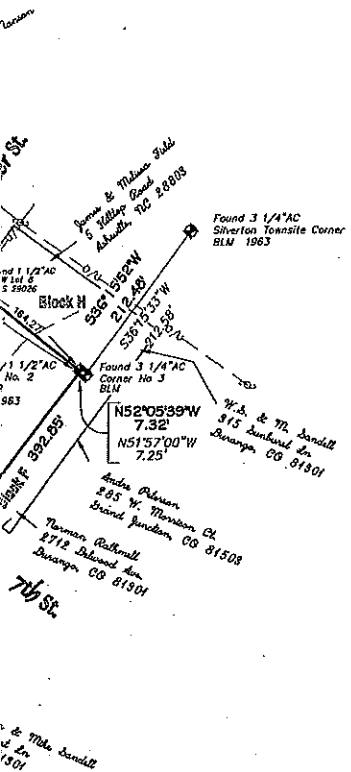
COUNTY OF SAN JUAN)

The foregoing instrument was acknowledged before me this 09th day of November, 2007, by J. Andrew Gleason and Leslie Gleason

Marcia J. Gable
Notary Public

My commission Expires: 8/23/08

1402 Greene St, Silverton, CO 81433 11/9/07
Address Date



CERTIFICATE OF APPROVAL

This plat and statements hereon are approved and accepted by the County of San Juan, Colorado, this day of _____, 200_____.

Attest: April D. Carter 12/11/07 Attest: Christine M. Dooley 12/11/07
Planning Commission Chairman

Attest: Ernest P. Kuhlman
Chairman of Board of County Commissioners

Attest: [Signature]
Clerk of the Board

SURVEYORS STATEMENT:

This survey is subject to any facts that may be disclosed by a title search and abstract. I hereby state this plat is based on a field survey made by me or under my direct supervision and that to the best of my professional knowledge, information, and belief, it correctly represents the facts found at the time of survey.

NOTICE: According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discovered such defect. In no event, may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

FRANK GIBBONS 11/21/07
Frank Gibbons Colo. Reg. L.S. #23498



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RECORDATION
this instrument was filed for record at 11:10 O'clock A M, the 14th day of JAN, 2007, and duly filed, Reception Number 146172 Fee 1.02
_____, Deputy.

Gibbons - NBQ Inc.
As Equal Engineering Co. Inc.
P.O. Box 3178 DURANGO, CO. 81302

Gleason Subdivision, a Re-Subdivision of Tract A-1 of the Boundary Survey of a part of Tract A of the Ophir Placer, M.S. 1124

San Juan County Colorado

Job: <u>Gleason.dwg</u>	Drawn by: <u>GW</u>
Checked by: <u>FG</u>	Rev: <u>November 1, 2007</u>
Scale: <u>1" = 100'</u>	Date: <u>July 30, 2007</u>

SILVERTON/SAN JUAN COUNTY OFFICE OF PLANNING

P.O. Box 250 Silverton, Colorado 81433
T: (970) 387-5522 F: (970) 387-5583 E: sickmiller@ekiva.net

~~March 31, 2021~~

OCT. 9 2007

J. Andrew Gleason
705 Kearney Street
Durango, CO 81301

Dear Mr. Gleason:

At its regular meeting on September 20th, 2007, the San Juan County Board of County Commissioners voted to approve your combined preliminary/final subdivision plat with the following conditions before recordation:

1. That the final plat drawings specifically identify the dedicated Open Space as an easement rather than land dedicated to the County.
2. That access to the property be guaranteed to future property owners through a new agreement with the owner of the driveway on Tract A-2 of Ophir Placer *or* the establishment of a driveway permit directly from the Shrine Road (County Road 6).
3. In keeping with County code 7-116, Scenic Preservation, the visibility of the building envelope on Lot 2 shall be adequately and naturally screened from the Shrine Road.
4. In keeping with the spirit of County code 7-122, a public easement shall be provided at the pathway of any existing trails leading to public lands.
5. In keeping with code 7-111.9(a), receipt of letters from applicable utility companies stating the possibility of service to the building envelope at Lot 2.
6. Formal agreement to develop in compliance with Final Plat Design Standards, as found in County Code section 7-112.
7. That the applicant acknowledges through plat notes and also recorded with the sale of each lot that:
 - a) CR 6 (the Shrine Road) does not necessarily receive winter maintenance
 - b) CR 6 will not receive improved or additional maintenance
 - c) That emergency services will not be available in a timely manner and perhaps not at all.

After making necessary changes and providing supporting documents to the Town/County Planner, please submit a 24"x36" mylar plat at a scale of 1" = 200' that shows compliance with conditions where applicable. Along with plat notes where necessary to satisfy the conditions of approval, the final plat should also include the following signature blocks:

- Signature of Applicant
- Notarization of Applicant Signature
- Signature of the Planning Commission Chairman
- Signature of the Chair of the County Commissioners
- Acceptance of plat by County Clerk and Recorder

Please see enclosed photocopies for examples of plat note signature blocks.

Sincerely,

Adam Sickmiller
Town and County Planner

**APPLICATION FOR IMPROVEMENT PERMIT
Sketch Plan Submittal**

**Proposed Gleason Cabin
Lot 2 Tract A-1, Ophir Placer, 252 County Road 6
San Juan County, Colorado**

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5. Project Plans: Sketch Plan
6. Onsite wastewater treatment system design-Trautner Geotech report
7. San Juan Basin Health Department Septic System Permit-pending
8. San Juan County Driveway and Road Access Permit-pending
9. Scenic Quality Report and fire hazard map
10. Geologic Hazards Report
11. Avalanche Hazard report

2. PROJECT NARRATIVE

Proposed Gleason Cabin, Lot 2A Ophir Placer

Applicant Name: Andy and Leslie Gleason

Project Location:

The project is located on Lot 2 Tract A-1, of the existing Gleason subdivision, Ophir Placer M.S. 1124, San Juan County, Colorado. The 5 acre Lot is located at 252 County Road 6 (Shrine Road), San Juan County, CO, 81433. The legal description is: T41N, R7W, Sec18, New Mexico Meridian.

Proposed Development: One residential cabin, shed, driveway, and septic system.

Zoning:

The property is zoned Mountain Zone. The Board of County Commissioners approved the building envelope location for Lot 2 Tract A-1, Ophir Placer on 12-14-2007.

Water Service:

The Applicant plans to haul water to be placed in a cistern. The proposed water cistern has a holding capacity of approximately 2500 gallons, to be located inside the proposed basement of the house.

Sewer Service:

A septic system is proposed for the cabin. The septic system was designed by Trautner Geotech, a Colorado Licensed Professional Engineer, in accordance with the San Juan Basin Health Department regulations. Two on-site septic profile test pits were recently excavated and evaluated by Trautner Geotech (report included).

Access. There is an existing driveway off of the Shrine Road that passes through Ophir Placer Tract A-2 via an easement with the owners of Tract A-2. This driveway allows access to Lot 1 and Lot 2 below the Shrine Road. The driveway has been widened and has a Hammerhead or "T" with ample room for a fire truck turn-around. The road was constructed with recommendations from Gilbert Archuleta, Town of Silverton Director of Public Works and Fire Chief. There is adequate off-street parking on both lots. A 50 foot, secondary driveway is proposed off of the existing driveway to the proposed building envelope at Lot 2.

Utilities

As requested by the county commissioners at the sketch plan stage, electric utilities have been run to Lot 2 underground as shown on the utility easement on the Survey Plat.

Power/Propane:

The Applicant plans to utilize propane for cooking. The propane will be kept in a permanent tank, to be stored outside of the cabin and away from any combustibles. Electricity will be

from the existing electric utility extension constructed during the Gleason subdivision. The electric utility box is located about 50 feet from the proposed building site.

Heating:

Heating for the cabin is planned to include one propane stove and electric baseboard and in-floor heat.

Exterior Lighting:

For safety, a minimal amount of exterior lighting will probably be installed at the cabin. The Applicant plans to install automatic on/off motion detection solar exterior light(s). Exterior lighting will be in conformance with the requirements of San Juan County.

Solid Waste Management:

The Applicant will be responsible for bi-weekly trash disposal. According to County regulations, property owners are responsible for solid waste transportation and solid waste disposal fees. On-site trash will need to be contained within a structure at all times until removal to the Transfer Station.

Landscaping:

Landscaping is to consist of raking and removal of combustible ground cover near the cabin, as recommended by the Colorado State Forest Service Firewise Practices, to develop adequate defensible space. Revegetation and screening will be provided by the Applicant in accordance with the requirements of San Juan County.

Access:

County Road 6 provides access to the project site. An existing driveway to 252 CR 6 will be utilized to access the building envelope. A 50 foot, secondary driveway is proposed off of the existing driveway.

Foundation:

The foundation for the proposed cabin will consist of a steel reinforced concrete foundation system with excavation/foundation work to be handled by Maisel Excavation. A basement is proposed for utilities, the cistern system and storage.

Surveying:

A survey plat for the Gleason Subdivision of the Lot 2 Ophir Placer was prepared by Licensed Surveyor Gibbons-NBQ Surveyors Inc. A signed and stamped copy of the survey plat is included within this application for your review.

Subsurface Conditions:

Subsurface conditions in the area generally consist of topsoil overlying sand-and-gravel soil. The sand-and-gravel soil generally includes cobbles and boulders. Underlying the surface soil is bedrock. The USGS geology map for the "Silverton caldera" area indicates that at the project site is Qd, glacial drift material. See the attached Geologic Hazard report for more information.

Building Envelope:

The building envelope is located in a grove of aspen trees at the top of a small hill with slopes in all directions less than 30%. The cabin footprint is located in the most heavily-vegetated area of the site, surrounded on three sides by trees and bushes, for natural screening. The Board of County Commissioners approved the building envelope location for the Gleason Subdivision on Lot 2 Tract A-1, Ophir Placer on 12-14-2007.

County Geohazards Map:

The Sketch Plan for this project has been overlaid onto the County Geohazards Map. According to the San Juan County Geohazards map, the proposed cabin appears to be in an area of "cst," which represents "Areas of thick colluvial or glacial accumulations generally thicker than six feet." Included for your review is a geologic hazard report describing the geologic conditions at the site. The report concludes that no mitigation is required due to geologic hazards.

County Avalanche Map:

The Sketch Plan for this project has been overlaid onto the County Avalanche Hazard Map. According to the County Avalanche Hazard Map, the property appears to be located outside a potential avalanche area. Included for your review is an avalanche hazard report, describing the potential avalanche hazard at the site. The report concludes that the proposed cabin location is buildable, as the proposed cabin is not located within an avalanche zone.

Cabin Size:

The proposed cabin size is two story, with an exterior footprint of approximately 26 feet by 28 feet (728 square feet exterior footprint dimension). A basement and partial second story (loft) is proposed.

Cabin Height:

The proposed one story cabin is designed with a roof pitch of 8:12. Using the plans included within this submittal, the cabin height is estimated to be approximately 24 feet above the finish floor elevation to the tallest part of the top exterior of the roof. After an initial excavation cut below the existing ground surface, the proposed cabin will be elevated approximately 24 feet above the proposed ground surface.

Deck/Porch Information: A non-enclosed front porch approximately 8 feet by 16 feet is proposed. The porch is proposed with a railing and stairs on the west side of the proposed house.

Cabin Style:

The Applicant has contracted with Dean Bosworth, Structural Engineer and Architect, to design the cabin. It will be wood-framed with wood and metal exterior.

Building Plans:

Draft building plans for the proposed cabin have been prepared for the Applicant by Dean Bosworth, and are included in this submittal for your review.

Total Square Footage:

We calculate the total proposed "Floor Area" to currently include approximately 1,300 square feet including the basement and loft area.

Building Materials:

The proposed cabin building materials consist of the following:

- Wood or Masonite siding (brown)
- non-reflective, dark colored, metal roofing material;
- Corrugated metal placed around foundation.

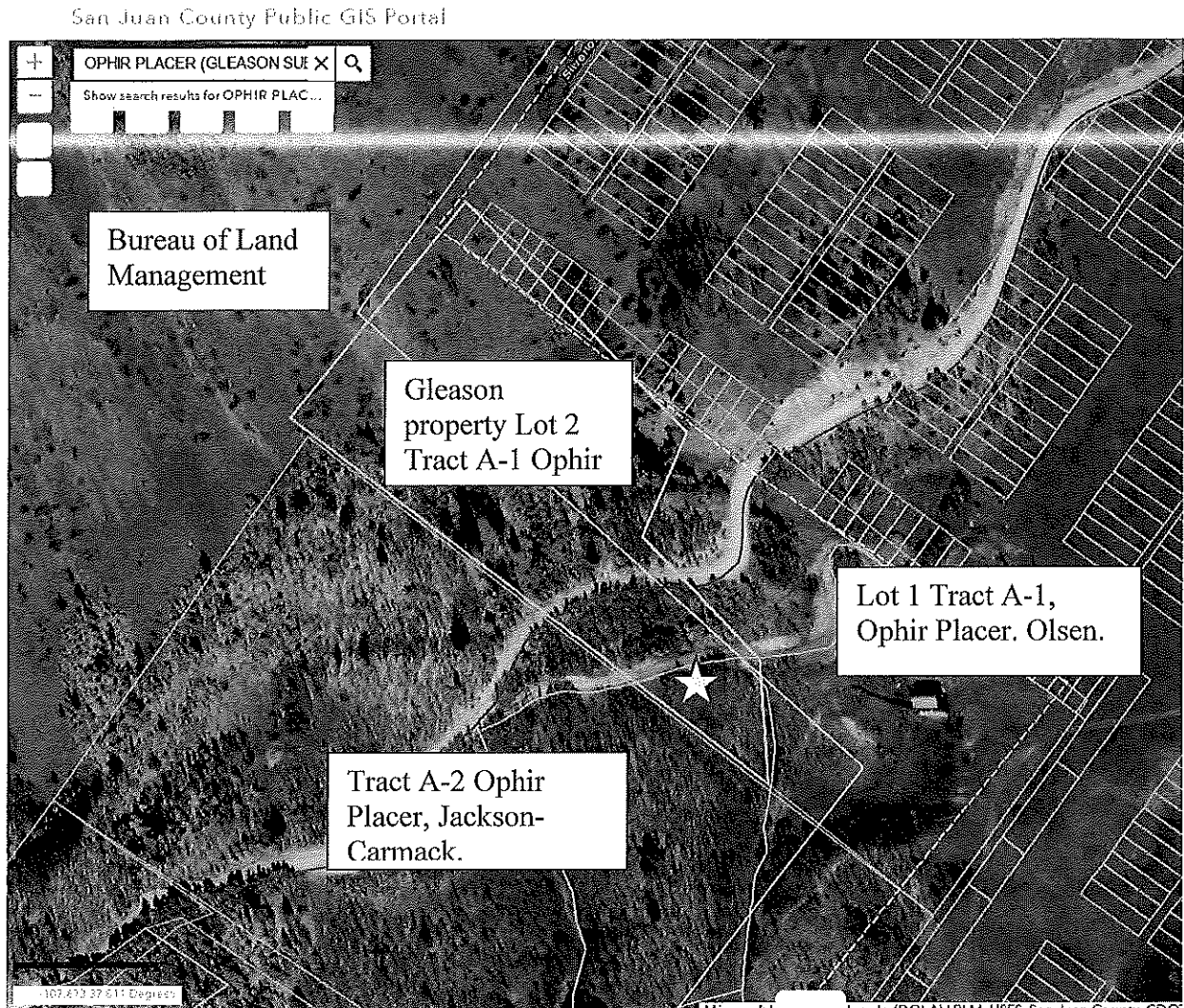
Proposed Shed:

The proposed shed is being designed as one story, with a footprint of 10 feet by 12 feet. The shed building style is to consist of standard wood framing construction, with board and batt siding, with the roof and log stain colors to match the cabin.

Setback:

The proposed cabin is within the previously approved building envelope for the Gleason Subdivision and adheres to all setback requirements from the county.

3. Adjacent Land Owner Map and list of adjacent owners- Gleason Cabin Project



Gleason property outlined in Blue –Lot 2 Tract A Ophir Placer. Building site –yellow star.
Adjacent ownership shown for adjacent parcels.

List of Adjacent land owners:

Bureau of Land Management

Tract A-2 Ophir Placer, S. Jackson- W. Carmack.

Lot 1 Tract A-1, Ophir Placer. M. Olsen.

4. Survey Plat with topography (PDF attached)

Division of Planning, a Re-Organization of the
 of the Boundary Survey of the
 of the State of New York, N.Y. 1925

GRAPHIC SCALE
 1" = 100' 0"

GRAPHIC NORTH
 1" = 100' 0"

LEGEND
 1. Impervious Stone Slabs
 2. Open Pav.
 3. Open Grass

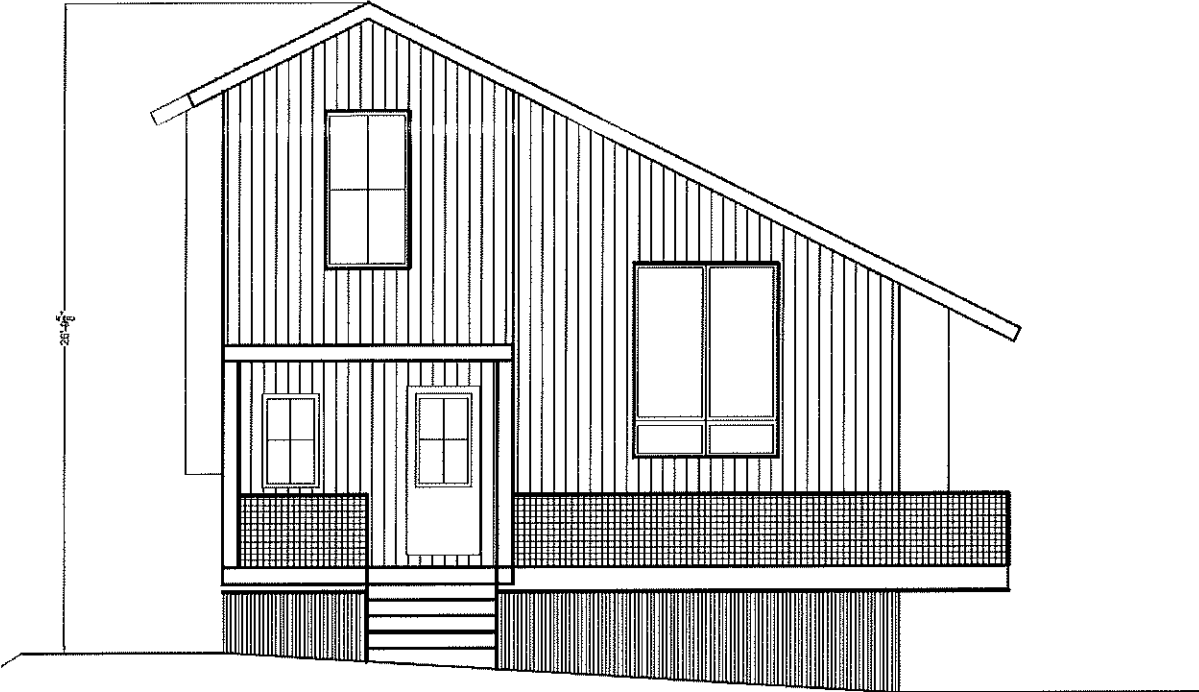
Field Notes
 The boundary of the above tract and the
 of the State of New York, N.Y. 1925

LINE	BEARING	DISTANCE	AREA
1	N 89° 15' 00" E	100.00	100.00
2	S 89° 15' 00" E	100.00	100.00
3	S 0° 00' 00" E	100.00	100.00
4	N 89° 15' 00" W	100.00	100.00
5	N 89° 15' 00" W	100.00	100.00
6	S 89° 15' 00" W	100.00	100.00
7	S 0° 00' 00" W	100.00	100.00
8	N 89° 15' 00" E	100.00	100.00
9	N 89° 15' 00" E	100.00	100.00
10	S 89° 15' 00" E	100.00	100.00
11	S 0° 00' 00" E	100.00	100.00
12	S 0° 00' 00" E	100.00	100.00
13	N 89° 15' 00" W	100.00	100.00
14	N 89° 15' 00" W	100.00	100.00
15	S 89° 15' 00" W	100.00	100.00
16	S 0° 00' 00" W	100.00	100.00
17	N 89° 15' 00" E	100.00	100.00
18	N 89° 15' 00" E	100.00	100.00
19	S 89° 15' 00" E	100.00	100.00
20	S 0° 00' 00" E	100.00	100.00
21	S 0° 00' 00" E	100.00	100.00
22	N 89° 15' 00" W	100.00	100.00
23	N 89° 15' 00" W	100.00	100.00
24	S 89° 15' 00" W	100.00	100.00
25	S 0° 00' 00" W	100.00	100.00
26	N 89° 15' 00" E	100.00	100.00
27	N 89° 15' 00" E	100.00	100.00
28	S 89° 15' 00" E	100.00	100.00
29	S 0° 00' 00" E	100.00	100.00
30	S 0° 00' 00" E	100.00	100.00
31	N 89° 15' 00" W	100.00	100.00
32	N 89° 15' 00" W	100.00	100.00
33	S 89° 15' 00" W	100.00	100.00
34	S 0° 00' 00" W	100.00	100.00
35	N 89° 15' 00" E	100.00	100.00
36	N 89° 15' 00" E	100.00	100.00
37	S 89° 15' 00" E	100.00	100.00
38	S 0° 00' 00" E	100.00	100.00
39	S 0° 00' 00" E	100.00	100.00
40	N 89° 15' 00" W	100.00	100.00
41	N 89° 15' 00" W	100.00	100.00
42	S 89° 15' 00" W	100.00	100.00
43	S 0° 00' 00" W	100.00	100.00
44	N 89° 15' 00" E	100.00	100.00
45	N 89° 15' 00" E	100.00	100.00
46	S 89° 15' 00" E	100.00	100.00
47	S 0° 00' 00" E	100.00	100.00
48	S 0° 00' 00" E	100.00	100.00
49	N 89° 15' 00" W	100.00	100.00
50	N 89° 15' 00" W	100.00	100.00
51	S 89° 15' 00" W	100.00	100.00
52	S 0° 00' 00" W	100.00	100.00
53	N 89° 15' 00" E	100.00	100.00
54	N 89° 15' 00" E	100.00	100.00
55	S 89° 15' 00" E	100.00	100.00
56	S 0° 00' 00" E	100.00	100.00
57	S 0° 00' 00" E	100.00	100.00
58	N 89° 15' 00" W	100.00	100.00
59	N 89° 15' 00" W	100.00	100.00
60	S 89° 15' 00" W	100.00	100.00
61	S 0° 00' 00" W	100.00	100.00
62	N 89° 15' 00" E	100.00	100.00
63	N 89° 15' 00" E	100.00	100.00
64	S 89° 15' 00" E	100.00	100.00
65	S 0° 00' 00" E	100.00	100.00
66	S 0° 00' 00" E	100.00	100.00
67	N 89° 15' 00" W	100.00	100.00
68	N 89° 15' 00" W	100.00	100.00
69	S 89° 15' 00" W	100.00	100.00
70	S 0° 00' 00" W	100.00	100.00
71	N 89° 15' 00" E	100.00	100.00
72	N 89° 15' 00" E	100.00	100.00
73	S 89° 15' 00" E	100.00	100.00
74	S 0° 00' 00" E	100.00	100.00
75	S 0° 00' 00" E	100.00	100.00
76	N 89° 15' 00" W	100.00	100.00
77	N 89° 15' 00" W	100.00	100.00
78	S 89° 15' 00" W	100.00	100.00
79	S 0° 00' 00" W	100.00	100.00
80	N 89° 15' 00" E	100.00	100.00
81	N 89° 15' 00" E	100.00	100.00
82	S 89° 15' 00" E	100.00	100.00
83	S 0° 00' 00" E	100.00	100.00
84	S 0° 00' 00" E	100.00	100.00
85	N 89° 15' 00" W	100.00	100.00
86	N 89° 15' 00" W	100.00	100.00
87	S 89° 15' 00" W	100.00	100.00
88	S 0° 00' 00" W	100.00	100.00
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197	N 89° 15' 00" E	100.00	100.00
198	N 89° 15' 00" E	100.00	100.00
199	S 89° 15' 00" E	100.00	100.00
200	S 0° 00' 00" E	100.00	100.00

ADDITIONAL INFORMATION
 STATE OF NEW YORK
 COUNTY OF NEW YORK
 CITY OF NEW YORK
 TRACT OF LAND
 OF THE STATE OF NEW YORK, N.Y. 1925

STATE OF NEW YORK
 DEPARTMENT OF PLANNING
 DIVISION OF PLANNING
 120 NASSAU ST., NEW YORK, N.Y. 10038
 TEL. 312-2221

5. Project Plans: Sketch Plan (Draft)



FRONT ELEVATION (WEST)

GLEASON CABIN SILVERTON, COLORADO	REVIEW
	FEB. 26, 2021
STRUCT: <i>structures integrated</i> durango silverton telluride	SHEET A4
DEAN, BOSWORTH, PE STRUCTURAL ENGINEER 970 729 1431 dean.bosworth@gmail.com	

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Avalanche Hazard Report- Gleason Cabin Project

1.0 INTRODUCTION

This report presents our snow avalanche hazard assessment for the Ophir Placer, Gleason subdivision, lot 2 in Silverton, Colorado. This avalanche hazard study presents an evaluation and detailed discussion of the site exposure of the property owned by Andy and Leslie Gleason including Lot 2 Tract A-1, Ophir Placer, an existing lot in an existing subdivision (Figure 1). The Lot is located at 252 County Road 6 (Shrine Road), San Juan County, CO, 81433. The legal description is: T41N, R7W, Sec18, New Mexico Meridian.

Our avalanche hazard analysis is based on our surface observations, a review of available literature, avalanche mapping for the area, dendrochronology, avalanche dynamics modeling and on our experience in the area. This study includes expected design level pressures from avalanche debris, avalanche runout distances and return periods.

1.1 Geologic Hazard Definition and Discussion

There are three (3) statutes that were adopted by the Colorado Legislature that are pertinent to geologic hazards and land use. "The Land Use Act" of 1970 established the basis for which later bills could be enforced. The Land Use Act mandated that decisions and authority to develop and enforce land use planning regulations should be conducted at local government levels. Senate Bill 35 (1972) required that local county governments either adopt land use planning regulations for subdivisions or follow a model set of regulations developed by the state. In 1974 the Colorado House amended the Land Use Act by adopting House Bill 1041.

House Bill 1041 provided legal definition of natural and geologic hazards. A natural hazard is considered any hazard from geologic conditions, wildfire, or flooding. A geologic hazard is defined as "a geologic phenomenon which is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazards to public health and safety or to property". The geologic hazards identified and defined in HB 1041 include; avalanche, landslide, rockfall, mudflow and debris fans, unstable or potentially unstable slopes, seismic effects, radioactivity and ground subsidence.

2.0 PROJECT BACKGROUND, SCOPE OF DEVELOPMENT AND SCOPE OF STUDY

The subject property is located on CR 6 near Silverton, Colorado (Figure 1).

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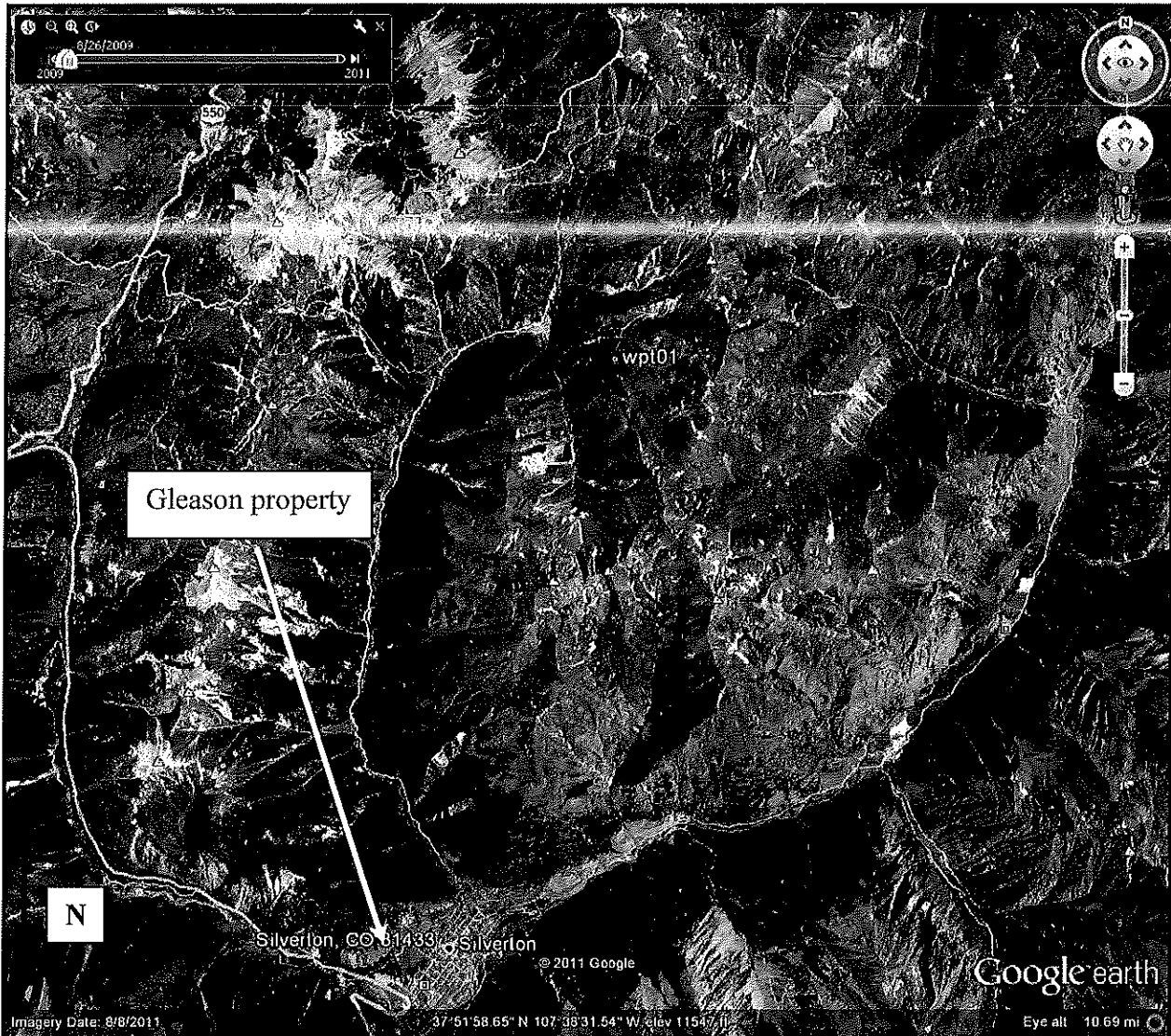


Figure 1
Location map of the Gleason property. Lot 2 Ophir Placer Tract A-1.

2.1 Current Scope of Development

We understand that the proposed project will consist of evaluating the avalanche hazard on the unnamed avalanche paths in the vicinity of the Ophir Placer mining claims near Silverton, Colorado (Figure 2). The development includes a single family cabin approximately 1200 square feet. The delineation of the avalanche paths near the subject property was conducted by the INSTAAR group.

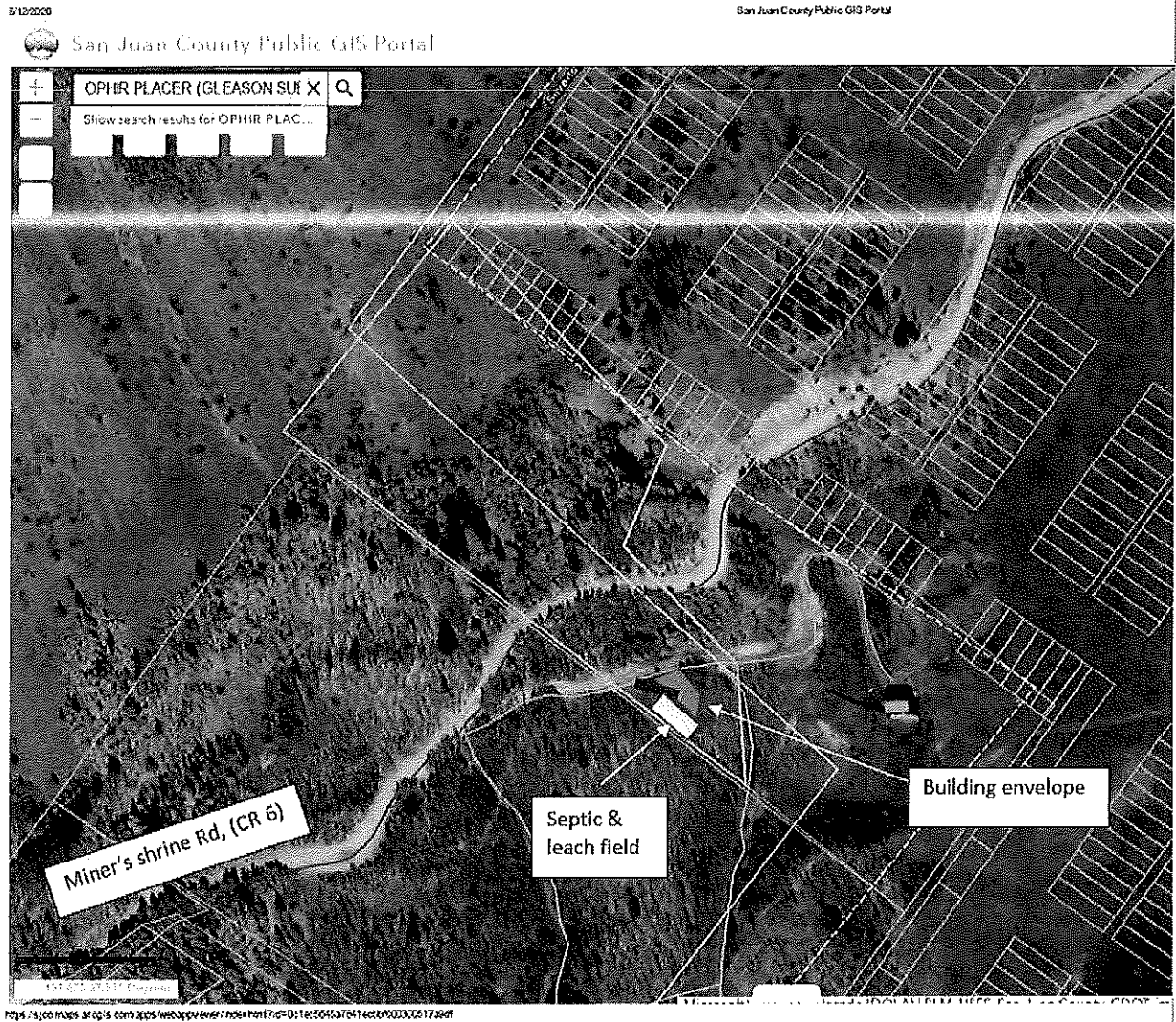


Figure 2. Gleason parcel Ophir Placer Gleason subdivision lot 2. Blue polygon= Building envelope. Red Line driveway and access. Yellow rectangle= septic

2.2 Scope of This Avalanche Hazard Study

We performed a field reconnaissance of the site in April, 2019 and September, 2021. The site observations include detailed observations of portions of the site to evaluate the existence and potential significance of avalanche hazards that may influence the site property. The general scope of our study included the following;

- Field observations including a description of the site topography.
- We observed the site for evidence of avalanche hazards outlined in Colorado House Bill 1041.

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- Identification of avalanche hazards that may influence the site utilizing the INSTAAR avalanche hazard map for the Silverton Quadrangle.
- Tree coring to determine dendrochronology of past avalanche events and age of trees in and adjacent to the avalanche paths.
- Avalanche dynamics modeling to determine the potential runout length and impact pressures of design-level avalanches.
- We prepared an avalanche hazard map which is included as Figures 4 and 5 of this report.

3.0 GENERAL AVALANCHE DISCUSSION

3.1 General Avalanche Hazard Discussion

Avalanche paths generally consist of three parts:

- the starting zone, where avalanches initiate,
- the track, where avalanches reach maximum velocity, and,
- the runout zone where avalanches decelerate and deposit snow and debris.

Avalanche paths can be either unconfined or channelized or have a combination of both. In Colorado, many avalanches are confined by gullies and forested areas.

The destructive force of avalanches occurs in two ways, the force from the powder blast which is at the leading edge of a moving avalanche and the force from the dense, flowing debris which makes up the bulk of entrained snow. The dense debris has the largest impact pressures and typically follows behind the powder blast by a few seconds. The magnitude of the avalanche impact pressure depends on the velocity of the flow and density of the snow as well as the angle of the impacted structure to the flow. The maximum impact pressure occurs on a structure with a wall perpendicular to the flow. As this angle is decreased, the force per unit area or pressure decreases, so that the calculated design pressure for a structure can vary from the predicted impact pressure.

Avalanches have return periods similar to floods based on the probability of avalanche occurrence. Some avalanche paths have avalanches occur numerous times during the winter season. Other avalanche paths only have avalanche occurrences every one to three hundred years. For example, a return period of 100 years has a probability of occurrence of 0.01 in any given year. Unlike floods, the return period of an avalanche is dependent on extreme weather events and the structure of the snowpack when the extreme weather event occurs. Similar to floods, the probability of an avalanche occurring is not dependent on the time since the last event.

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Avalanche hazard zoning is usually based on the design avalanche. The “design avalanche” has a destructive potential that depends on the return period and the encounter probability. The only reliable method for accurate identification of the return period and encounter probability is a long observation period that is at least twice as long as the design period (Mears, 1992). For most zoning situations the design avalanche is based on an avalanche with a 100 year return period.

Avalanche paths near residential areas in Colorado are generally delineated into two zones; the Red or High Hazard Zone and the Blue or Moderate Hazard Zone. The Red Zone is generally defined as an area affected by an avalanche with a return period of less than 30 years or by an avalanche with a dynamic impact pressure of greater than 30 kPa (or 600 lb/ft²). The Blue Zone is generally defined as an area affected by an avalanche with a return period of 30 to 100 years and also by an avalanche with a dynamic impact pressure of less than 30 kPa (or 600 lb/ft²). Residential and commercial structures are generally permitted in Blue Zones when some type of mitigation is incorporated into the design of the building. Avalanche hazard zoning is not consistent within the state of Colorado and is usually defined by the county government. Some municipalities have adopted specific avalanche hazard zoning rules.

3.2 Regional Avalanche Hazard Discussion

The Ophir Placer is located in the San Juan Mountains of southwestern Colorado. Avalanches typically occur in the San Juan Mountains from November through May, though extraordinary snowfall events can cause avalanches to occur earlier or later in the winter season. Avalanches in the San Juan Mountains typically stay within well-defined avalanche paths, but can over-run historic avalanche paths during periods of unusually heavy snow fall. Heavily timbered slopes are not necessarily safe from avalanches if avalanches can initiate on open slopes above the timbered slopes.

3.3 Local Avalanche History

Avalanche paths in the vicinity of the Ophir Placer are shown on the INSTAAR avalanche hazard maps on the Silverton Quadrangle, 1976. The avalanche path to the west was previously unnamed.

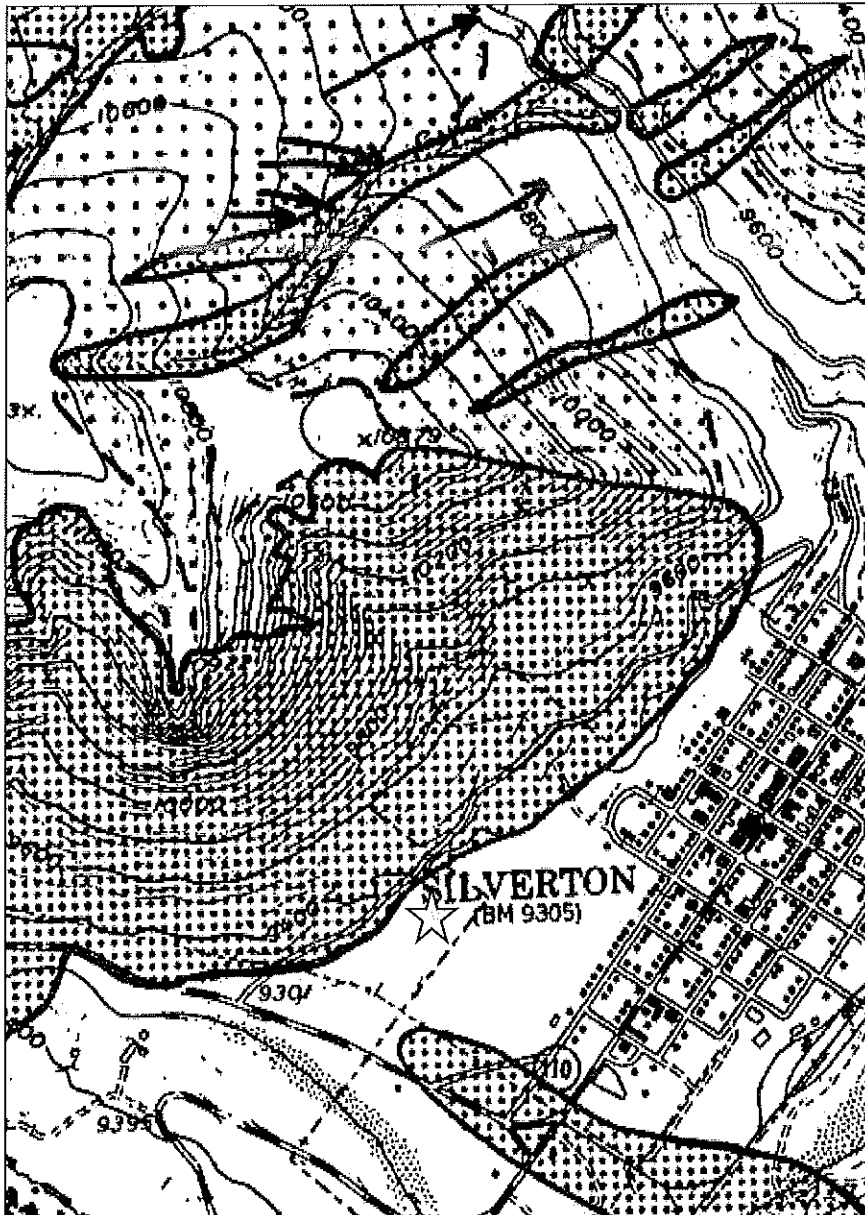


Figure 2. Yellow star is approximate location of building envelope.
Stippled areas are Avalanche paths adjacent to the Ophir Placer from the INSTAAR hazard maps.

4.0 AVALANCHE HAZARD DISCUSSION

We have provided a brief discussion of the observed conditions followed by a discussion regarding potential mitigation concepts for the observed avalanche hazard.

4.1 Local avalanche hazard.

Average annual snowfall for the area near Silverton, Colorado is approximately 5 m (197 inches) per year (Western Regional Climate Center). The average settled snowpack depth in the vicinity of the site avalanche path is approximately 1.5 to 2.5 m (5 to 8 feet) although this depth

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can vary considerably.

The avalanche paths near the Ophir Placer are defined in this study as shown on Figure 4. This was based on historic avalanche occurrences, potential impact pressures and snow flow heights modeled with the AVAL-1D and RAMMS avalanche dynamics model, and on dendrochronology of trees within the avalanche path. Details of these methods are discussed below:

4.2. Avalanche dynamics modeling with RAMMS

We analyzed the potential for snow avalanches to occur on the slopes above the Ophir Placer using the Swiss RAMMS (Rapid Mass Movements Simulation) model and AVAL-1D model. AVAL-1D is a one-dimensional avalanche dynamics program that predicts runout distances, flow velocities and impact pressures of both flowing and powder snow avalanches. RAMMS is a two-dimensional, state-of-the-art numerical simulation model to calculate the motion of geophysical mass movements (ie. snow avalanches) from initiation to runout in three-dimensional terrain at the subject property (RAMMS User Manual v1.5). RAMMS is based on the same motion equations as the AVAL-1D model used in our previous study. We utilized a Digital Elevation Model (DEM) and orthophotos of the site and surrounding terrain acquired from Digital Data Services (DDS) for the analysis.

RAMMS allows the user to input various snow slab heights for the avalanche release zone and to vary the friction parameters for forested regions within the avalanche path. We input the forested regions based on our site analysis in the field as well as utilizing the orthophotos from DDS and Google Earth images. We input the snow height release areas based on our field reconnaissance. We applied the Swiss default friction values for the avalanche paths in the study.

The predicted runout, flow heights, velocities and calculated impact pressures for a 100 year return period avalanche event from the RAMMS model are shown in the figures below.

Parameters for the avalanche simulation were based on topographical and vegetative indicators within the avalanche path. Snow depth and density were based on NRCS SNOTEL data from the Red Mt Pass SNOTEL site and the Western Regional Climate Center data for Silverton. The average snow depth for the Ophir Placer avalanche paths were interpolated between the two sites.

The predicted runout, flow heights, velocities and calculated impact pressures for a 100 year return period avalanche event from the RAMMS model are shown in the figures below.

It should be noted that the predicted runout zone from the RAMMS model does not show the potential cabin site in the calculated avalanche path. We have increased the size of the calculated avalanche runout zone from the RAMMS model due to our field observations, dendrochronological analysis, historic avalanche activity and our experience in the area. We utilized RAMMS to interpolate the impact pressures, velocity and snow height of the flowing avalanche debris at the potential cabin site.

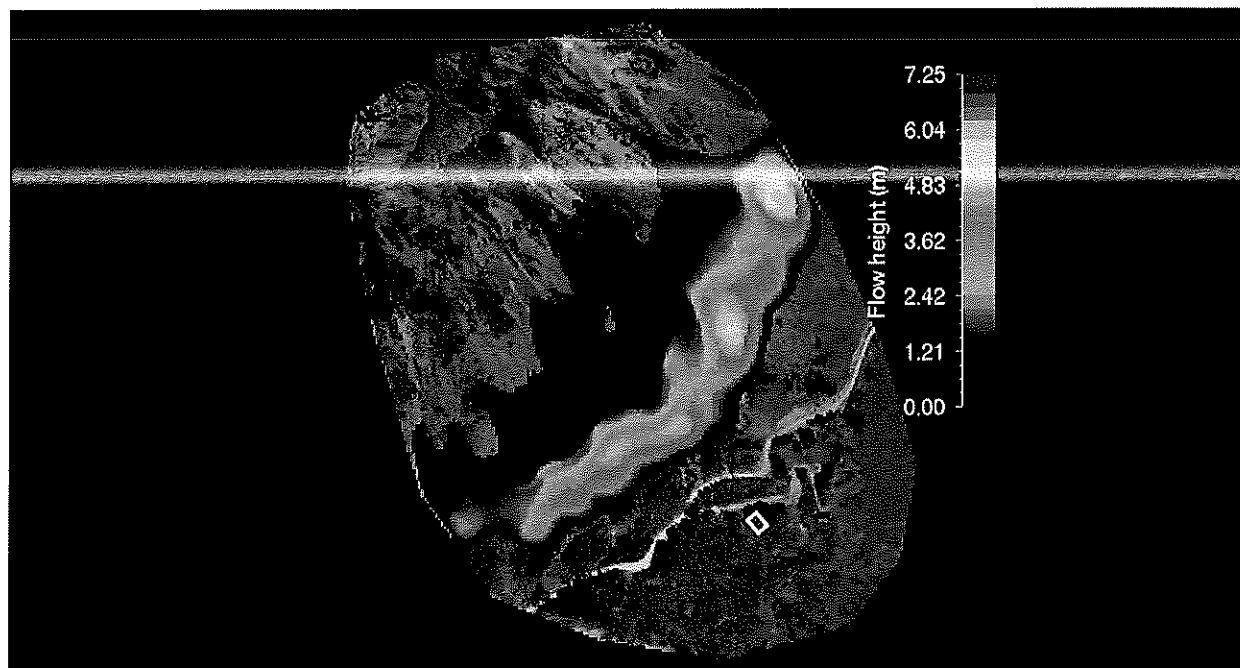


Figure 3

Orthophoto of the Anvil Mt avalanche paths with modeled maximum impact pressures in color for a release with a 1.75 meter slab. The estimated impact pressure at the Potential Cabin 0 kPa (or 0 lb/ft²). The color bar indicates impact pressure in kiloPascals (kPa). Cabin Site –white box.

4.3 Dendrochronology and Vegetative Indicators of Avalanche Frequency

Trees within and adjacent to the Ophir Placer were bored with an increment core to determine the age of the trees. Past avalanche activity can also be interpreted from increment cores and cross sections where the tree has been partially damaged from avalanches. Dendro-ecological techniques can provide a means for reliably dating avalanches and calculating frequency where sufficient woody vegetation exists for sampling (Jenkins and Hebertson, 2004).

Four trees were sampled with an increment core and numerous trees were inspected for flagging in or adjacent to the avalanches paths near the Gleason property. The Aspen trees were 20-55 years old and the Blue Spruce is 65 years old. Trees of similar diameters were noted in areas where samples were taken. Flagged trees have had the branches on the uphill side broken off by previous avalanche events.

There was no evidence of historic avalanche activity on the cabin site.

4.4 Avalanche Hazard to Structures and Access at the Ophir Placer

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We consider that the proposed cabin site as shown on Figure 3 on the Ophir Placer does not appear to be within an avalanche path and could be considered to be a relatively safe location for a residential structure. It is possible that some of the powder from the avalanche west of property could reach the building envelope. We calculate the mean speed of the powder blast that would reach building envelope 4 at 6.5 m/s or 14.5 mph but we feel that the effect will be negligible. We must emphasize that even though the building envelope is not within an avalanche path, the access road and surrounding areas are all close to avalanche paths that can pose a serious threat during unstable snow conditions and during storm events. It would be prudent to check with the Colorado Avalanche Information Center daily avalanche bulletin prior to accessing the property during the winter season.

5.0 CONCLUSION

The information presented in this report is based on our surface observations, a review of available literature, avalanche mapping for the area, dendrochronology, and avalanche dynamics modeling and on our experience in the area. We recommend that we be contacted and included in future design phases and development of this project to provide engineering geology and avalanche hazard mitigation consultation. Please contact us immediately if you have any questions, or if any of the information presented above is not appropriate for the proposed site development.

The information presented in this letter is applicable only for the Ophir Placer near Silverton, Colorado and is based on our surface observations, avalanche history, dendro-chronological tree ring analysis, avalanche dynamics modeling and on our experience in the area.

The avalanche hazard observations presented above are not suitable for adjacent project sites, or for a proposed scope of development which is different than that outlined for this study.

Avalanche hazard can vary depending on a number of factors including but not limited to; snow pack height, snow layer type, wind speed and direction, and meteorological factors before, during and after a storm cycle. We provide an estimate of the potential hazards of a design avalanche for the subject avalanche path, but extraordinary snow or weather phenomena can produce unexpected avalanches in areas that have no evidence of previous avalanche activity.

Please contact me if you have any questions, or if we may be of additional service.

Respectfully submitted,

J. Andrew Gleason
Engineering Geologist/Avalanche Specialist

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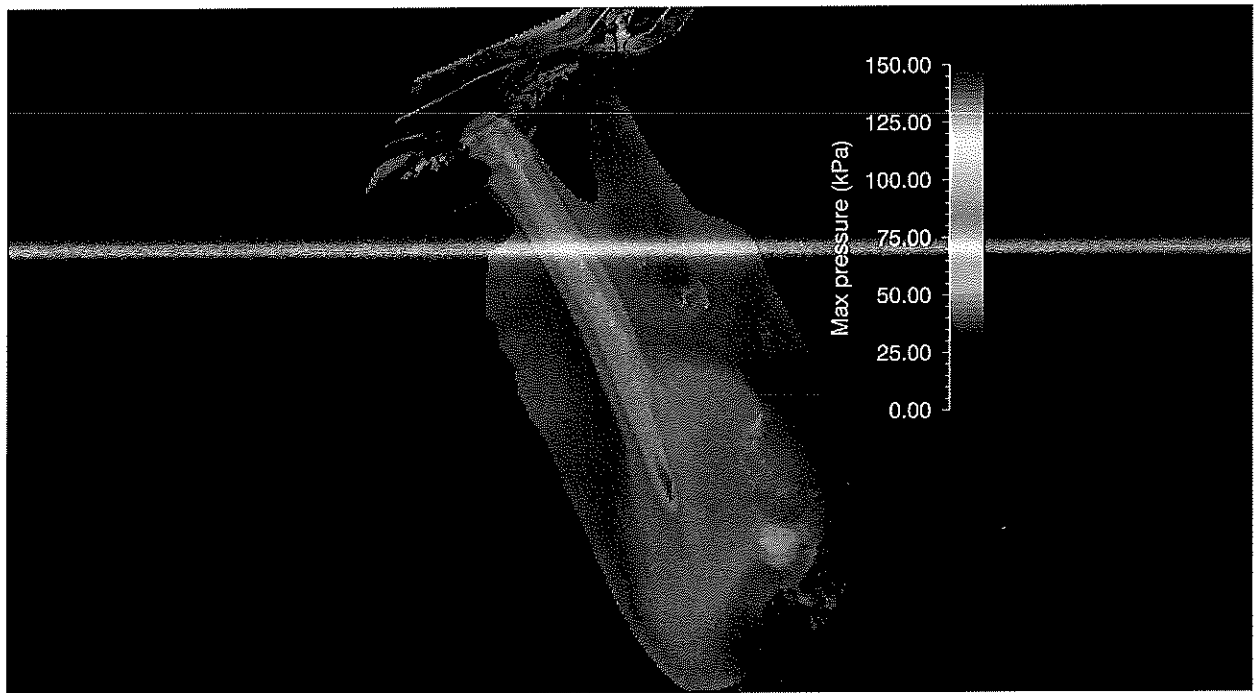
References

Mears, A. I., 1992, Snow Avalanche Hazard Analysis for Land Use Planning and Engineering, Colorado Geological Survey, Bulletin 49, Dept. of Natural Resources, Denver, CO.

Jenkins, M. J., and Hebertson, E. G., 2004, A Practitioner's Guide for Using Dendro-Ecological Techniques to Determine the Extent and Frequency of Avalanches, International Snow Science Workshop, p. 423, Jackson, WY, 2004.

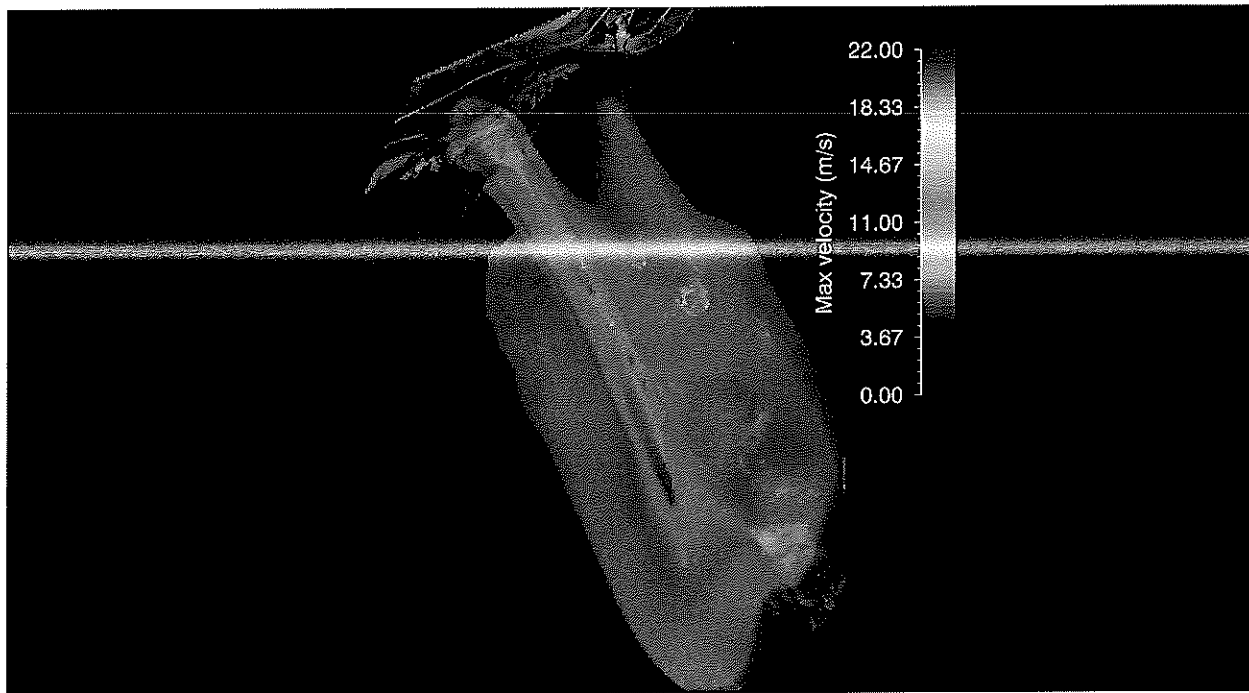
Appendix A

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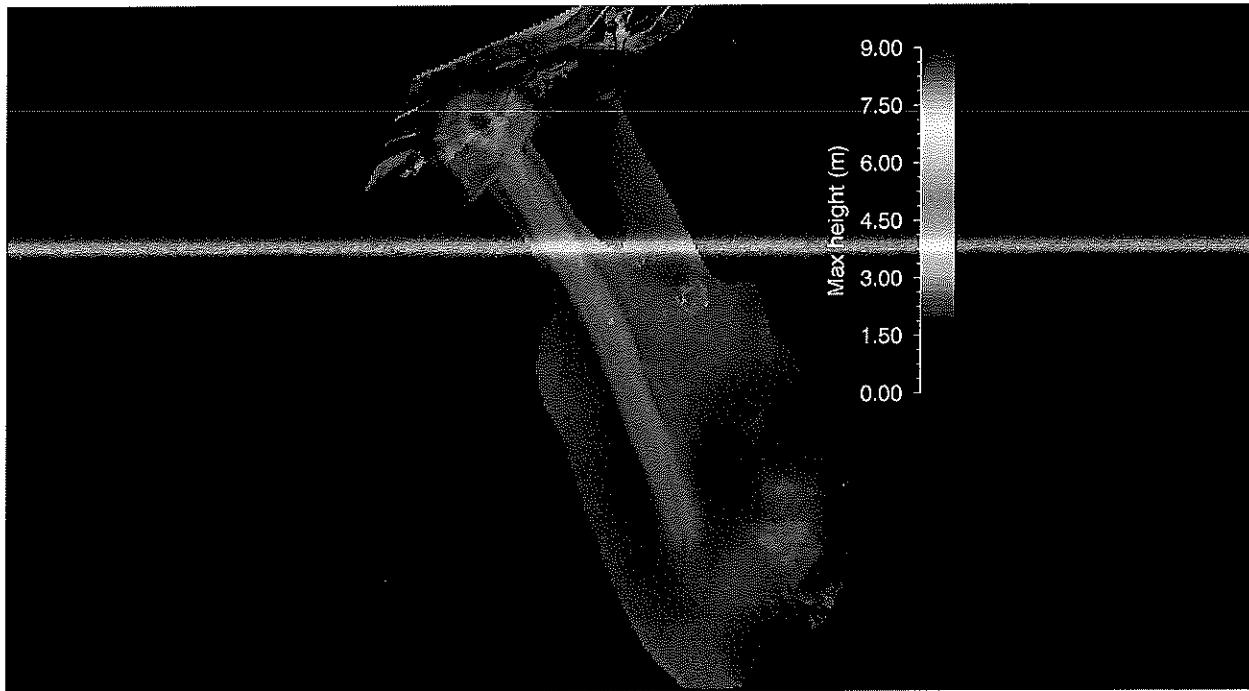
Orthophoto of the VP South avalanche path with modeled maximum impact pressures in color for a release with a 1.25 meter slab. The color bar indicates impact pressure in kiloPascals (kPa).

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Orthophoto of the VP South avalanche path with modeled velocities for a release with a 1.25 meter slab. The color bar indicates velocity, scale is in meters/second.

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Orthophoto of the VP South avalanche path with maximum flow height of snow for a release with a 1.25 meter slab. The color bar indicates height of avalanche debris. Scale is in meters.

SCENIC QUALITY REPORT

Lot 2 Tract A-1, Ophir Placer

1. INTRODUCTION AND SITE LOCATION

San Juan County regulations state the following:

All residential development shall be required to submit a Scenic Quality Report at the time of sketch plan submittal.

This is a Scenic Quality Report for the Proposed Gleason Cabin, located on Lot 2 Tract A-1, Ophir Placer M.S. 1124

The Ophir Placer is located near CR 6 in the town county overlay district and is an existing lot in an existing subdivision.

The site is located within the County's Master Plan "economic development corridor."

That area is where development is to be concentrated and encouraged, when compared to development on more remote and less accessible backcountry sites.

A Vicinity Map depicting the general location of the project site is included within this submittal for your reference.

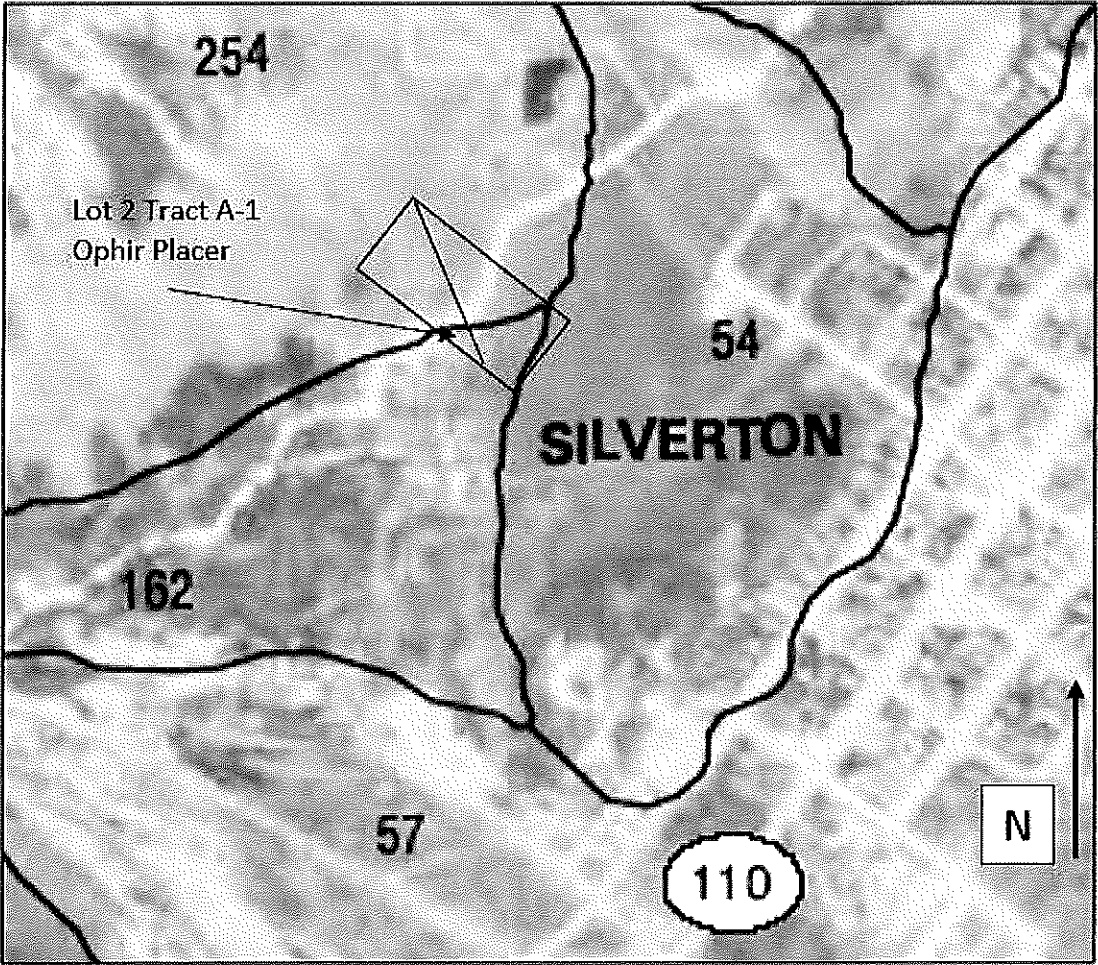


Figure 1. Vicinity Map

2. PROJECT SITE AND PROPOSED CABIN LOCATION

County regulations require that this Scenic Quality Report include the following information:

Designations of scenic views of natural and historic features both from and toward the site and descriptions of how these vistas shall be preserved. Graphic depictions of the proposed structure's impact on these views shall be submitted to allow staff, the Planning Commission, and the Board of County Commissioners to assess the impacts of the project and the effectiveness of proposed mitigation measures.

The project site, Lot 2 Tract A-1, Ophir Placer, consists of approximately 5 acres of gentle sloped grassy meadow, aspens and willows, one County Road, and some steeper wooded slopes across CR 6. The approximate elevation at the site is 9400 feet. The slope of the 5 acre project site varies at about 5 to 30 percent.

The Applicants have proposed to construct a cabin on their site on the existing lot in an existing subdivision. Within that building envelope the Applicants have selected the least visible location for the proposed cabin.

The proposed cabin is located at a large aspen grove which will provide screening from town and Highway 550. The existing relatively large stand of mature aspens shields the proposed cabin from County Road 6 for those driving on the Shrine Road.

Photos on the following page show the stakes and flagging at the proposed cabin footprint. The cabin was staked by one of the two Applicants using the proposed exterior cabin dimensions of 26 feet by 28 feet.

The pictures on the following page show the staked/flagged cabin footprint.



Figure 2. Cabin footprint- black square.

3. VISIBILITY OF THE CABIN FROM COUNTY ROAD 6

County Road 6 passes through the project site. County Road 6 provides access to the Miner's Shrine.

The proposed cabin will be momentarily visible from County Road 6 for a driver headed to HWY 550 from the Shrine. Portions of the cabin will be obscured due to the large aspen grove, some willows, and evergreens, and significant grade change between driver and cabin.

The photo drawing on the following page is a graphic depiction to approximate scale of what the proposed cabin visibility is expected to be, from the County Road 6 shoulder, without any proposed imported tree screening. The following page depicts the view along the edge of road, with the viewpoint of a driver standing on the roadway shoulder with their vehicle pulled over, looking down the road embankment towards the Animas River and the proposed cabin. Photos were taken in the fall prior to leaves growing on the aspens and other nearby existing screening vegetation. Screening consisting of planting imported trees can be provided by the Applicants if required by and as specified by San Juan County.



Figure 3. Photo from CR 6 with proposed cabin outlined in black dashed rectangle. Note the proposed cabin is behind the aspen trees adjacent to CR 6.

4. VISIBILITY OF THE CABIN FROM Greene Street and HWY 550

The proposed cabin will be visible from Greene St near 6th St south until HWY 550. The cabin site will be approximately 2000 feet from Greene St. The photo drawing on the following page is a graphic depiction to approximate scale of what the proposed cabin visibility is expected to be, from Greene St near 6th St without any proposed imported tree screening, for a driver on Greene St headed south to HWY 550. Photos were taken in the fall with some trees already bare. Screening consisting of planting imported trees can be provided by the Applicants if required by and as specified by San Juan County.



Figure 4. Photo from Greene St with cabin location. Scale: rectangle is approximately 24' in height.

5. VIEWS FROM THE PROPOSED CABIN

In the County Scenic Quality Report regulations, it is requested that we provide information about the view FROM the building envelope(s).

Photos are included on the following page, showing the view FROM within the staked cabin footprint.

On the following page are color photos of views from the proposed cabin, looking approximately towards the north, south, east, and west.



Figure 5 Photo from HWY 550 to the NW. Cabin Height appx 24'.

6. LOCATION OF STRUCTURE WAS SELECTED TO MINIMIZE VISIBILITY FROM PUBLIC LANDS AND EXISTING TRAILS

The County Scenic Quality regulations require the following information:

Evidence that the location of the structure is designed to minimize the visual impacts and to not detract from the scenic quality of adjacent public lands or existing trails.

Here is information regarding individual (underlined> parts of the above regulation:

- Location of the structure:

The Applicants selected the least visible part of the building envelope with the most existing vegetation for the “location of the structure.”

- Adjacent public lands:

The project site borders BLM-administered public lands on the northwest.

The existing vegetation (aspen grove) screens the proposed cabin from the adjacent public lands located above the County Road 6 right of way towards the northwest of the project site.

- Existing trails:

There are no known significant existing trails in the viewing vicinity of the project site.

The Scenic Report regulation at the top of this page requires information about how the Applicants selected (or did not select) a “location of structure” which would minimize “visual impacts” from “adjacent public lands” and “existing trails.”

The cabin footprint selected by the Applicants minimizes the visual impacts, while remaining within the existing building envelope.

7. CABIN DESIGN WORKS WITH NATURAL TOPOGRAPHY

County regulations require that the Scenic Quality Report includes information regarding the following:

Evidence that the designs orient improvements in ways that allow them to blend in with and utilize the natural topography. The submittal shall include, but not be limited to, elevations at a scale suitable for a determination that all standards in this section have been met, Three-Dimensional Modeling, etc.

The proposed cabin has been designed to work with the existing topography in the building envelope. The small cabin footprint and overall cabin design works with the natural grade of the building envelope, and not against it. The Applicants have already utilized the structural engineering consultant firm in order to amend the standard plans, in order to include the site specific topography and the Trautner Geotech recommendations.

The proposed cabin design is shown on the Applicants' draft building plans, on the following pages. Please note that the "front" of cabin has been oriented towards the south at the existing aspen grove.

8. TOPSOIL, UTILITIES, LIGHTING, AND DRIVEWAYS

This section of the Scenic Report describes design features associated with topsoil, location of utilities, exterior lighting, and any proposed driveway(s).

A. TOPSOIL

County regulations require that the project should include the following:

Plans to remove and save topsoil, prior to any grading or excavation and replacement, for reuse during re-vegetation.

Any topsoil found during construction of the proposed improvements will be separately stockpiled on-site, to be used for landscaping. If screening (such as trees) is required by the County, then any topsoil found during construction can be used for the landscaping associated with the screening or trees.

B. UTILITIES

County regulations require that the project should include the following:

Location and installation of utilities in ways that will cause the least damage to the natural environment.

The project includes the following proposed utilities: a proposed underground septic system leachfield, a proposed under-cabin water tank cistern, and some associated underground sewer piping. The Applicants will tie in to the existing underground line, by constructing a proposed underground buried electric service line. The septic system leachfield location was selected based on San Juan Basin Health Department regulations and setbacks by Trautner Geotech. The utility construction will occur with the least amount of disturbance necessary, in order to limit any damage to the natural environment. No phone/cable lines are proposed. Power sources are also proposed to include propane (in a portable tank) and a woodstove, and these items are not anticipated to cause significant damage to the natural environment.

C. EXTERIOR LIGHTING

County regulations require that the project should include the following:

Provisions requiring shielding of exterior lighting to prevent direct visibility of light bulbs from off-site, directing of all exterior lighting toward either the ground or the surface of a building and prohibiting high intensity sodium vapor or similar lighting. The proposed exterior lighting for this project is a minimum amount of automatic on-off motion detection lights, just enough for safety purposes. No sodium vapor lights are proposed or will be used. We would suggest one light at each door for safety purposes. All exterior lighting will be in conformance with the requirements of San Juan County regulations.

D. DRIVEWAYS

County regulations require that the project should include the following:

Design and construction plans for roads and associated structures that bear a logical relationship to existing topography to minimize the need for cuts and fills.

There is currently one proposed driveway for this project. The main driveway is short, located along an existing driveway to the house at 252 CR 6, with minimal excavation needed. The driveway is aligned along one main contour, as shown on the Sketch Plan within this submittal. In accordance with the County regulations, the applicable forms have been submitted to Road and Bridge Supervisor for his comments on the proposed driveway. The proposed driveway is designed to require the minimum amount of grading needed for access to the cabin.

9. BUILDING MATERIALS

County regulations require that the building design should include the following:

Utilization of colors and textures found naturally in the landscape and prohibition of reflective materials, such as highly reflective glass or metals.

The proposed colors and textures of the cabin are the following:

- Wood or wood product (Masonite) walls
- metal corrugated “propanel” non reflective roofing material.
- metal corrugated accent panels to be placed along bottom exterior of cabin.
- Natural stacked stone accents such as around bases of porch posts.

10. Fire Hazard Map

The building site is located within a non-burnable or very low burn probability location as shown on the following figure from the San Juan county wildfire risk public viewer map. Landscaping is to consist of raking and removal of combustible ground cover near the cabin, as recommended by the Colorado State Forest Service Firewise Practices, to develop adequate defensible space.



San Juan County Wildfire Risk Map. Black rectangle and star show property boundary and proposed cabin site.

11. CONCLUSION

In conclusion, this project appears to be in general conformance with the County Scenic Quality regulations in the following ways:

- The Applicants have selected the least visible buildable location for the proposed cabin footprint. The small building envelope and septic location was in part determined by Trautner Geotech. The Applicants have placed the footprint within the densest vegetation, in order to maximize natural screening. Additional screening can be provided as determined by the County such as importing and planting of trees along County Road(s) on the site.
- The cabin design has a small footprint, works well with the existing building envelope topography, and avoids a sprawling, larger and more visible structure.
- The proposed cabin footprint is relatively small.
- The proposed access driveway bears a logical relationship to the surrounding topography, and minimizes excavation.
- The colors and textures of the materials selected for the cabin and shed (browns, rust, and natural stone, logs, and wood) blend in well with the colors of the natural surroundings.

Geologic Hazard Report
For
The Gleason Cabin Project
Lot 2 Tract A-1, Ophir Placer M.S. 1124
San Juan County, Colorado

By
J. Andrew Gleason M.S.
Engineering Geologist

1.0 INTRODUCTION

This report presents our geologic hazard assessment for the Gleason Cabin project located in the Gleason Subdivision, on Lot 2 Tract A-1, Ophir Placer M.S. 1124, as approved by San Juan County on 12-11-2007 by the San Juan County Board of County Commissioners.

This geologic hazard study presents our interpretation of the surface characteristics and geologic exposures at the project site. Our hazard assessment is based on our surface observations, a review of available literature and geologic mapping for the area, and on our experience in the area.

1.1 *Geologic Hazard Definition and Discussion*

There are three (3) statutes that were adopted by the Colorado Legislature that are pertinent to geologic hazards and land use. "The Land Use Act" of 1970 established the basis for which later bills could be enforced. The Land Use Act mandated that decisions and authority to develop and enforce land use planning regulations should be conducted at local government levels. Senate Bill 35 (1972) required that local county governments either adopt land use planning regulations for subdivisions or follow a model set of regulations developed by the state. In 1974 the Colorado House amended the Land Use Act by adopting House Bill 1041.

House Bill 1041 provided legal definition of natural and geologic hazards. A natural hazard is considered any hazard from geologic conditions, wildfire, or flooding. A geologic hazard is defined as "a geologic phenomenon which is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazards to public health and safety or to property". The geologic hazards identified and defined in HB 1041 include; avalanche, landslide, rockfall, mudflow and debris fans, unstable or potentially unstable slopes, seismic effects, radioactivity and ground subsidence. We have provided excerpts from "Guidelines and Criteria for Identification and Land Use Controls of Geologic Hazard and Mineral Resource Areas", 1974, Rogers, W.P. et al., Special Publication 6, Colorado Geological Survey, in Appendix A which provides legal and descriptive definitions of the geologic hazards outlined in House Bill 1041.

2.0 PROJECT BACKGROUND, SCOPE OF DEVELOPMENT AND SCOPE OF STUDY

The project site is located on Lot 2 , Ophir Placer Subdivision in San Juan County, Colorado. The project is located at 252 CR 6 (Miner's Shrine Road).

The project site encompasses approximately 5.0 acres of property. The parcel is roughly triangular in shape and is located in the area known locally as the Elephant Hills. The project site is in an approved subdivision in San Juan County with an existing house on Lot 1, adjacent to the site.

2.1 *Current Scope of Development*

The Ophir Placer consists of 2 five (5) acre parcels which are located south and east of the Miners Shrine Road near the west side of Silverton, CO (Figure 1). The proposed project will consist of one wood-framed, single family home between 1200 and 1300 square feet, constructed

on steel reinforced concrete foundation systems. The residences is being designed by an engineer familiar with the local geologic hazards regulations. There is an existing driveway for the house on Lot 1 that will be used as a common access for the lot via a 30 foot wide access easement as shown on the plat.

2.2 Scope of This Geologic Hazard Study

We performed a geologic field reconnaissance of the site in April, 2019 and September, 2021. The site geologic observations include detailed observations of portions of the site to evaluate the existence, and potential significance of geologic hazards that may influence the proposed development. The general scope of the study included the following;

- Geologic field observations including a description of the site topography, geologic character and geomorphology,
- Identification of geologic hazards that may influence the project development and proposed lot layout.

We observed the site for evidence of geologic hazards outlined in Colorado House Bill 1041, The geologic hazards we identified as potentially influencing this site include:

- Radioactivity; a discussion regarding the potential for hazards associated with radiation,
 - Seismic effects; identification of local faults based on the available literature,
 - Avalanche; an evaluation and brief discussion of the site exposure to avalanche hazards,
 - Rockfall; observations of potential rockfall source areas and identification of areas which may be influenced by rockfall and recommendations for detailed analysis of the rockfall activity on the site, if needed,
 - Mudflow and debris fans; identification of areas of the site which may be influenced by debris flow activity,
 - Unstable and potentially unstable slopes; identification of potentially unstable and unstable slope areas based on our geologic field reconnaissance. We will provide recommendations for appropriate geotechnical engineering study of the potentially unstable slope areas based on our field work.
- We prepared a geologic map and a geologic hazards map which are included as Figures 1 and 2 respectively of this report.

3.0 GEOLOGIC OBSERVATIONS

We have provided a brief and cursory discussion of the regional and local geology followed by a more specific discussion of the site geology below to provide background information prior to discussing the site specific geologic hazard considerations.

3.1 Regional Geology Discussion

The site is located in the San Juan Mountains of southwestern Colorado. There are diverse geologic conditions in the area, all of which may have an influence on geologic hazard considerations and land use.

Geologic rock units in the area range from Pre-Cambrian Granite and Gneiss to late Cretaceous to early Tertiary sedimentary shale and sandstone units. Middle to late tertiary volcanic units are common in the Alpine regions of the area. Late quaternary glacial, eolian soils and soil deposits produced by weathering overlie many of the rock units. The shale and sandstone rock units and associated soils produced from weathering of these materials are commonly encountered in developed areas.

During the middle to late Cretaceous, approximately 80 to 66 million years ago, a mountain building episode termed the "Laramide Orogeny" caused regional uplift. The San Juan Dome was formed, the erosional remnant of which exists under the mountainous areas in the region. The San Juan Basin which has since filled with sediment was formed in the area south of the San Juan Mountains. This activity caused upwarping and deformation of the geologic units in the area. This uplift is evidenced nearly everywhere in the region. The sedimentary unit bedding planes all dip (tilt) generally toward the south, and the center of the San Juan Basin. The numerous hogback ridges and questas in the area are formed by steeply dipping sedimentary units.

There have been several glacial episodes which have occurred in the area. Glacial moraine and outwash terrace deposits are common in the area. The U-shaped valleys in the region are a testament to the erosional forces imposed by the glaciers.

The steeply dipping geologic units forming the ridges in the area are associated with numerous areas of active landslides and unstable slope areas. In areas where the bedding planes parallel the slope inclinations, translational landslide activity is common. In the north Animas Valley, north of Durango, post-glacial melt induced saturated soil conditions which caused movement of several rotational and multi-unit landslide complexes. Many of these areas are located adjacent to highly developed areas.

The soils produced by weathering of the sedimentary units in the area usually have expansive characteristics, as do many of the eolian deposits. The glacial outwash and alluvial soil deposits are relatively benign, from a development and foundation design perspective.

3.2 Local Geology

The local geology in the Silverton area consists of volcanoclastic sediments derived from the Laramide Orogeny volcanic period. The volcanic rock units are exposed in the cliffs on Anvil Mountain above town. Glacial drift and alluvial deposits dominate the Silverton Valley

3.3 Site Geology

The subject property is located on the south side of a southwest to northeast aligned glacially carved valley within the Silverton Caldera. Most of the subject property is located on glacially derived morainal material. The property is located adjacent to an alluvial fan but is not located within the building envelope. There are outcrops of the Burns Member of the Silverton Volcanic Group on the uphill side of the Shrine Road.

The subject property is located on a north facing slope with some areas to the west exceeding 30 percent slopes. A drainage channel above the building envelope to the west has intermittent water flow during snowmelt. A cursory geologic map of the site is presented on Figure 1.

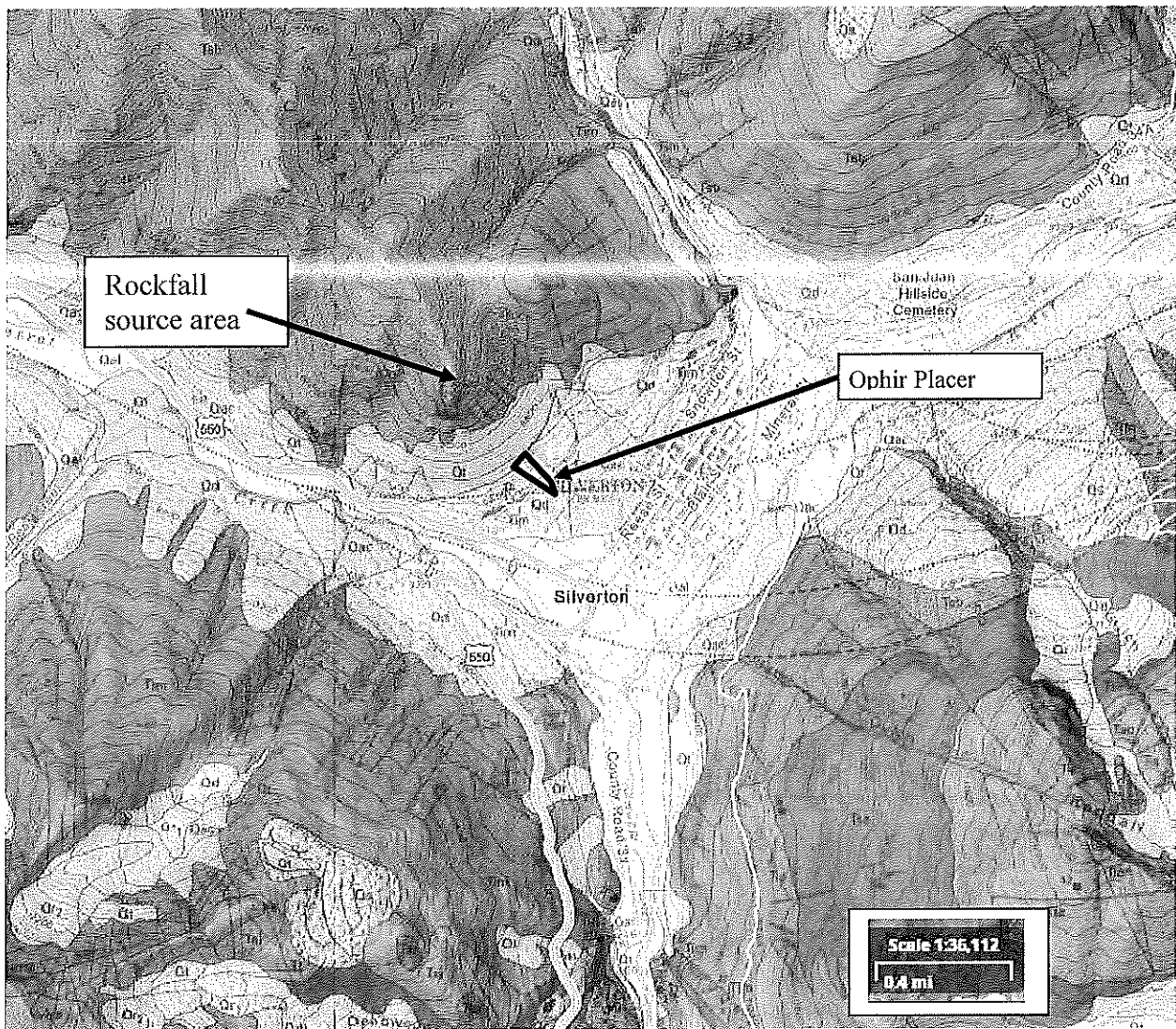


Figure 1. Geologic map of the Ophir Placer and Vicinity. Black lines show approximate boundary location. From the Geologic map of the Silverton and Howardsville quadrangles, southwestern Colorado, 2000, Luedke, R.G., and Burbank, W.S., U.S. Geological Survey, Geologic Investigations Series Map I-2681.

Key to geologic map:

Qd- Glacial Drift; **Qt** –Talus; **Qac-** Alluvial cone deposits; **Qal-** Alluvium; **Tsb-**Burns Member of Silverton Volcanics; **Tsj-** San Juan Formation; **Tim-** Monzonite and granodiorite.

4.0 GEOLOGIC HAZARD DISCUSSION

As discussed in the scope of service section above, we observed evidence that the following geologic hazards which may influence the proposed project development;

- Rock fall,
- Avalanches,
- Unstable or Potentially Unstable Slopes,

- Radioactivity,
- Seismic Effects,

We have provided a brief discussion of the observed conditions.

We have provided a discussion of the observed conditions of the rockfall source areas, a description of our rockfall modeling techniques, followed by a discussion regarding potential mitigation concepts for the observed geologic hazards.

The Sketch Plan for this project has been overlaid onto the San Juan County Geohazards Map (Figure 2). According to the San Juan County Geohazards map, the proposed cabin appears to be in an area of "cst," which represents "Areas of thick colluvial or glacial accumulations generally thicker than six feet. Potential mass failure areas" Included for your review is a report prepared by Andy Gleason formerly of Trautner Geotech of Durango, describing the geologic conditions at the site. The report concludes that no mitigation is required due to geologic hazards.

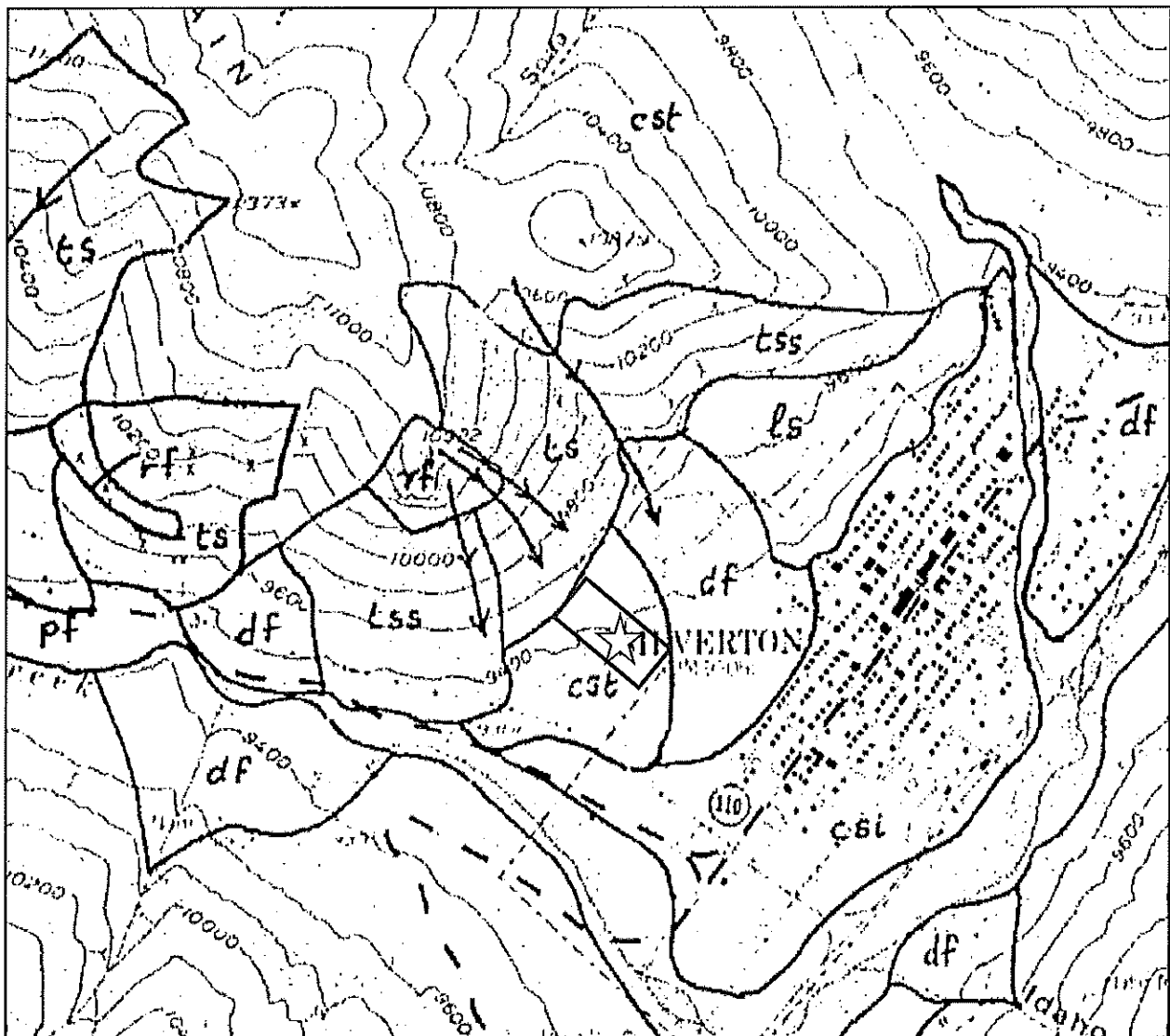


Figure 2. San Juan County Geologic Hazards map with project site overlay and building site.

4.1 Rockfall

Rockfall is the most serious geologic hazard on the subject property. There is evidence of relict and active rockfall on the west parts of the property above the Shrine Road. The building envelope is located out of the rockfall hazard area due to the large outcrop and morainal material that forms a natural barrier on the uphill side of the Shrine Road (Figure 2). Boulders can be found at the surface on parts of the property. Some of the large boulders and blocks of rock above the property most likely rafted down with ancient glacial deposition that occurred in the Pleistocene to Holocene period.

The outcrops of the Tsb-Burns Member of Silverton Volcanics are potential source areas for rockfall west of the project site. There are also small rocks and boulders derived from glacial material on many of the steep slopes above (to the west of) the property, that have the potential to become dislodged and move downhill to pose a potential rockfall hazard above the Shrine Road.

4.1 Rockfall Analysis

We conducted a detailed rockfall analysis using the Colorado Rockfall Simulation Program Version 4.0 (CRSP) in order to predict rockfall behavior at the subject property on the slopes above the main house and the guest house. The CRSP analysis is a tool to predict rockfall behavior and to assist in the design of rockfall protection measures. We created a topographic profile using a hand held, GPS unit, Google Earth Pro and topographic maps of the area (Figure 3 and 4). We input the topographic profile into the CRSP model. We ran the model to simulate the existing conditions at the subject property, which consists of boulders up to approximately 8 feet in diameter. We manipulated the model's input parameters such as surface roughness, tangential and normal coefficients to match the existing conditions.

We ran numerous iterations of the program with varying sizes of rocks to attempt to mitigate the modeled rockfall behavior at levels deemed acceptable for adequate protection of the proposed development.

We estimated rockfall impact pressures and velocities with rocks ranging from three (3) feet to eight (8) feet in diameter. Our analysis demonstrates that the rocks in the rockfall source area above the house to the west do not have the potential to reach the proposed structure. Most of the rocks stopped on the slopes above the trees, the rest stopped at the natural berm located uphill of the Shrine road above the proposed cabin site (Appendix A).

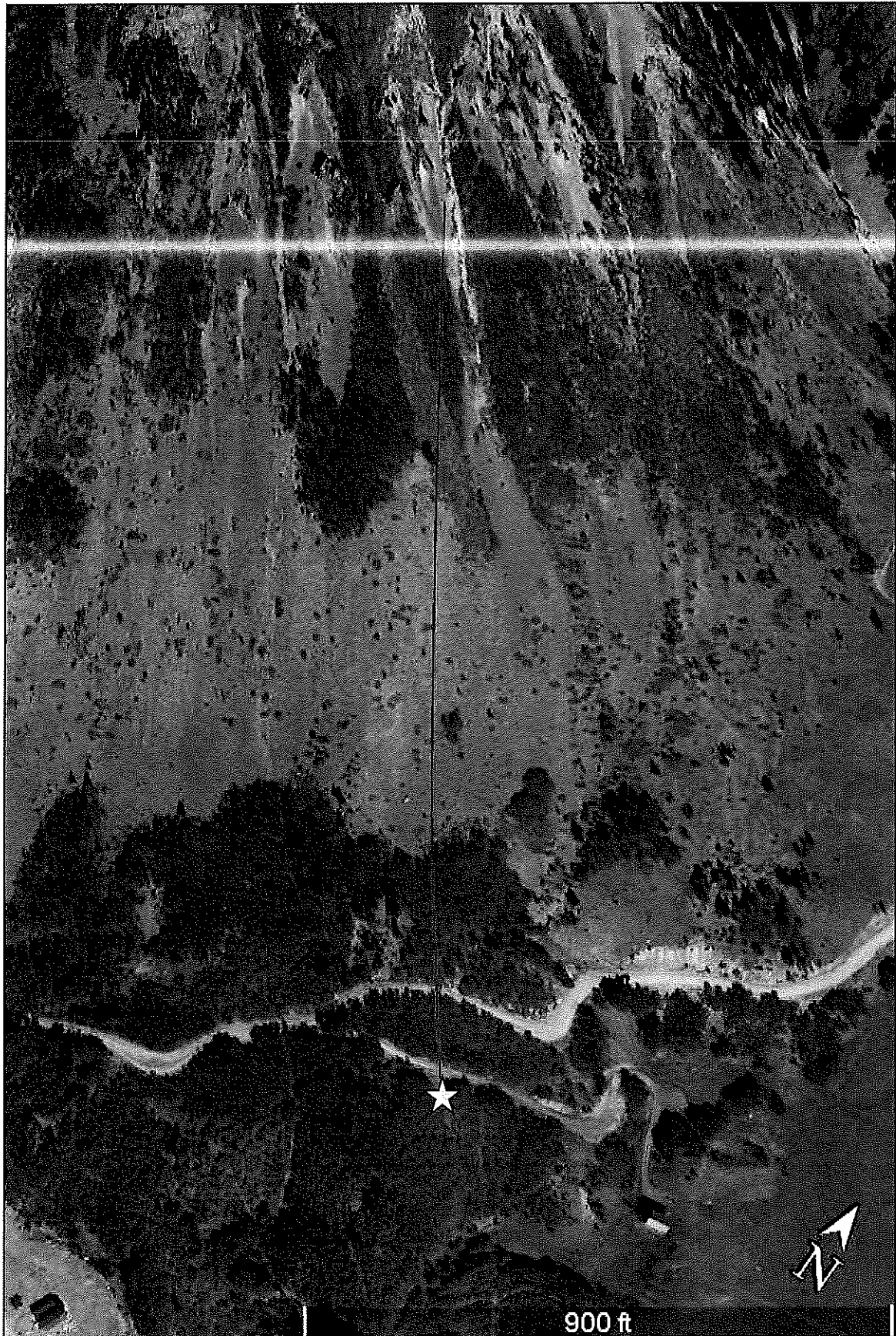


Figure 3. Profile used in CRSP analysis. Star shows proposed cabin site.

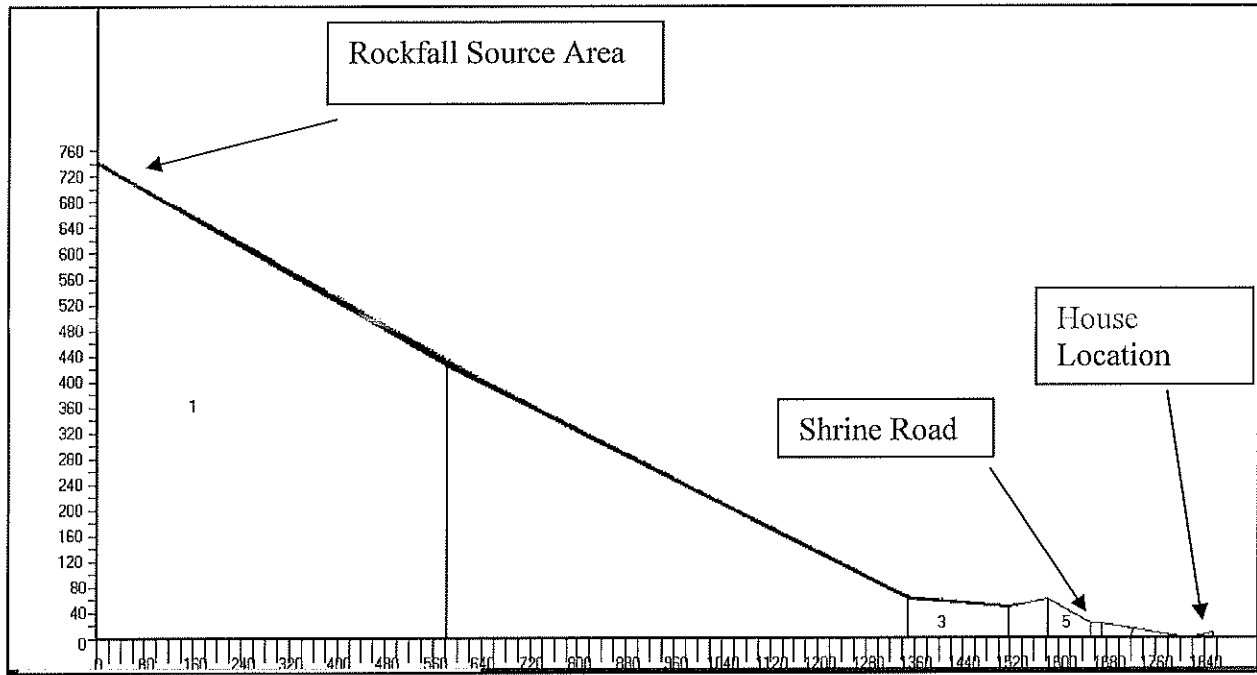


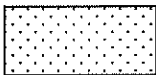
Figure 4. Topographic profile used in CRSP analysis

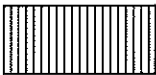
There is no evidence of recent rockfall at the building envelope. The building site was chosen as it is not within the rockfall hazard zone on the property.

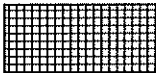


Figure 2. Geologic Hazard Map of the Ophir Placer property.

Key to Geologic Hazard Map.

Potential Rockfall Hazard 

Area with 30% slopes 

Outcrop and Morainal feature 

4.2 Avalanche

See the Ophir Placer Avalanche report included in this submittal.

4.3 Unstable and Potentially Unstable Slopes

There are slopes that exceed 30 % on the subject property but not within the building envelope (Figure 2). Some of these slopes may be potentially unstable but will not affect the building envelope. We observed small-scale movement of sheet wash in the colluvial material at the

surface, but did not observe any deeper instabilities. We did not encounter adverse soil creep on the subject property.

We suspect that the bedrock underlying the property (Tsb- Burns Member of the Silverton Volcanic group) is in place and is not prone to landslide movement. A geotechnical investigation with subsurface excavation is included in this submittal.

4.4 Radioactivity (Radon Issues)

Many soils and formational materials in western Colorado produce Radon gas. There are no known sources of radioactivity on the site. Structures should be appropriately ventilated to reduce the accumulation of Radon gas. Several Federal Government agencies including the Environmental Protection Agency (EPA) have information and guidelines available for Radon considerations and home construction. If a radon survey of the site soils is desired, please contact us and a radiometric analysis can be initiated.

4.5 Seismic Effects

There are no active faults or recent earthquake activity in the vicinity of the project site according to the Colorado Geological Survey's Colorado Late Cenozoic Fault, Fold and Earthquake Database.

5.0 CONCLUSION

There are geologic hazards on the subject property, Lot 2 Tract A-1, Ophir Placer M.S. 1124, but not within the building envelope of the Gleason Subdivision as approved by San Juan County on 12-11-2007 by the San Juan County Board of County Commissioners.

The information presented in this report is based on our understanding of the proposed development, on the data obtained from our field reconnaissance and observations and on our experience conducting geologic hazard surveys in the area since 1998.

The geologic evaluation presented above is intended to be used only for this project site and the proposed scope of development which was provided to us. The geologic hazard evaluation presented above is not suitable for adjacent project sites, or for a proposed scope of development which is different than that outlined for this study.

Please contact us if you have any questions, or if we may be of additional service.

Respectfully submitted,

J. Andrew Gleason
Engineering Geologist

Appendix A. CRSP Data

CRSP Input File -C:\Program Files (x86)\Crsp\Silv1.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 1854
Initial Y-Top Starting Zone Coordinate: 740
Initial Y-Base Starting Zone Coordinate: 640

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	1.5	.5	.5	0	740	581	
425							
2	1.4	.26	.25	581	425	1350	
61							
3	.95	.56	.56	1350	61	1517	49
4	1.2	.55	.55	1517	49	1581	61
5	1	.5	.5	1581	61	1653	24
6	1	.5	.5	1653	24	1670	24
7	1.2	.25	.25	1670	24	1815	0
8	1	.5	.5	1815	0	1855	8

CRSP Simulation Specifications: Used with C:\Program Files (x86)\Crsp\Silv1.dat

Total Number of Rocks Simulated: 100
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 165 lb/ft³
Rock Shape: Spherical
Diameter: 8 ft

CRSP Analysis Point 1 Data - C:\Program Files (x86)\Crsp\Silv1.dat

Analysis Point 1: X = 1854, Y = 8

NO ROCKS PAST ANALYSIS POINT 1

CRSP Data Collected at End of Each Cell - C:\Program Files
(x86)\Crsp\Silv1.dat

Velocity Units: ft/sec

Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	74	59	5.63	11	4
2	47	38	3.21	4	1
3	21	11	3.85	1	0
4	No rocks	past end of cell			
5	No rocks	past end of cell			
6	No rocks	past end of cell			
7	No rocks	past end of cell			
8	No rocks	past end of cell			

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN
PROPOSED RESIDENCE
LOT 2 GLEASON SUBDIVISION
PARCEL NO. 48290180010002
SILVERTON, SAN JUAN COUNTY, COLORADO

January 12, 2021

PREPARED FOR:

Mr. Andy Gleason
gleason_j@fortlewis.edu
Project No. 56301WT

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ATTACHMENTS

INFILTRATOR SYSTEMS IM-1060 SEPTIC TANK DETAIL

1.0 REPORT INTRODUCTION

This report provides the results of an onsite wastewater treatment system (OWTS) design for the proposed residence to be located at Lot 2 Gleason Subdivision off the Miner's Shrine Road in Silverton, San Juan County, Colorado. The purpose of the report is to provide design details for the OWTS in accordance with the 2018 San Juan Basin Public Health Department's Onsite Wastewater Treatment System Regulations and the Colorado Department of Public Health and Environmental Regulation #43. The services were performed in accordance with our proposal to Mr. Andy Gleason, dated September 23, 2020, Proposal No. 20299P.

As outlined within our proposal for services for this project the client is responsible for appropriate distribution of this report to other design professionals and/or governmental agencies unless specific arrangements have been made with us for distribution.

The following outline provides a synopsis of the various portions of this report;

- ❖ Sections 1.0 provides an introduction and an establishment of our scope of service.
- ❖ Section 2.0 of this report provides our field study observations.
- ❖ Sections 3.0 presents our general OWTS analysis based on the surface and subsurface field exploration.
- ❖ Section 5.0 provides general OWTS operation and maintenance recommendations.
- ❖ Section 6.0 provides an overview of our required construction observations.
- ❖ Section 7.0 provides our conclusions and limitations.

The data used to generate our recommendations are presented throughout this report and in the attached figures.

1.1 Proposed Construction

We understand architectural plans for the proposed residential structure at the site are still under design. The residence will likely consist of a one bedroom residence; however, this OWTS design has been prepared to accommodate a total of two bedrooms which equates to 300 gallons of wastewater flow per day. If the proposed construction or wastewater flows are different that described above, we should be notified to re-evaluate the recommendations presented in this report.

2.0 FIELD STUDY

2.1 Site Description and Geomorphology

The subject property is approximately 7.8 acres and is currently vacant. The Miner's Shrine Road bisects the property along with a gravel driveway that currently accesses Lot 1 Gleason Subdivision. The residence and OWTS will be located just southeast of the driveway. The ground surface at the OWTS soil treatment area (STA) is gently sloping down to the southeast. The residence will be located on a mound just east of the STA. Vegetation consists primarily of grasses and Aspen trees. We understand water will be hauled to the site and stored in a cistern. A 50 foot setback is required from the cistern to all OWTS components.

2.2 Subsurface Soil and Water Conditions

The field exploration was performed on August 11, 2020. Two profile pits (Pits 1 and 2) were excavated with a mini-excavator at the approximate locations shown on Figure 1 to evaluate the subsurface conditions. The pits were logged by a representative of Trautner Geotech. Logs of the pits are provided below.

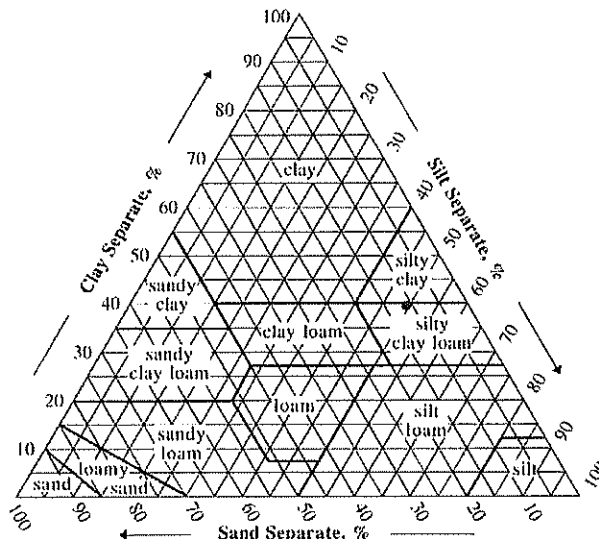
Log of Profile Pit 1

Depth	USDA Classification
0-1.5'	CLAY LOAM; moderate blocky texture, stiff, slightly moist, reddish brown.
1.5-7'	SANDY CLAY LOAM; moderate granular texture, dense, moist, brown.
<ul style="list-style-type: none"> No free water or redoximorphic features were observed during excavation. 	

Log of Profile Pit 2

Depth	USDA Classification
0-3'	CLAY LOAM; moderate blocky texture, stiff, slightly moist, reddish brown.
3-6.5'	SILTY CLAY LOAM; moderate granular texture, dense, moist, brown.
6.5-7.5'	SANDY CLAY LOAM; moderate to strong granular texture, scattered cobbles, dense, moist, brown.
<ul style="list-style-type: none"> No free water or redoximorphic features were observed during excavation. Bulk disturbed sample obtained from 1 to 3 feet. 	

The soils encountered consisted of clay loam, silty clay loam and sandy clay loam from the ground surface down to the depth explored of 7 1/2 feet. The soils encountered all classify at Soil Type 3. We performed a gradation and hydrometer analysis on a bulk disturbed sample obtained from Profile Pit 2. The laboratory classification indicates that the soils classify as a Silty Clay Loam. The results of the laboratory analysis are shown on the USDA Soil Texture Triangle below.



3.0 OWTS DESIGN ANALYSIS

Based on the site and subsurface soil conditions an OWTS consisting of a bed of Infiltrator Chambers in a gravity distribution system is proposed for the site. The Soil Treatment Area (STA) will be sized for a total of two bedrooms using a Long Term Acceptance Rate (LTAR) of 0.35 gallons per square foot per day for the on-site Soil Type 3 soils. The sewage will gravity flow from the residence to the septic tank for primary treatment. Effluent will then gravity flow from the tank to a distribution manifold for final distribution.

4.0 DESIGN RECOMMENDATIONS

The design recommendations presented below are based on the proposed construction, the site and subsurface conditions and our experience in the area. If conditions encountered during construction are different than those that are described in this report please contact us and we will re-evaluate our design recommendations. A layout of the OWTS components is provided on Figure 1.

4.1 Soil Treatment Area

- The treatment system will consist of four rows of 15 Infiltrator Quick 4 Plus Standard Chambers in each row (60 chambers total). The total STA will be 720 square feet.
- A 20 percent increase in the size of the STA was applied for gravity flow to a bed configuration. A 30 percent reduction in the size of the STA was applied for use of Infiltrator chambers.
- STA calculations are provided on Figure 2.
- The bed should be excavated down approximately 2 to 4 feet below the adjacent ground surface. The base and sidewalls of the trenches should be level and scarified prior to chamber placement.
- A minimum of 12 inches and a maximum of 36 inches of cover soil should be placed over the chambers.
- The final cover soil should consist of a Type 1 or 2 soil with the upper 2 inches, at minimum, being topsoil suitable for vegetation.
- The base and sidewalls of the excavation should be scarified prior to the chamber placement.
- Backfill and surface grading should be graded to deflect surface water away from the STA and should be sloped at 3 Horizontal:1 Vertical maximum. This will be especially important along the up-slope side of the field.
- Disturbed soil should be re-vegetated as soon as possible with a native grass mix. No trees, shrubs or other plants with deep roots should be planted on or near the absorption area as this may damage the system piping.
- Four-inch diameter inspection ports should be installed vertically into the knockouts provided in the chamber end caps. Install vents at each end of each corner of the bed. The inspection ports should extend at least 8 inches above the finished ground surface or be protected in a valve box at finished grade. The vent pipes should not extend down to the base of the trench. The inspection ports can be secured with a short section of piping and a coupling that will prevent slippage downward.
- A plan view of the STA is presented on Figure 3 and a cross section of the STA is presented on Figure 4.

4.2 OWTS Design Components

Recommended OWTS components provided below are based on our design details and our experience with the specific component manufacturers. Equivalent components may be feasible but need to be approved by us prior to construction.

4.2.1 Septic Tank

- An Infiltrator Systems IM-1060, or equivalent, two chamber septic tank is proposed for primary treatment of sewage. An equivalent tank must have a minimum capacity of 1,000 gallons and have two compartments.
- An effluent filter must be installed in the tank outlet tee. An Orenco Biotube filter is recommended. A handle for the filter should be extended to within approximately 6 inches of the tank lid for easy access and maintenance.
- The tank must be set level. The excavation bottom must be free of large rocks or other objects that could damage the tank during placement. A gravel or road base bedding material may be needed to act as a leveling course and prevent tank damage during placement.
- Tanks should be installed per the manufacturer's recommendations.
- Install tank with 2 feet minimum cover soil for frost protection. Maximum tank soil cover depth is 4 feet.
- The septic and dose chamber lids must extend to final surface grade and made to be easily located.

4.2.2 Sewer Piping

- The sewer line from the residence to the septic tank should not be less than the diameter of the building drain and not less than 4 inches in diameter.
- The sewer pipe should have a rating of SDR35 or stronger.
- The sewer pipe should be sloped between 2% to 4% to help limit disturbance of solids in the tank and potential sewage bypass of the first chamber of the tank. If a steeper slope is needed, this can be accomplished with vertical step-downs in the sewer line.
- A minimum 36 inches of cover soil should be provided over the sewer pipe. Paved areas, patios or other areas without vegetative cover may be more susceptible to frost. We recommend 48 inches of soil cover over the sewer pipe in these areas and the pipe be insulated on top and sides with 2-inch thick blue foam insulation board. If adequate soil cover is not possible, we should be contacted for re-evaluation prior to installation.
- The sewer pipe should be bedded in compacted $\frac{3}{4}$ inch road base or native soils provided that the native soils contain no angular rocks or rocks larger than $2\frac{1}{2}$ inches in diameter to help prevent settlement of the pipe. Sags could cause standing effluent to freeze and damage piping.
- Install cleanout pipes within 5 feet of the building foundation, where the sewer pipe bends 90 degrees or more and every 100 feet of sewer pipe.
- All 90 degree bends should be installed using a 90 degree long-sweep or by using two 45 degree elbows.
- The sewer line locations shown on Figure 1 is considered conceptual. We assume that there will be only one sewer line exiting the residence. It is the responsibility of the owner and/or contractor to locate all sewer lines exiting the proposed structures at the site.

4.2.3 Effluent Transport Piping

- 4 inch diameter SDR35 effluent transport piping should be sloped at 2% minimum to drain back from the septic tank to the manifold.
- The effluent transport pipe should be bedded in compacted ¾ inch road base or native soils provided that the native soils contain no angular rocks or rocks larger than 2½ inches in diameter to help prevent settlement of the pipe. Sags could cause standing effluent to freeze and damage piping.
- 24 inches minimum of cover soil should be provided over the effluent transport pipe. Paved areas, patios or other areas without vegetative cover may be more susceptible to frost. We recommend 48 inches of soil cover over the sewer pipe in these areas. If adequate cover soil is not possible the effluent pipe should be insulated on top and sides with 2-inch thick foam insulation board and the design should re-evaluate soil cover prior to installation.
- All 90 degree bends should be installed using a 90 degree long-sweep or by using two 45 degree elbows.

4.2.4 Manifold Piping

- 4 inch diameter SDR35 should be utilized for the manifold piping.
- The manifold will consist of four sections of pipe inserted into the knockouts provided into the Infiltrator Chamber End Caps. The lateral manifold pipes will be connected by a horizontal manifold.
- The manifold piping should be inserted at least 18 inches into the one of the cutout locations in the Infiltrator End Caps. The lower penetrations are preferred. A splash block should be placed below each pipe outlet to limit the potential for scouring of the soil surface.
- The lateral manifold should be installed level to provide equal distribution to the STA.

5.0 OWTS OPERATION AND MAINTENANCE

The OWTS will require periodic inspection and maintenance to function properly. A properly designed, installed and maintained system can greatly increase its lifespan. The level of maintenance will vary depending on the complexity of the system and water use habits of the residents. We recommend that an OWTS Operation and Maintenance (O&M) Manual be developed. Depending on the complexity of the system a contract with an OWTS maintenance provider may be prudent. Below are some basic recommendations for the OWTS O&M.

5.1 OWTS Operation

- Use of high efficiency water fixtures is recommended to decrease the hydraulic load on the OWTS system.
- Fix plumbing leaks immediately as this may cause a hydraulic overload of the soil absorption system.
- Do not irrigate the area on top of or directly up-gradient of the soil absorption field as this may cause a hydraulic overload.

- Do not dispose of household waste down household drains as this may clog or damage OWTS components. Examples of household waste includes: dental floss, cotton swabs, coffee grounds, paper towels, feminine products and many other kitchen and bath items.
- Use of kitchen garbage disposals is not recommended. If a garbage disposal is utilized, kitchen wastewater should be screened thoroughly. Many kitchen solids are not decomposed in the septic tank and may cause increased tank pumping frequency.
- Do not dispose of household chemicals, greases, oils, paints, hot tub water or water softener backwash in household drains. A separate drywell, if feasible, may be necessary for hot tub water or water softener backwash disposal.
- Limit the use of bleach as this may harm useful bacteria in the septic tank and soil absorption system.
- Liquid dishwasher and clothes washer detergent is recommended for households served by an OWTS. Clay substances used as fillers in powder detergents may result in clogging of the soils absorption system.
- The effluent in septic tanks can freeze during extended periods of non-use in cold weather. We recommend that a tank heater be installed in this system to help prevent freezing.

5.2 OWTS Maintenance

- Inspect the septic tank, distribution box and soil treatment area at least annually for problems or signs of failure.
- The effluent filter should be cleaned annually by spray washing solids into the first chamber of the septic tank.
- Septic tank should be pumped and cleaned every 3 to 5 years depending on use. Longer pumping intervals may increase the quantity of solids that reach the soil STA, which may shorten its life span.
- Pumping of the septic tank should take place when the level of the sludge and scum layers combined take up 25 to 33% of the capacity of the first chamber of the tank.

6.0 OWTS CONSTRUCTION OBSERVATION

The San Juan Basin Public Health Department requires that the designer of the system provide an As-Built certification of the OWTS construction. We should be provided with at least 48-hour notice prior to the installer needing the As-Built inspections. Prior to issuance of our certification letter, we require observation of all system components prior to backfill. The number of site visits required for the inspection will depend on the installer's construction schedule.

7.0 LIMITATIONS

We have conducted this design in accordance with generally accepted engineering principles and practices in this area at this time. We make no warranty either expressed or implied. The recommendations provided in this report are based on the site conditions, profile pit evaluations, soil texture analysis, the proposed construction and our experience in the area. Variations in the subsurface conditions may not become evident until excavation is performed. If conditions encountered during construction appear different from those described in this report, we should be notified so that re-evaluation of the recommendations may be made.

This report has been prepared for the exclusive use by our client for design purposes. We are not responsible for technical interpretations by others of our information. As the project evolves, we should provide continued consultation and field services during construction to review and monitor the implementation of our recommendations, and to verify that the recommendations have been appropriately interpreted. Significant design changes may require additional analysis or modifications to our design.

It is our opinion that the designed location of the OWTS components does not violate any setback requirements of the current San Juan Basin Public Health Department Regulations. Below is a table of common minimum horizontal setbacks to OWTS components. Refer to the San Juan Basin Public Health Department Regulations for a complete list of required setbacks. *We recommend the OWTS components be surveyed by a Professional Colorado Land Surveyor and verified by Trautner Geotech prior to the system installation.*

Table 1 - Common Minimum Horizontal Setbacks from OWTS Components

	Wells	Water Supply Line	Occupied Dwelling	Lined Ditch or Lake	Lake, Irrigation Ditch, Stream	Dry Ditch or Gulch	Septic Tank
STA	100'	25'	20'	20'	50'	25'	5'
Septic Tank	50'	10'	5'	10'	50'	10'	-
Building Sewer	50'	10'	0'	10'	50'	10'	-

Please contact us for any necessary revisions or discussion after review of this report by the San Juan Basin Public Health Department.

Please contact us if you have any questions, or if we may be of additional service.

Respectfully,
 TRAUTNER GEOTECH



Jason A. Deem, P.G.
 Engineering Geologist

Reviewed



Tom R. Harrison P.E.
 Geotechnical Engineer

FIGURES



APPROXIMATE SCALE:
1 INCH = 30 FEET

56301WT	TRAUTNER GEOTECH, LLC	LOT 2 GLEASON SUBDIVISION OWTS SITE PLAN	FIGURE 1
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OWTS SOIL TREATMENT AREA CALCULATIONS

In accordance with the current SJBPH Department's Onsite Wastewater Treatment System Regulations, the soil treatment area was calculated as follows:

CALCULATION OF OWTS DESIGN FLOW:

$Q = (F)(B)(N)$

WHERE:

Q = DESIGN FLOW

F = AVERAGE FLOW PER PERSON PER DAY

B = NUMBER OF BEDROOMS (UP TO 3 BEDROOMS)

N = NUMBER OF PERSONS PER BEDROOM (UP TO 3 BEDROOMS)

F =

75 GALLONS PER DAY

B =

2 BEDROOMS

N =

2 PERSONS PER BEDROOM

Q =

300 GALLONS PER DAY

CALCULATION OF OWTS SOIL TREATMENT AREA:

MINIMUM TREATMENT AREA = $Q \div \text{LTAR}$

WHERE:

Q =

300 GALLONS PER DAY

LTAR (SILTY CLAY LOAM - SOIL TYPE 3) =

0.35 GALLONS/FT²/DAY

MINIMUM SOIL TREATMENT AREA =

857.1 SQUARE FEET

INCREASE FOR BED WITH GRAVITY DISTRIBUTION =

1.2

REDUCTION FOR INFILTRATOR CHAMBERS =

0.7

MINIMUM SOIL TREATMENT AREA FOLLOWING ADJUSTMENTS =

720 SQUARE FEET

NUMBER OF ROWS OF CHAMBERS =

4

CHAMBERS PER ROW =

15

AREA PER CHAMBER =

12 SQUARE FEET

TOTAL SOIL TREATMENT AREA AS DESIGNED =

720 SQUARE FEET

SCALE
1 INCH = 20 FEET

4 INCH DIAMETER PVC OBSERVATION PORTS INSTALLED VERTICALLY INTO KNOCKOUTS PROVIDED IN END CAPS. INSTALL VENTS AT EACH END OF EACH TRENCH. REMOVABLE LID TO BE PLACED ON TOP OF PIPE. PIPE MUST STICK UP AT LEAST 8 INCHES ABOVE FINISHED GRADE. PIPES SHOULD NOT EXTEND TO SOIL SURFACE AND SHOULD BE SECURED TO CHAMBER TO PREVENT SLIPPING DOWNWARD.

INFILTRATOR QUICK 4 PLUS STANDARD END CAP

INSTALL SPLASH PLATES BENEATH EACH DISTRIBUTION PIPE TO LIMIT SCOUR POTENTIAL

INFILTRATOR QUICK 4 PLUS STANDARD CHAMBERS. FIFTEEN (15) CHAMBERS PER ROW (60 CHAMBERS TOTAL).

4" DIAMETER NON-PERFORATED SDR35 MANIFOLD PIPE INSTALLED LEVEL

4" DIAMETER NON-PERFORATED SDR35 PIPE SLOPED AT 2% MIN. TO DRAIN TO DISTRIBUTION MANIFOLD

Notes:

1. All piping should have a rating of SDR35 or stronger.
2. Changes to this design should not be made without consultation and approval by a representative of Trautner Geotech.

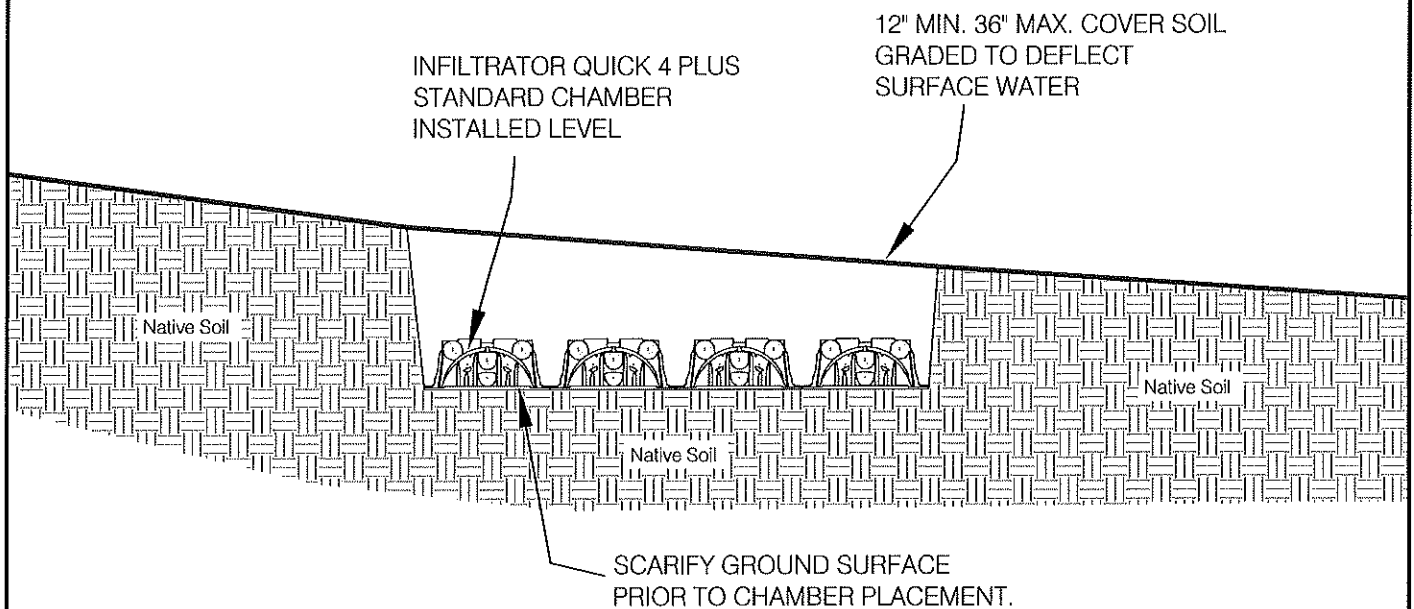
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TRAUTNER GEOTECH, LLC

LOT 2 GLEASON SUBDIVISION
SOIL TREATMENT AREA PLAN VIEW

FIGURE 3

SCALE
1 INCH = 4 FEET



Notes:

1. All piping should have a rating of SDR35 or stronger.
2. Chambers should be installed level.
3. Changes to this design should not be made without consultation and approval by a representative of Trautner Geotech.

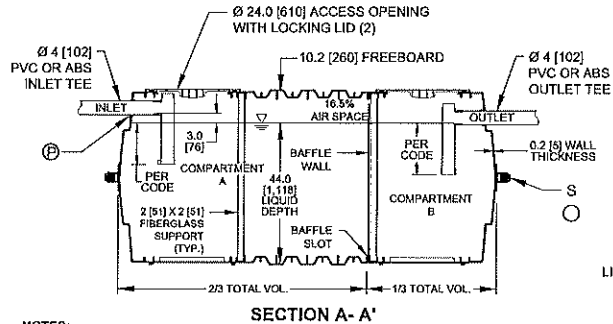
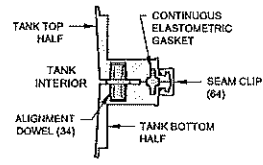
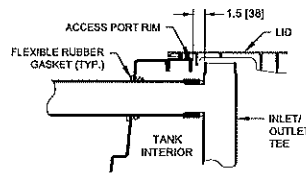
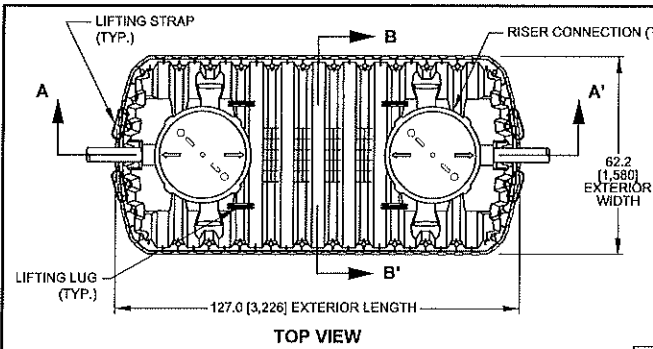
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TRAUTNER GEOTECH, LLC

LOT 2 GLEASON SUBDIVISION
SOIL TREATMENT AREA CROSS SECTION

FIGURE 4

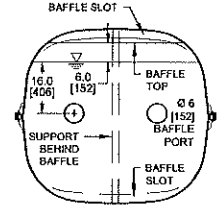
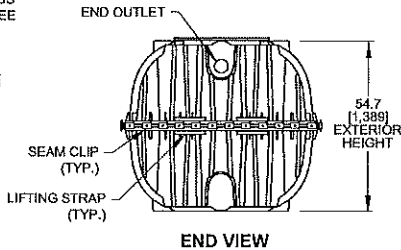
ATTACHMENTS



TANK EXTERIOR	
LENGTH	127.0 [3,226]
WIDTH	62.2 [1,580]
HEIGHT	54.7 [1,389]

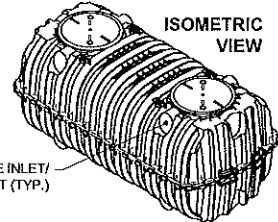
LIQUID DEPTH	44.0 [1,118]
INVERT DROP	3.0 [76]
FREEBOARD	10.2 [260]

TOTAL CAPACITY	1,247 GAL [4,720 L]
WORKING VOLUME	1,070 GAL [4,050 L]
COMPARTMENT A VOL.	713 GAL [2,700 L]
COMPARTMENT B VOL.	357 GAL [1,350 L]



NOTES:

- ALL DRAWING DIMENSIONS IN INCHES [MILLIMETERS] OR AS NOTED.
- EXTERIOR OF ACCESS OPENING LID INCLUDES THE FOLLOWING WARNING IN ENGLISH, FRENCH & SPANISH: "DANGER DO NOT ENTER: POISON GASES."
- TANK MARKINGS WILL INCLUDE: MANUFACTURER NAME, MODEL NUMBER, LIQUID CAPACITY, DATE OF MANUFACTURE, MAXIMUM BURIAL DEPTH, INLET, AND OUTLET.
- MAXIMUM BURIAL DEPTH IS 48 in [1,219 mm].
- MINIMUM BURIAL DEPTH IS 6 in [152 mm].
- MAXIMUM VEHICLE LOAD IS 4,500-lb [20-kN] AXLE LOAD.
- TANK IS FOR NON-TRAFFIC APPLICATIONS.
- AIRSPACE IS 16.5%.
- OUTLET TEE IS COMPATIBLE WITH EFFLUENT FILTER.
- INTERIOR LENGTH TO WIDTH RATIO IS 2.3:1 (118.8-INCH INTERIOR LENGTH / 51.7-INCH INTERIOR WIDTH = 2.3).
- FREE VENT AREA BETWEEN TOP OF BAFFLE WALL AND BOTTOM OF TOP BAFFLE SLOT IS 39.7 in².
- BAFFLE WALL THICKNESS IS 0.31 in [8 mm].



INFILTRATOR SYSTEMS INC.
4 Business Park Rd. Old Saybrook, CT 06475
(800) 221-4436

**INFILTRATOR IM-1060 TANK
2-COMPARTMENT CONFIGURATION**

Drawn by: EMB	Date: 08/05/2013
Scale: NOT TO SCALE	Checked by: DFH
Sheet: 1 of 1	

