

## Environment Site Assessment

A Phase 1 Environmental Site Assessment was performed for the Traverse Mountain property on November 19, 2006, by AGECE Applied Geotechnical Engineering Consultants of Sandy, Utah. The site assessment found that no items of obvious adverse environmental concern were found regarding historical use of structures on adjoining properties. In the past the site was used primarily for agricultural purposes, although there are sections of the Provo Reservoir Canal and of the Union Pacific railroad crossing the site. No major adverse conditions were discovered relating to soils, geology, and hydrogeology. In addition, there were no registered environmental hazards in the vicinity of the property, as shown by review of federal and state government environmental databases. Overall, the site was found to have no recognized environmental conditions.

### Vegetation

The only known use prior to any development of Traverse Mountain property is in the production of agricultural crops, primarily winter wheat. The remainder of the site consists of native vegetation common to the foothill sloped of northern Utah. Species include scrub oak, sagebrush, and other plants common to the area. No evidence of endangered species or threatened plant species has been found on the site.

### Aquifer Recharge Areas

MW Brown undertook an examination of the drainage patterns, streams, and aquifer recharge areas on the Traverse Mountain property, to determine whether these issues will affect development. The geologic formations on the foothills are primarily gravelly formations. As a result, all precipitation in this area percolates into the water table underground and remains in the watershed. It does not leave the site in the form of runoff in streams. The only exception would be in the event of a heavy storm, where precipitation may accumulate and begin to leave the site as runoff. There have been no perennial historical flows exiting the Traverse Mountain property, and it is not anticipated that this will change. As development occurs at Traverse Mountain, recharge of into the underground aquifers will continue as it has in the past. This may be accomplished through the installment of detention basins in strategic locations, to enable runoff to be directed to drains and detention basins.

### Stream and Aqueducts

No comprehensive information on the locations of streams in the State of Utah is available. MW Brown used the area's USGS 7.5 minute quadrangle to approximate the location of streams and channels at Traverse Mountain. Several ephemeral drainage channels exist in the small canyons throughout the property. In addition, the Murdock Canal crosses the southwestern portion of the property, as indicated on the map showing the rough locations of the drainage channels. The Murdock Canal is contained within an easement across the property, ranging in width from 55 feet to 300 feet. The Jordan Aqueduct, in a 66-inch diameter pipe also crosses the property. No streams cross the property.

## Drainage Areas

The southern portion of Traverse Mountain slopes to the south, with surface runoff being directed toward Timpanogos Highway (SR-92) running east-west at the south property line. Surface runoff is passed through culverts under the railroad and the canal. Several unnamed natural drainage channels in this southern part of the property begins in the mountainous terrain to the north and runs southerly toward Timpanogos Highway (SR-92).

Several large natural drainage channels can be seen in the northern part of the property with the largest being Oak Hollow. The drainage channels start near the ridgeline to the northwest and run southwest toward Interstate 15. Oak Hollow is the only named drainage channel and it appears to be contiguous to the Jordan River, with a drainage area close to two square miles at Traverse Mountain. The remaining drainage channels become less defined where they leave the foothills and are intercepted by the canal, Timpanogos Highway (SR-92) and Interstate 15. Additional information concerning drainage can be referenced in the Storm Drain section of the Area Plan.

Vegetative cover is fair, mainly consisting of native grasses with limited areas of mountain brush and sagebrush. Soils are generally well-drained, gravelly with rapid permeability. Infiltration rates for on-site soils are anticipated to be in the range of 5 to 30 minutes per inch.

## Slopes

MW Brown has performed a slope analysis, which is a part of this section. In the areas where development is planned the majority of the slopes are less than 10% after approved mass grading. Slopes in the northern portion of the property range from 15% to greater than 30%. A map indicating areas of 30% or greater is provided in this section.

## Wetlands and Floodplains

The Lehi City Development Code requires that any development area containing wetlands adhere to the U.S. Army Corps of Engineers guidelines regarding wetlands. An examination of the Corps of Engineer's online interactive mapping program shows that no wetlands are found in the area north of Timpanogos Highway (SR-92), east of Interstate 15, south of the Utah County-Salt Lake City County line, and west of Alpine.

The Federal Emergency Management Agency (FEMA) publishes maps of all areas of the United States. These maps are mainly used to determine flood zones, flood plains, and the probability of flooding in an area. The Traverse Mountain property is shown on FEMA Flood Insurance Rate Map Community Parcel Number 495517 0105 A. Traverse Mountain is in Flood Zone C, indicating minimal flooding danger.

## Wildlife Habitat

The Lehi City Development Code requires that any development with the potential to adversely affect wildlife habitat must take steps to minimize impacts on the habitat. There is wildlife on the site that has been observed in the higher elevations of the property, particularly in the area to be designated as undevelopment open space.

In the opinion of the Division of Wildlife Resources of the Utah Department of Natural Resources, there is no rare, threatened or endangered species living in the area, including the township-range sections adjoining the property. The informational manager at the Division of Wildlife stated that "Utah Natural Heritage Program (UNHP) does not have records of occurrence for any species of special concern, including threatened or endangered species with the study area." Letter from Department of Natural Resources Division of Wildlife dated, February 1, 2000, is reference at the end of this section.

#### Historical Areas

The only known uses of the Traverse Mountain property are agricultural before development activity began in 2001. According to the Environmental Site Assessment performed by AGEC in December 2006, there are no historical sites on the property. The Utah Historical Society requires that any structure over fifty years old be considered for historical status. There were no buildings at all on the property prior to the development activity begun in 2001.

#### Archeological Sites

Psomas Engineering contacted Jim Dykmann, an archeologist with the Utah Historical Society, regarding the presence of archeological sites on the property. Mr. Dykmann stated that there are no known archeological sites on the property. A letter from Department of Community and Economic Development Division of State History Utah State Historical Society dated, July 17, 2000, is referenced at the end of this section.



Department of Community and Economic Development  
Division of State History  
Utah State Historical Society

UTAH STATE  
HISTORICAL  
SOCIETY

Michael O. Leavitt  
Governor  
Max J. Evans  
Director

300 Rio Grande  
Salt Lake City, Utah 84101-1182  
(801) 533-3560 FAX: 533-3503 TDD: 533-3502  
ushs@history.state.ut.us http://history.utah.org

July 17, 2000

Maria Vyas  
Planner I  
PSOMAS  
2825 East Cottonwood Parkway, Suite 120  
Salt Lake City UT 84121

RE: Fox Ridge Development

Post-it <sup>®</sup> Fax Note	7671	Date	# of pages
To	VYAS	From	
Co./Dept		Co.	
Phone #		Phone #	
Fax #	270-5782	Fax #	

In Reply Please Refer to Case No. 00-0138

Dear Ms. Vyas:

The Utah State Historic Preservation Office received the above referenced information. After consideration of the project and the consultation meeting, the Utah Preservation Office provides the following comments for consideration.

1. Problems with the area of potential effect. I made a mistake concerning the location of this project. The original letters indicating that there were known cultural sites in the project area applies to the west side of the freeway and another project
2. Concerning the Fox Ridge Project, the area of potential effect has not been surveyed for cultural resources. Given the nature of the project area, the USHPO would not recommend a cultural resource survey of the project area. The potential for affecting cultural resources in the area is limited.
3. There is one exception to this recommendation; the northern part of the project extends up into an area named Oak Hollow. I understand that development is to take place at a later date, and that developers are not sure at this point of when this will happen. When the area is to be developed, our office recommends that a sample survey be completed of the project area. The potential is higher in this area for the location of indigenous sites and human remains.

This information is provided on request to assist with Section 106 responsibilities as specified in §36CFR800. If you have questions, please contact me at (801) 533-3555. My email address is: jdykman@history.state.ut.us

As ever,  
  
 James L. Dykman  
 Compliance Archaeologist

RECEIVED

JUL 19 2000

LEHI CITY

JLD:00-0138 OR/NAE



State of Utah  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WILDLIFE RESOURCES

1594 West North Temple, Suite 2110

PO Box 146301

Salt Lake City, Utah 84114-6301

801-538-4700

801-538-4709 (Fax)

801-538-7458 (TTY)

Michael O. Leavitt  
Governor

Kathleen Clarke  
Executive Director

John Kimball  
Division Director

February 1, 2000

Maria Vyas  
Psomas Engineering  
2825 East Cottonwood Pkwy  
Suite 120  
Salt Lake City, UT 84121

Dear Ms. Vyas,

I am writing in response to your request for information regarding species of special concern found proximal to the area described in your request in Salt Lake and Utah Counties.

The Utah Natural Heritage Program (UNHP) does not have records of occurrence for any species of special concern, including threatened and endangered species, within the study area.

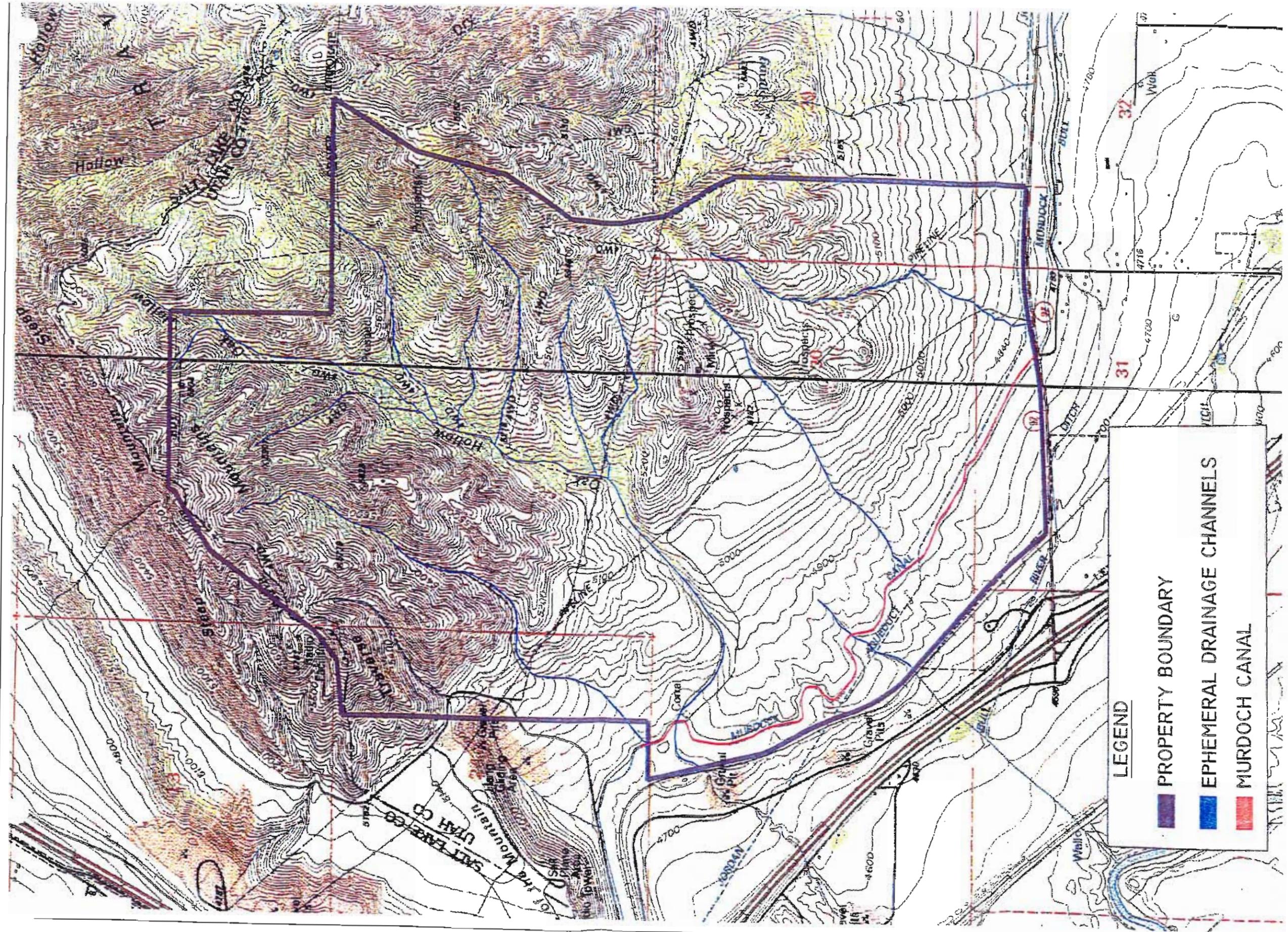
The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated by the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values may also be present on the designated site. These values may include critical habitats for ring-necked pheasant, Hungarian partridge, chukar, deer, and elk. Please contact UDWR's regional habitat manager, Doug Sakaguchi, at (801) 489-5678 if you have any questions.

The UNHP normally charges for this type of request, but due to the small amount of research and time required to fulfill this request, you will not be charged for this information. Please contact our office at (801) 538-4759 if you have any questions.

Sincerely,

Aian Ward  
Information Manager



**LEGEND**

- PROPERTY BOUNDARY
- EPHEMERAL DRAINAGE CHANNELS
- MURDOCH CANAL

DATE	AMV
BY	AMV
CHECKED	SJR

**FOX RIDGE  
STREAMS AND DRAINAGE CHANNELS**

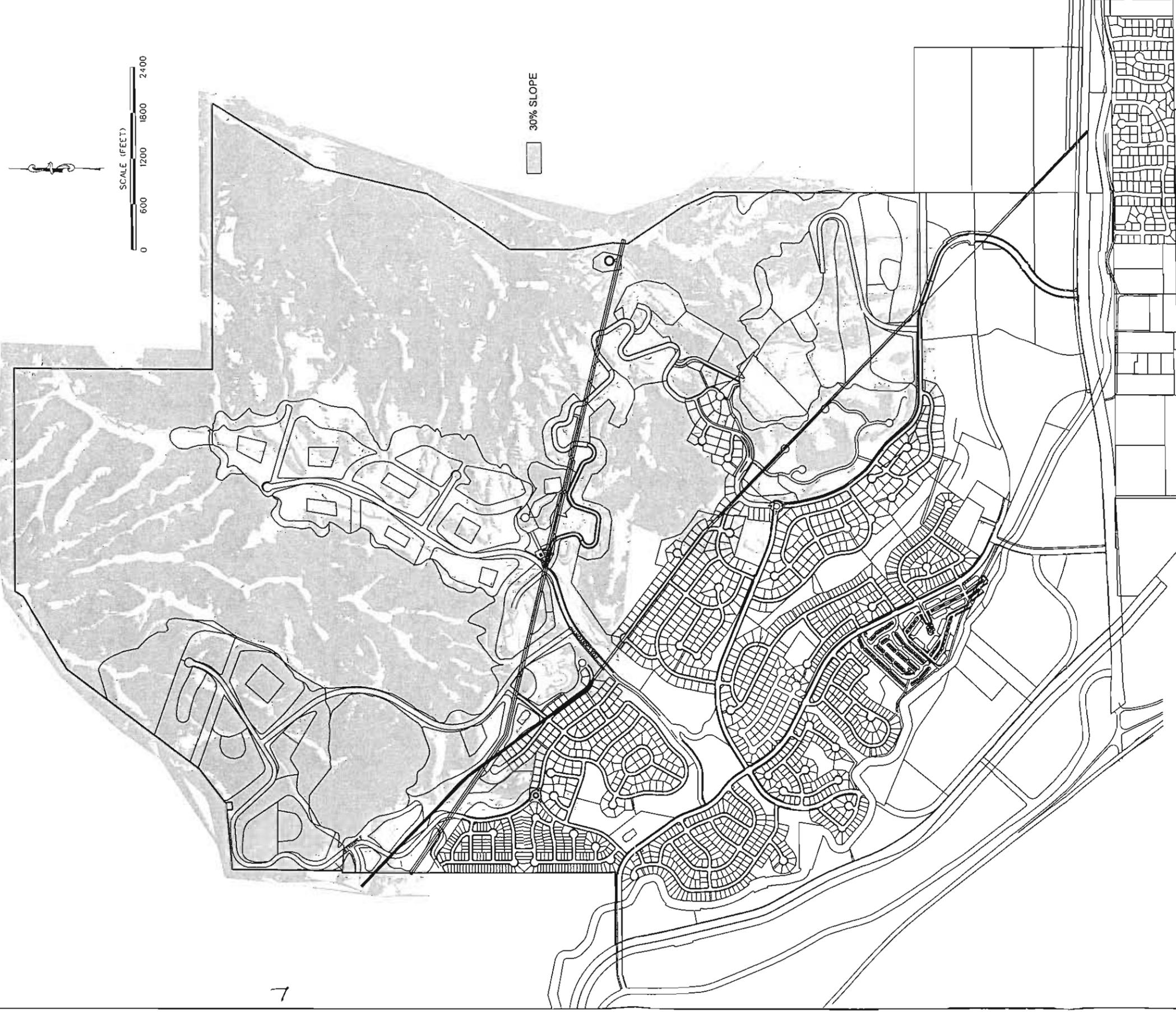
DATE	BY	SCALE
		1" = 1500'



SCALE (FEET)



30% SLOPE



7



Office: (801) 377-1790 Fax: (801) 377-1789  
578 East 770 North, Orem UT 84097

Client:

TRAVERSE MOUNTAIN, LEHI UTAH

Drawing Name:

30 PERCENT SLOPE

PROJECT NO.  
2010.037

11-21-11

## Mass Grading

Mass grading is defined as grading that is completed on a large scale over a large area which includes all the area approved for development at Traverse Mountain (see Mass Grading Exhibit 1) and includes the process of achieving a desired ground configuration by altering the existing ground contours through engineered cutting and filling of soils. Mass grading generally does not create final designed pads and a rough grading plan and/or precise grading plan will typically be used once the specific product has been determined. The mass grading operation will balance the soils such that the final grading operation will not import or export beyond trench and fine grading spoils.

East and Central Canyon will be a balanced mass grading operation. West Canyon has been permitted by Lehi City to be an export mass grading operation with the exported materials being transferred to the adjoining Geneva Rock property or transported out Flight Park Road.

All mass grading within the East Canyon Planning Areas A, B, and D as well as the 5.4 acre private park in Planning Area C2 shall be done in one phase including slope protection and revegetation. The grading may stop during winter weather conditions; however the intent is to proceed with grading until completion. Planning Area C1 grading may be done separately from the mass grading at Planning Area A, B, C2, and D.

All graded slopes created during the mass grading operation will be revegetated with an appropriate seed mix see Exhibit 2 for sample seed mix with recommendations for planting methods and the planting season.

Exhibit 3 - Traverse Mountain Exceptions from the Lehi City Grading Permit and Hillside Preservation Ordinance were approved by Lehi City Council on November 11, 2008, and are made a part of this Area Plan as a reference to the granted exception to the Lehi City Development Code Chapter 12-A.

Soil screening and rock crushing machinery is permitted in all area designated for mass grading on a temporary basis while the mass grading operation is occurring.

**Canyon Summary**

	Gross Acres	Proposed Units
Low Density (1-4)		
Medium Density (4.1-6)	66.3	295
High Density 1 (6.1-9)	33.8	261
High Density 2 (9.1-14)	27.8	298
High Density 3 (14.1-18)	32.0	482
High Density 4 (18.1-20)	19.8	385
Flexible Density (1-20)	89.3	500*
<b>Future Parks</b>		
Public 23.0 Acres		
Private 15.6 Acres		
<b>Manufactured Slopes</b>	172.4	
<b>Churches</b>	12.8	105
<b>Canyon Sub-Total</b>	<b>493.8</b>	<b>2,326</b>

\* Note: Not to Exceed 500 Homes in Flex Zone

**Parks Summary**

	Gross Acres	Parks Subtotal
<b>Total Private Parks</b>	24.5	7.1
Existing		
Proposed		17.4
<b>Total Trails</b>	8.7	3.7
Existing		
Proposed		5.0
<b>Total Public Parks</b>	46.0	6.7
Existing		
Proposed		39.3
<b>Future Public Park w/in OS</b>	45.0	
<b>Jordan Narrows Public Park</b>	12.5	
<b>Total Public Parks</b>	112.2	136.7

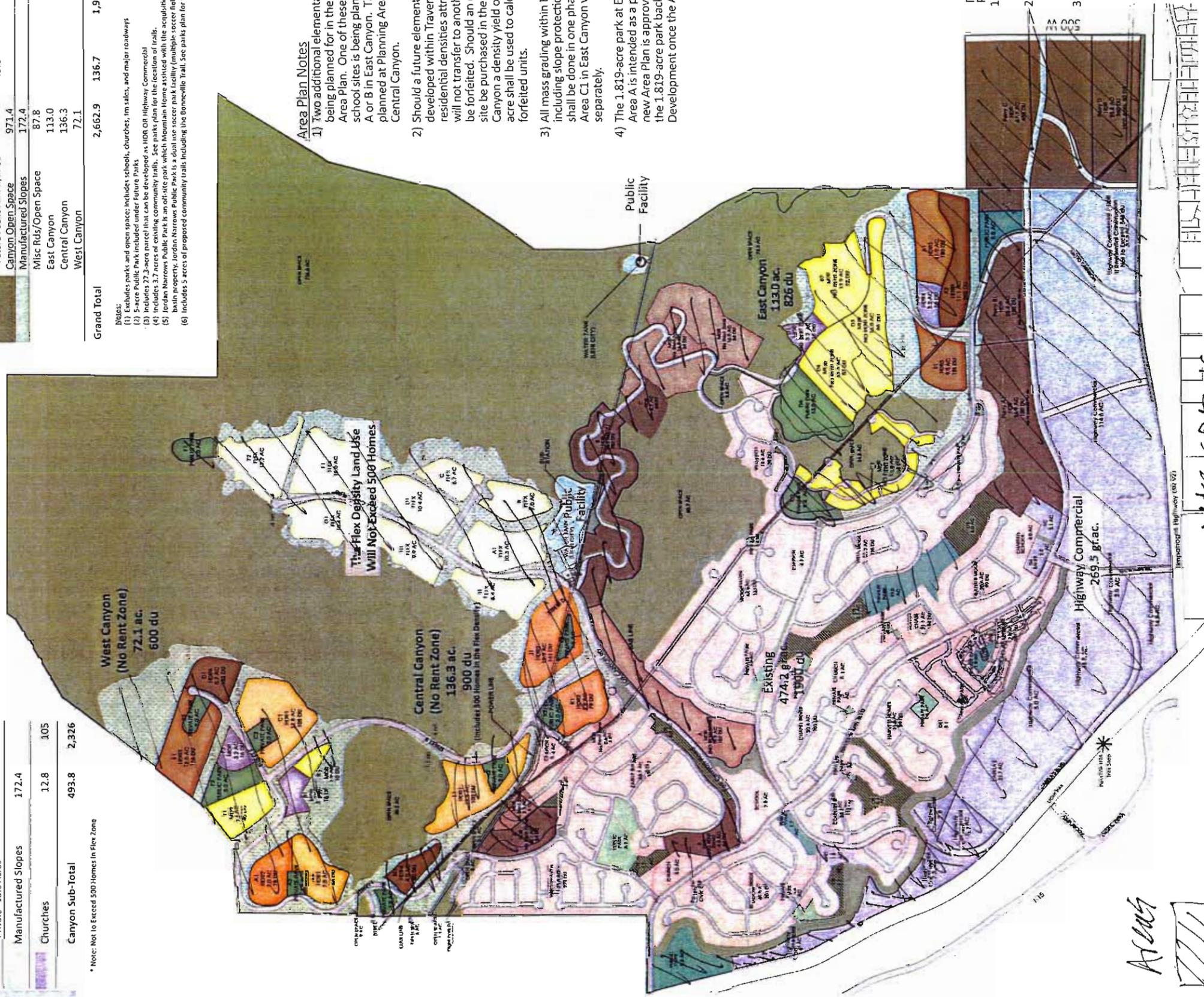
**Summary**

	Gross Acres	Parks Subtotal	Existing Units	Proposed Units	Total Units
<b>Existing</b>	474.2 <sup>(1)</sup>		1,434	--	1,434
SFD	--		122	--	122
TownHomes	--		344	--	344
Apartments	--		--	184	184
MDR (1-6)	58.7		--	434	434
HDR (6.1-20)	49.0		--	968	968
Perry Homes	153.6 <sup>(1)</sup>		--	--	--
Highway Commercial	269.5 <sup>(1)</sup>		--	--	--
Open Space	25.7		--	--	--
<b>Existing Parks</b>					
Public	17.5 <sup>(4)</sup>	6.7	--	--	--
Private		7.1	--	--	--
Trails		3.7	--	--	--
<b>Jordan Narrows Public Park</b>	12.5 <sup>(5)</sup>				
<b>Future Parks</b>	66.7 <sup>(4)</sup>				
Public		39.3			
Private		17.4			
Trails		5.0			
<b>Future Public Park w/in OS</b>	45.0				
<b>Canyon Open Space</b>	971.4				
<b>Manufactured Slopes</b>	172.4				
Misc Rds/Open Space	87.8				
East Canyon	113.0		--	826	826
Central Canyon	136.3		--	900	900
West Canyon	72.1		--	600	600
<b>Grand Total</b>	<b>2,662.9</b>	<b>136.7</b>	<b>1,900</b>	<b>3,912</b>	<b>5,812</b>

- Notes:**
- (1) Excludes parks and open space; includes schools, churches, tm sales, and major roadways
  - (2) 5-acre Public Park included under Future Parks
  - (3) Includes 27.3-acre parcel that can be developed as HDR OR Highway Commercial
  - (4) Includes 3.7 acres of existing community trails. See parks plan for the location of trails.
  - (5) Jordan Narrows Public Park is an off-site park, which Mountain Home assisted with the acquisition of the park/detention basin property. Jordan Narrows Public Park is a dual use soccer park facility (multiple soccer fields) and detention basin.
  - (6) Includes 5 acres of proposed community trails including the Bonneville Trail. See parks plan for the location of trails.

**Area Plan Notes**

- 1) Two additional elementary school sites are being planned for in the Traverse Mountain Area Plan. One of these possible elementary school sites is being planned at Planning Area A or B in East Canyon. The second is being planned at Planning Area H at the Flex Area of Central Canyon.
- 2) Should a future elementary school(s) be developed within Traverse Mountain the residential densities attributable to these sites will not transfer to another property but shall be forfeited. Should an elementary school site be purchased in the Flex Area of Central Canyon a density yield of six units per the acre shall be used to calculate the number of forfeited units.
- 3) All mass grading within East Canyon Area including slope protection and revegetation shall be done in one phase except Planning Area C1 in East Canyon which shall be graded separately.
- 4) The 1.819-acre park at East Canyon Planning Area A is intended as a place holder until the new Area Plan is approved. Lehi City will deed the 1.819-acre park back to Mountain Home Development once the Area Plan is approved.



*ALONG*

*MRS GRACE*

*MRS GRACE*  
Area Plan

**Traverse Mountain**  
Lehi, Utah  
Mountain Home Development



EXHIBIT 2

**Re: Re-Vegetation Recommendations**

*Prepared for:*

Mountain Homes Development Corp  
Traverse Mountain  
Lehi, Utah  
c/o Jack Hepworth  
September 27, 2011

Dear Lehi City Staff,

Northland Design (The Consultant) contracted with Mountain Homes Development Corp. (The Client) to prepare a report that meets the requirements of Section 12-A.030-D4 Hillside Preservation Development Standards as set forth by the City of Lehi.

**1. Re-vegetative Plan**

The following re-vegetative plan (Table 1) includes a seed-mix specifically selected for the Traverse Mountain project taking into consideration the existing plant communities found on the site. It is recommended that construction and silt fencing be placed to provide a limits of disturbance line to minimize damage to existing adjacent plant communities to remain.

Proposed hillside grades for the site are 2 to 1 slopes at final completion. The existing surface soil face consists of silt, sand, gravel and bedrock.

**Table 1. – Species Recommended for Direct Seedings**

Species	Seeding Rates lbs/ac (PLS)
<i>Grasses</i>	
Bluebunch wheatgrass	Agropyron spicatum 2
Mountain brome	Bromus carinatus 3
Slender wheatgrass	Agropyron trachycaulum 3
Western wheatgrass	Agropyron smithii 4
Pubescent Wheatgrass	Agropyron Trichophorum 3
Hard Fescue	Festuca ovina 2
	Total 18

(Source: Great Basin Seed, Ephraim Utah)

**2. Maintenance Recommendations:**

Existing Plantings:

Existing plantings if protected during construction shall maintain themselves and not require any maintenance. Protective measures should at a minimum be: Visible construction fencing and necessary silt fencing.

Proposed Planting:

When seeded correctly this mix requires no maintenance and is intended to establish itself. Re-seeding is occasionally required where seed didn't establish or was thinned.

**3. Methods for Minimizing Problems**

**Planting Methods**

All seeds must be incorporated into soil to adequately germinate and establish. Seeds may be distributed on the soil surface by hand or mechanical broadcasting; however some means must also be employed to cover the seeds with an appropriate amount of soil. New plants are difficult to establish on steep and unstable slopes primarily because seeds are not placed or incorporated into the soil. Most seeds require 0.25 inch depth placement in the soil. Seed coverage can be accomplished using drags, rakes, or rails. Depositing seeds on a roughened surface and placing mulch or erosion blankets can improve seedling establishment, however these practices alone will not assure successful establishment of many species. Seeds should be covered immediately after broadcast distribution to prevent wind and water erosion and loss to small mammals, insects, and birds.

**Planting Season**

Direct seeding should be completed in the late fall and early winter period, normally during October and November. Late fall plantings are recommended to prevent seed from germination in the summer months when consistent moisture is not available to maintain the small seedlings. In addition, seeds of some species require a period of cold and moist conditions to break dormancy and germinate uniformly. Seeds deposited and maintained in the soil over winter normally germinate in the spring when soil moisture is available to assure germination and initial establishment. Over-winter stratification of the seeds eliminates dormancy and allows for uniform germination and seedling establishment. (*Information by Western Ecological Consulting Inc. 2004*)

If there are further questions regarding this report please call me at the numbers listed above.

Thank you,

Jeremy S. Fillmore, President, LLA  
Licensed Landscape Architect  
Northland Design Group

# Exhibit 3

## Traverse Mountain Exceptions from Lehi City Grading Permit and Hillside Preservation Ordinances

In the approved Area Plan it was agreed that the scale and scope of the development required flexibility and creative design techniques, and that design and engineering standards need to be in harmony with the scale and special circumstances at the Traverse Mountain Property.

Lehi City's Grading Permit and Hillside Preservation Ordinances do not preclude Traverse Mountain from their vested rights under the approved Concept Plans. Per the August 15, 2006, City Council approval of the June 1, 2006 Concept Plan mass grading will occur in the Canyon District and elsewhere on slopes that exceed 30%. The following language is a part of the June 1, 2006 approved concept plan. "The Canyon District at Traverse Mountain will consist of several types of mixed-use residential and commercial development including various themed attached and detached housing, cluster housing, townhomes, rental properties, high rise construction up to 12 stories for various mixed-uses and district retail including neighborhood retail and resort properties. The development will be integrated with the natural environments to provide a unique canyon living experience. Due to unique terrain conditions and other appropriate constraints and conditions of the property, mass grading will be permitted to achieve the allocated densities (as per the ADA and 1<sup>st</sup> Amendment). Where grading occurs, slopes will be revegetated with like and natural vegetation."

### **TRAVERSE MOUNTAIN VARIANCES TO THE GRADING PERMIT ORDINANCE**

#### **Grading Permit Requirements Section D**

Traverse Mountain shall submit a grading plan, soils report, and geologic report, if recommended, Storm Water Prevention Plan, and a vegetation plan, when applicable for a grading permit.

#### **Submittal Requirements Section C & Grading Permit Issuance Section B) 2**

Item 12.060 (K) (1) (steep slopes) is not applicable to Traverse Mountain. Traverse Mountain is allowed to develop areas within the approved Concept Plan where slopes exceed 30% so long as Traverse Mountain meets the criteria outlined in the Lehi City Grading Permit Ordinance as amended by Traverse Mountain in this document. Grading plans shall specifically denote areas that exceed 30%.

#### **Grading Permit Issuance Section A & B) 3**

A preliminary plat will not be required for mass grading in Sage and Radio Tower Canyons as identified in the November 18, 2008, Lehi City Council approved Concept Plan; however, a conceptual vision plan will be required prior to issuing a grading permit.

## TRAVERSE MOUNTAIN VARIANCES TO THE HILLSIDE PRESERVATION ORDINANCE

### **Replacement of the Purpose and Intent Paragraph**

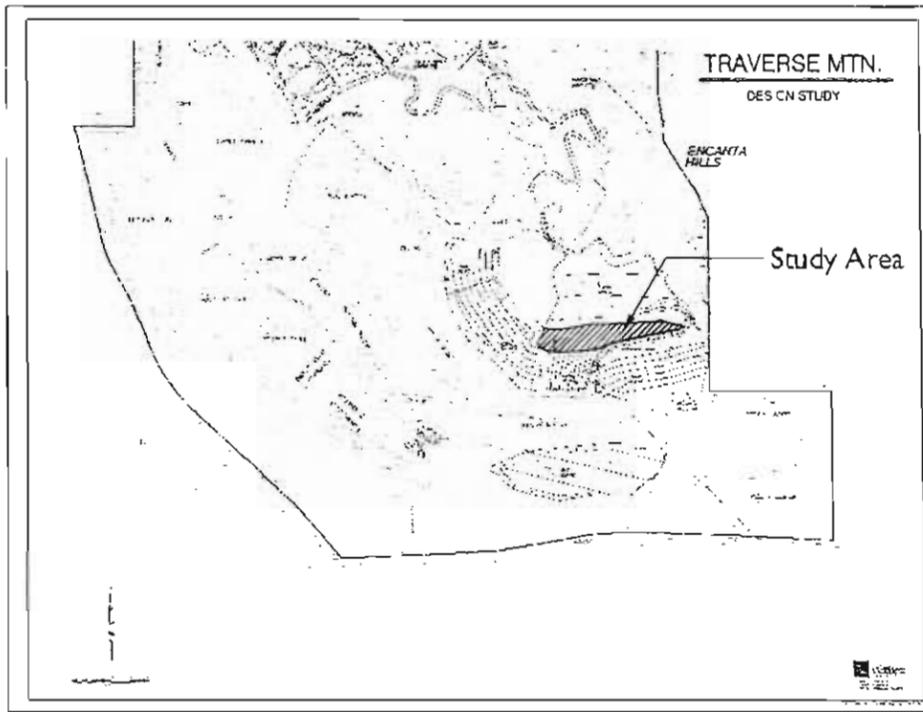
To ensure that all grading, excavation, filling or erection of any structure on land within the approved Concept Plan shall conform to the Lehi City Hillside Preservation and Grading Permit Ordinance as amended by Traverse Mountain in this document, while giving due consideration to the vested rights of Traverse Mountain and its predecessors in previously approved concept and/or area plans.

### **Purpose and Intent Sections - Items A - J**

Items A, B, F, G, I, and J do not take into account that Traverse Mountain will be permitted to mass grade on slopes that exceed 30% throughout the approved Concept Plan given certain conditions are met which conditions are set forth in the Lehi City Hillside Preservation and Grading Permit Ordinances as amended by Traverse Mountain in this document. Items A, B, F, G, I, and J does not preclude Traverse Mountain of vested rights under the approved Concept Plan. The City has previously approved mass grading throughout the Canyon District with the approval of the June 1, 2006 Concept Plan.

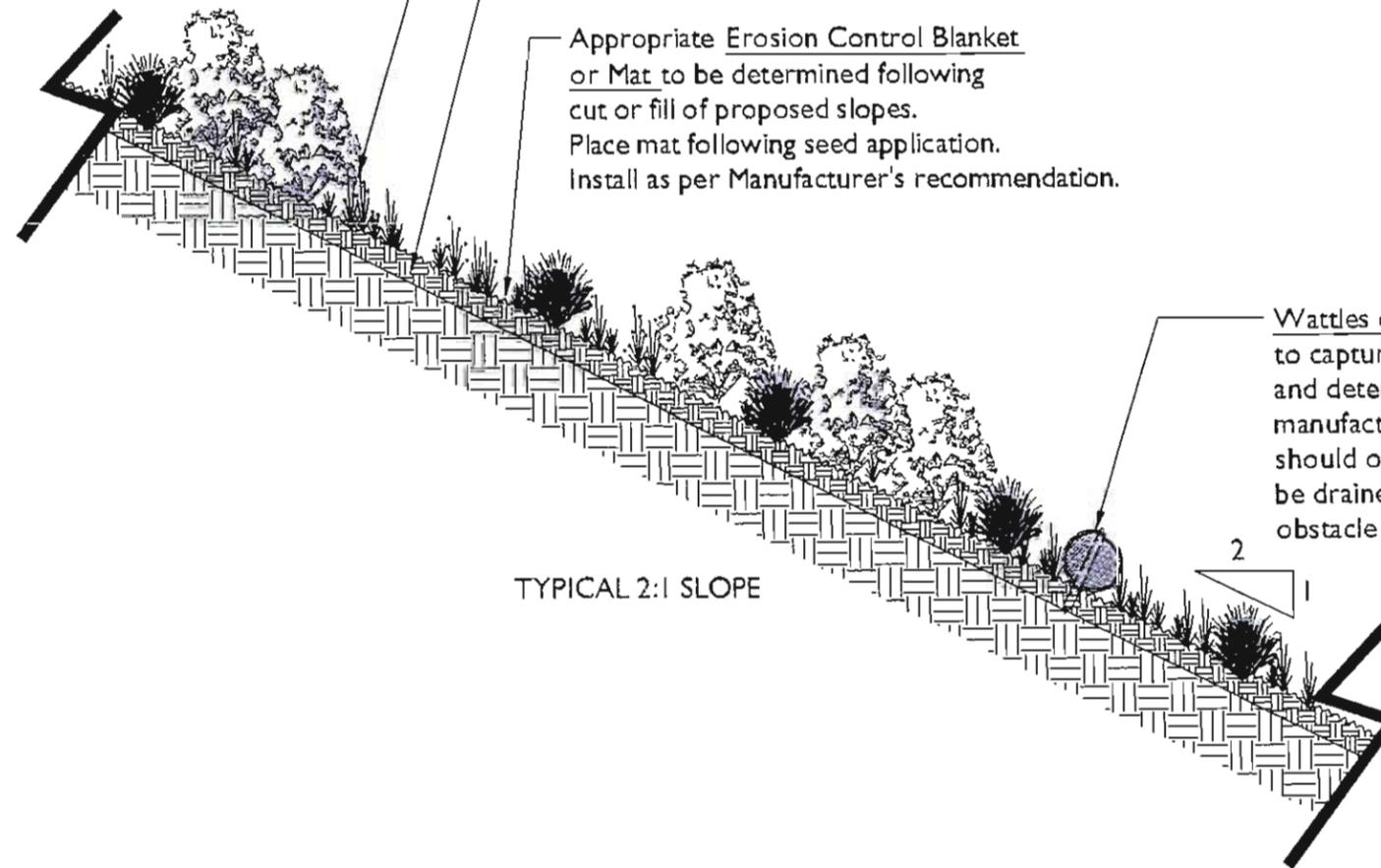
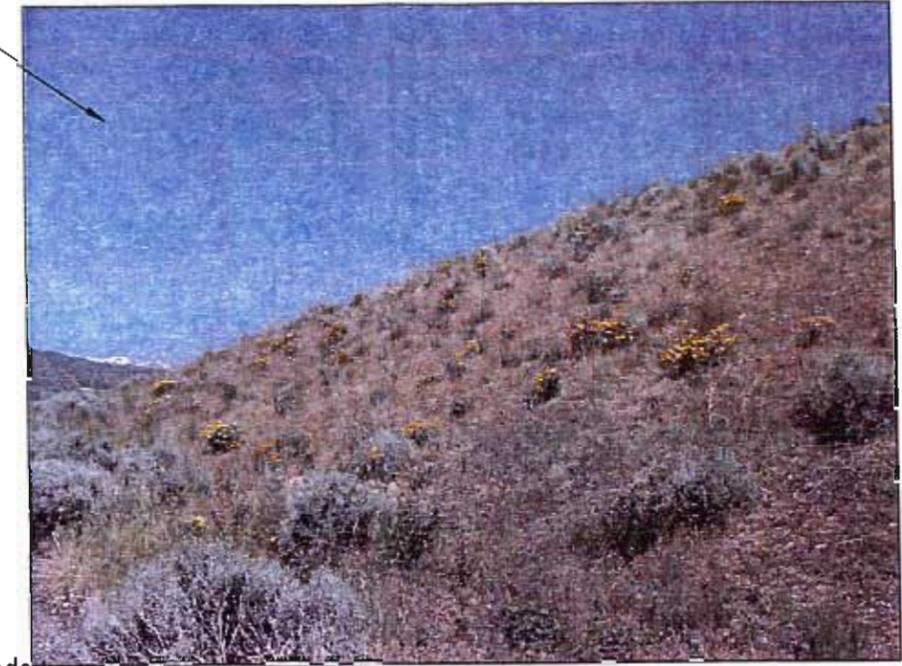
### **Development Standards and Provisions Section - Item A**

Traverse Mountain is allowed to grade, excavate, fill, erect structures, and otherwise disturb slopes greater than 30% provided Traverse Mountain has complied with sound engineering practices and geologic recommendations as well as the Lehi City's Hillside Preservation and Grading Permit Ordinances as amended by Traverse Mountain in this document. Traverse Mountain will submit a preliminary plat to Lehi City Council for all areas within the Concept Plan except those areas approved for mass grading in Sage and Radio Tower Canyons as identified in the November 18, 2008, Lehi City Council approved Concept Plan.



Index Map

**Exhibit A**  
 The re-vegetated slope indicated represents a 2:1 slope located on the Traverse Mountain property which was seeded in 2004. Plantings indicated are representative of the proposed Revegetative Seed Mix below.



**RE-VEGATATIVE SEED MIX:**

SPECIES	%
Slender wheatgrass	15
Western wheatgrass	17.5
Bluebunch wheatgrass	16.25
Sheep fescue	3.5
Sandberg bluegrass	2.75
Indian ricegrass	10
Rubber rabbit brush	5
Western sage	5
Blanket flower	5
Blue flax	10
California poppy	10

SEEDING RATE IS 20 POUNDS PER ACRE

(Seedmix provided by Granite Seed, Lehi, Utah)



**SLOPE RE-VEGETATION STUDY**



Applied Geotechnical Engineering Consultants, P.C.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

TRAVERSE MOUNTAIN DEVELOPMENT  
LEHI, UTAH

PREPARED FOR:

MOUNTAIN HOME DEVELOPMENT CORPORATION  
3940 NORTH TRAVERSE MOUNTAIN BOULEVARD, SUITE 200  
LEHI, UTAH 84043

ATTENTION: TY THORPE

PROJECT NO. 1061366

DECEMBER 19, 2006

## SUMMARY

1. Based on an historical review of county tax records, aerial photographs and interviews, the majority of the southwestern end of the property that has been recently developed has been dry farmed for grain crops or used as pasture since at least the 1930s. The cultivated fields on the property generally decreased in size in the 1990s as they were laid fallow. The hillsides in the northeastern portion of the property have been undeveloped. The west edge of the property near the Winterhaven subdivision was excavated for sand and gravel from the late 1970s to the 1990s. There is no evidence of buildings, pavements or improvements on the subject property prior to the beginning of construction for the Traverse Mountain development in 2001 with the exception of several horse corrals and natural gas and high voltage power lines crossing the property. Since that time numerous residential subdivisions, roads, two churches, a well pumphouse, reservoir and Cabela's store have been constructed. The site is located in an increasingly commercial area in Lehi, Utah.
2. The Murdock Canal crosses the south and southwest end of the property in an open ditch. The buried Jordan Aqueduct crosses the property parallel to the canal. Highway 92 crosses the south edge of the property in an east-west direction. Bull River Road extends along most of the south edge of the property.
3. There are several small prospect mines on the east center side as noted on the USGS quadrangle maps. Information about the claims or minerals found on the property is beyond the scope of this report. Mine tailings, if present, may contain elevated lead or arsenic and should be investigated.
4. Most of houses in the Chapel Bend, Hunter Chase, Heathermoor, Country Run, Shadow Ridge and Harvest Home subdivisions have been completed. Numerous houses are still under construction in the Winterhaven, Eagle Summit, Woodhaven and Vista Ridge subdivisions. A third church building will be constructed on the west end of the development by the intersection of Traverse Mountain Boulevard and Holmstead Road. Most of the houses are two-story wood-frame structures with attached garages and basements. Roads have been partially built for the Vialetto and Bella Collina subdivisions.
5. The Cabela's store is a two-story 115,239 square foot masonry block structure with an attached 19,422 square foot warehouse. Large asphalt paved parking lots are on the west, south and east sides of the building. The remainder of the proposed commercial lots on the south side of the development have not been improved.
6. The office building is a wood-framed two-story structure occupied by Mountain Home Development and the home owners association with parking lots surrounding the building. Most of the roads extending through the subdivisions are two-lane asphalt paved roads with concrete curbs, gutters and sidewalks. Triumph Boulevard, Traverse Mountain Boulevard and Chapel Ridge Road are four lane roads.
7. A large electrical substation is under construction east of the municipal water tank and reservoir. The well pumphouse supplies the municipal water to the development. Buried electrical, natural gas, sewer and water utilities extend through the subdivisions. Buried natural gas pipelines cross the west half of the development. High voltage electrical power lines cross the property near the toe of the mountain slopes. Power lines extend along the

north side of Bull River Road. Numerous pad-mounted Rocky Mountain Power electrical transformers are located in the subdivisions. The transformers have labels indicating that they do not contain poly-chlorinated biphenyls (PCBs). Due to the age of the buildings, they likely were not constructed with asbestos-containing building materials or lead-based paints.

8. Our site visit, interviews and records research indicate no evidence of underground storage tanks on the property. There are three large above ground diesel fuel tanks in a contractor's equipment yard on the west end of Traverse Mountain Boulevard. The tanks are located within concrete spill containment basins. A smaller diesel tank is located by the construction work proceeding along Morning Glory Road. The tank had a plastic liner spill containment basin. Significantly stained pavement or soils and stressed vegetation were not observed. Several inches of snow covered most of the mountain sides but had melted off near the subdivisions. Unusual odors were not noticed.
9. Government agency inquiry indicates there are no NPL, RCRA TSD or CORRACTS sites within 1 mile of the property. There are no CERCLIS, Brownfields, VCP sites or landfills within ½ mile of the property. There are two LUST sites within ½ mile of the property. Both LUST sites have been investigated with the LUST files closed with no further remedial action required. There are no RCRA generators, UST, DERR incident or NRC sites on or adjacent to the property. There are no known institutional controls or engineering controls on the subject property.
10. The temporary above ground fuel tanks on site have spill containment devices and do not appear to be a significant concern to the property. There do not appear to be current or past property conditions that would be a significant environmental concern on the subject property. A reconnaissance and data base search of properties in the vicinity of the subject property finds no evidence of facilities or environmental conditions that have adversely impacted the subject property.
11. We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM Practice E 1527-05 of the property described in the Property Location and Legal Description section of this report. Any exceptions to, or deletions from, this practice are described in the Data Gaps/Deviations section of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property.



Applied Geotechnical Engineering Consultants, Inc.

GEOTECHNICAL INVESTIGATION  
EAST CANYON AREA  
TRAVERSE MOUNTAIN DEVELOPMENT  
LEHI, UTAH

PREPARED FOR:

MOUNTAIN HOME DEVELOPMENT CORP.  
3940 NORTH TRAVERSE MOUNTAIN BOULEVARD, SUITE 200  
LEHI, UTAH 84043

ATTENTION: JACK HEPWORTH

PROJECT NO. 1100334

NOVEMBER 2, 2011

## EXECUTIVE SUMMARY

1. The subsurface materials encountered at the site generally consist of approximately 3 to 24 inches of topsoil overlying predominantly sand, gravel and bedrock. Bedrock was generally encountered within the depth investigated in the eastern and north/central portions of the site. The bedrock generally consists of quartzite with some sandstone, siltstone, claystone and shaly limestone except in Test Pit TP-10, TP-12, TP-13 and TP-14 where volcanic bedrock was encountered. Clay layers were encountered in the northern portion of the site in Test Pits TP-16A and TP-18A and in the central and southern portions of the site. The clay is underlain by bedrock in the northern portion of the site in Test Pits TP-16A and TP-18A. The clay extends to the maximum depth investigated in the western/central portion of the site in Test Pits TP-10, TP-13, TP-14, TP-27A, TP-30A, TP-36A and TP-37A.
2. No subsurface water was encountered in the test pits or borings to the maximum depth investigated, approximately 50 feet below the ground surface.
3. Based on subsurface conditions encountered in the test pits and borings, the site is suitable for the proposed construction. The proposed residences may be supported on spread footings bearing on the undisturbed natural soil, quartzite bedrock or on compacted structural fill extending down to the undisturbed natural soil or quartzite bedrock. Spread footings bearing on the undisturbed natural soil may be designed using an allowable net bearing pressure of 1,500 pounds per square foot. Spread footings bearing on at least 2 feet of the natural sand and gravel, quartzite bedrock or compacted structural fill may be designed using an allowable net bearing pressure of 3,500 pounds per square foot.
4. Volcanic bedrock was encountered in the areas of Test Pits TP-10, TP-12, TP-13 and TP-14. The volcanic bedrock is expansive and should be further evaluated to determine its suitability for support of structures. We anticipate that structures in expansive bedrock areas could be supported on deep foundations or the expansive material could be removed to a sufficient depth and be replaced with compacted, low permeable, non-expansive structural fill. Additional study should be considered to better define the extent of the expansive bedrock at the site and to provide additional foundation recommendations for these areas taking into consideration proposed cuts and fills in this area.

## Executive Summary (continued)

5. Permanent, unretained cut and fill slopes in the natural sand and gravel may be constructed at 2 horizontal to 1 vertical or flatter. Cut slopes in the quartzite bedrock may be constructed at 1  $\frac{3}{4}$  horizontal to 1 vertical or flatter. Cut slopes in the natural clay and volcanic bedrock may be constructed at 3 horizontal to 1 vertical or flatter. Cut and fill slopes should be protected from erosion by revegetation or other methods. Surface runoff should be diverted away from the face of cut and fill slopes. For the relatively high cut slopes planned for the development, periodic terraces could be considered to divert surface runoff from the cut slope.
6. Bedrock was encountered in the eastern and north/central portions of the site and practical excavation refusal was encountered at depths as shallow as approximately 5  $\frac{1}{2}$  feet below the ground surface. Excavation difficulties will be encountered in the bedrock, particularly for confined excavations such as utility trenches. Alternate excavation methods such as ripping, jackhammering, saw cutting or light blasting may be required.
7. Excavation of test pits in proposed cut areas extended as deep as was practical for the excavation equipment used. Borings for a previous study extended to a depth of approximately 50 feet below the ground surface. We anticipate that proposed cuts at the site will extend significantly deeper than the explorations. We anticipate that excavation will be primarily in quartzite bedrock for the eastern and north/central portions of the site. If conditions are found to be different, we should be notified to reevaluate our recommendations.
8. Geotechnical information related to foundations, subgrade preparation, pavement design and materials is included in the report.



Applied Geotechnical Engineering Consultants, Inc.

GEOTECHNICAL INVESTIGATION  
SAGE/RADIO CANYON DEVELOPMENT  
TRAVERSE MOUNTAIN DEVELOPMENT  
LEHI, UTAH

PREPARED FOR:

MOUNTAIN HOME DEVELOPMENT CORP.  
3940 NORTH TRAVERSE MOUNTAIN BOULEVARD, SUITE 200  
LEHI, UTAH 84043

ATTENTION: JACK HEPWORTH

PROJECT NO. 1080943

OCTOBER 28, 2008

Executive Summary (continued)

6. Excavation of test pits extended as deep as was practical for the tracked excavator used. Proposed cuts at the site will extend significantly deeper than the explorations. We anticipate that excavation will be primarily in quartzite bedrock. If conditions are found to be different, we should be notified to reevaluate our recommendations.
7. Geotechnical information related to foundations, subgrade preparation, pavement design and materials is included in the report.





Applied Geotechnical Engineering Consultants, Inc.

GEOTECHNICAL INVESTIGATION  
CENTRAL CANYON AREA  
TRAVERSE MOUNTAIN DEVELOPMENT  
LEHI, UTAH

PREPARED FOR:

MOUNTAIN HOME DEVELOPMENT CORP.  
3940 NORTH TRAVERSE MOUNTAIN BOULEVARD, SUITE 200  
LEHI, UTAH 84043

ATTENTION: JACK HEPWORTH

PROJECT NO. 1100333

NOVEMBER 2, 2011

## EXECUTIVE SUMMARY

1. The subsurface materials encountered at the site and areas adjacent to the site generally consist of up to approximately 2 feet of topsoil overlying predominantly sand and gravel. Bedrock was generally encountered at relatively shallow depths in test pits excavated near the steeper slopes. Fine-grained clay and silt layers were encountered in portions of the site, particularly, in the more gentle slopes on the east side of the canyon and in the areas south of the site.

Practical excavation refusal was encountered in the bedrock in some of the test pits at depths ranging from approximately 4½ to 15 feet below the ground surface.

2. No subsurface water was encountered to the maximum depth investigated, approximately 19½ feet.
3. Based on subsurface conditions encountered in the test pits, the site is suitable for the proposed construction. The proposed residences may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Spread footings bearing on the undisturbed natural soil may be designed using an allowable net bearing pressure of 1,500 pounds per square foot. Spread footings bearing on at least 2 feet of the natural sand and gravel, bedrock or compacted structural fill may be designed using an allowable net bearing pressure of 3,500 pounds per square foot.
4. Significant fill was encountered in the area of Test Pit TP-18 extending to the maximum depth investigated, approximately 15½ feet below the ground surface. Approximately 3½ feet of fill was encountered in Test Pit TP-8B. It appears that there are areas of significant fills adjacent to the road in the southeastern portion of the area. The fill encountered in Test Pit TP-18 appears to be relatively loose and erratic in density. Unsuitable fill should be removed from below areas of proposed buildings and pavement.
5. Permanent, unretained cut and fill slopes in the natural soil may be constructed at 2 horizontal to 1 vertical or flatter. Cut slopes in the bedrock may be constructed at 1¾ horizontal to 1 vertical or flatter. Cut and fill slopes should be protected from erosion by revegetation or other methods. Surface runoff should be diverted away from the face of cut and fill slopes. For the relatively high cut slopes planned for the development, periodic terraces could be considered to divert surface runoff from the cut slope.

Executive Summary (continued)

6. Bedrock was encountered in many of the test pits and practical excavation equipment refusal was encountered at depths as shallow as approximately 4½ feet below the ground surface. Excavation difficulties will be encountered in the bedrock, particularly for confined excavations such as utility trenches. Alternate excavation methods such as ripping, jack-hammering, saw cutting or light blasting may be required.
7. Excavation of test pits in proposed cut areas extended as deep as was practical for the tracked excavator used. Proposed cuts at the site will extend significantly deeper than the explorations. We anticipate that excavation will be primarily in quartzite bedrock. If conditions are found to be different, we should be notified to reevaluate our recommendations.
8. Geotechnical information related to foundations, subgrade preparation, pavement design and materials is included in the report.

