

STATE OF COLORADO

COLORADO GEOLOGICAL SURVEY

Department of Natural Resources
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October 26, 2011

Mr. Terry Rorick
El Paso County Planning
27 East Vermijo Ave.
Colorado Springs, CO 80903-2088
plnweb@elpasoco.com

Re: Crystal Park Subdivision Lot M-244 S-334R , CGS EP-12-0004_1

Dear Mr. Rorick;

Thank you for the submittal of the above referenced proposal. CGS has performed a technical review concerning geologic hazards for the lot. I visited the site on October 20, 2011 to review the development plans. A geologic study letter from RMG Engineers was included in the referral.

The lot consists of approximately 0.7 acres and is located on a north-facing slope with grades of 20 to 40 percent. A roughed in driveway and building area already exist on the site.

As is the case for essentially all of the Crystal Park area, the site underlain by deeply weathered (grussified) Pikes Peak Granite bedrock. Surficial materials overlying in-place bedrock consist of colluvium (materials mass wasted downslope under gravity either by soil creep or surface or subsurface water movement) derived from the bedrock materials. The thickness of these materials can vary from tens of feet to nil depending on specific site conditions. In the area of the site bedrock is exposed in a few places and owing to the steep slopes, the colluvium is mostly thin.

CGS offers the following comments.

Steep Slopes

As mentioned by RMG, minor downslope creep is present on this site. Bent trees were visible on the lot. Engineering recommendations for foundations should be followed. Water infiltration may cause subsurface pressures near the building foundation and should be minimized. The current building footprint appeared to be stable. If additional deep cuts into the hillside are needed, such cuts should be evaluated for stability.

Septic Considerations

Septic systems located on steep slopes require an engineered design. This should be done to ensure that effluent does not daylight on steep slopes.

Erosion Control

The steep slopes and loose, granular nature of the soils present moderate to severe erosion concerns following site grading. To the extent feasible, concentrated runoff should not be allowed to discharge uncontrolled down steep slopes and bare areas should be protected against erosion at all times.

COLORADO



DEPARTMENT OF
NATURAL
RESOURCES

John Hickenlooper
Governor

Michael King
Executive Director

Vincent Matthews
Division Director and
State Geologist

Radon

The Pikes Peak granite is known to contain uranium-bearing minerals and can produce radionuclide particles as well as radon gas. Information from the EPA regarding radionuclides in water can be found at: <http://www.epa.gov/safewater/radionuc.html>. While this lot is not at any greater risk than other lots in the development, it may be prudent for the homeowners to be aware of this potential risk and to have their well water tested. This test would need to be specifically requested, as it is not a normal drinking water test. Special water filters can be used if concentrations are found above recommended levels.

Earthquakes

The Ute Pass Fault lies at the base of the mountain front in Manitou Springs and has shown geologically recent movement (within the past 170,000 years). Again, this lot does not pose greater risk than others in the development, but homeowners and engineers should be made aware of this potential hazard.

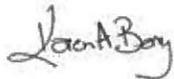
Rockfall

As noted in the RMG report. Boulder can be found on the site; however, the lot is located near the top of the hill and not below significant steep rock outcrops. Rockfall risks appear to be low. Some loose rock on the slope above the proposed home may become dislodged due to construction or freeze/thaw. It may be prudent to remove such rocks during home construction.

Summary

In summary, there do not appear to be any geologic hazards that will prevent development of the site as planned. Please contact me if you have any questions or concerns. I can be reached at 303.866.2611 ext. 8315 or by email at karen.berry@state.co.us.

Sincerely,



Karen A. Berry
Acting Deputy Director
Geological Engineer, PG, AICP, CPESC-SWQ



Job No. 131894

September 16, 2011

Richard Iler
4249 Ashby Field Drive
Colorado Springs, CO 80922

RECEIVED

SEP 21 2011

Attn: Mr. Richard Iler

EPC DEVELOPMENT SERVICES

Re: Summary Report of Preliminary Geologic Hazards
Ponderosa View
Site S-334R, Crystal Park Subdivision No. 2
El Paso County, Colorado

Dear Mr. Iler,

This report presents the findings of our Preliminary Geologic Hazards evaluation performed by RMG Engineers Group (RMG) for the above-referenced site in El Paso County, Colorado. The purpose of our report is to evaluate the occurrence of potential geologic hazards and our opinions of the observed conditions on the proposed development with the respect to the intended usage.

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

Existing and Proposed Land Use

The site will consist of an approximately 0.70 acre parcel zoned as "PUD" Planned Unit Development per El Paso County zoning. The proposed land use is to create Site S-334R within the Crystal Park No. 2 subdivision for residential construction.

Project Description

The proposed development of this site will consist of the construction of a single-family dwelling with a septic system and well. This geologic hazards study was performed to evaluate geologic conditions that may impact the proposed development and provide recommendations for mitigation and design for residential construction.

Site Evaluation Techniques

The information included in this report has been compiled from

1. Field reconnaissance
2. Geologic and topographic maps
3. Review of previous reports performed by RMG in the subdivision
4. Available aerial photographs
5. Geologic research and analysis
6. Site development plans prepared by others

Geophysical investigations were not considered necessary for characterization of the site geology.

Site Conditions

We performed a site visit for field reconnaissance on September 16, 2011. At the time of the field reconnaissance, the site consisted of vacant land generally located southwest of the intersection of Summit Road and Ponderosa View in El Paso County, Colorado. The ground surface was well vegetated and contained a low to moderate growth of coniferous trees, aspens, and native grasses. Topographically, the site is located southwest of Eagle Mountain. The slopes on the site vary from about 20 to 40 percent grade. The site has good drainage generally in the form of surface sheet flow directed to the east and south. Deep gullies or drainages were not observed in the vicinity of the site. Potential, minor slope creep was observed in the vicinity of the site as evidenced by occasional curved trees.

General Geology

The site geology was based upon mapping presented by the Colorado Geological Survey (CGS) (¹Keller et al, 2003). The following paragraphs present a summary of the general mapped site geology.

The surficial deposits as observed during our site visit consist of residuum and colluvium generally composed of sands and gravels with varying amounts of silt. Several large boulders on the order of 2 to 6-foot diameter or greater were observed on the site and along the proposed driveway. Evidence of rockfall or debris flow deposits were not observed in the vicinity of the site.

The bedrock underlying the subject site is comprised of the Pikes Peak Granite of Middle Proterozoic Era. The Pikes Peak Granite is comprised of light-gray to pinkish-reddish brown and coarse grained. The Pikes Peak Granite often produces deposits of grus (loose, disaggregated mass of constituent minerals) when weathered. The principal minerals composing

¹ Keller, John W., Siddoway, Christine, Morgan, Matthew L., Route, Erik E., Grizzell, Matthew T., Sacerdoti, Raffaello, and Stevenson, Adair, 2003 *Geologic Map of the Manitou Springs Quadrangle, El Paso and Teller Counties, Colorado*, Colorado Geological Survey, Open File Map 03-19.

the Pikes Peak Granite are perthitic microcline, quartz, plagioclase (oligoclase), and biotite. The Pikes Peak Granite is also considered to be the most abundant of the intrusive rocks in the Manitou Springs Quadrangle.

The site is located in the vicinity of the Ute Pass Fault zone. The Ute Pass Fault is located approximately 1.5 miles to the northeast. According to information presented by the CGS (²Kirkham et al, 2004-2007), several earthquakes have occurred in the vicinity of the Ute Pass Fault near Colorado Springs and Woodland Park. The earthquakes, with magnitudes in the range of 3.0 to 3.9, occurred approximately from 1962 to 2007.

BEARING OF GEOLOGIC FACTORS UPON PROPOSED DEVELOPMENT

General Geologic Considerations

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic hazards identified are not considered unusual for mountainous regions of Colorado. Mitigation of geologic hazards is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic hazards should be mitigated by implementing appropriate planning, engineering, and local construction practices.

Potentially Unstable Slopes

Downslope creep, which is the slow downslope movement of superficial soil and rock materials, is common to the area, however, the potential for relatively rapid creep at the site is considered to be low. Nevertheless, the structural design of the residence should consider its placement on the hillside and the additional pressures that could be generated by retaining upslope materials. Proper surface grading and positive drainage away from the structure will reduce the potential for downslope creep to impact the proposed residence. Any landscaping should utilize xeriscape techniques in order to minimize needed irrigation to maintain landscaping. Further, stormwater and snowmelt runoff from parking areas should be directed towards drainage channels and away from potentially unstable slopes, both during construction activities and upon completion of site development.

Rockfall

The subject site does not have exposed cliffs or very steep slopes above it to generate rockfall. The subject property is not considered to be prone to rockfall.

² Kirkham, R. M., Rogers, W. P., Powell, L., Morgan, M. L., Matthews, V., and Pattyn, G. R., 2004-2007, *Colorado Earthquake Map Server*. Colorado Geological Survey Bulletin 52b.

<http://geosurvey.state.co.us/Default.aspx?tabid=270>

Debris Flows and Debris Fans

Terrain features consistent in the formation of debris flows and debris fans are not present on the vicinity of the property.

Seismicity

The International Residential Code, 2006 Edition, indicates maximum considered earthquake spectral response accelerations of approximately 0.22g for a short period (Ss) and 0.06g for a 1-second period (S1) for the site. Specific recommendations should be provided by the Geotechnical Engineer during the design phase of the project.

Surface Drainage and Erosion

The permeability of the sands and gravels at the site is generally considered to be high. Surface runoff could also be rapid and the potential for rapid erosion of unvegetated slopes could be high. Long-term slopes should not be steeper than 3:1 (horizontal:vertical) in both cut and fill areas. Revegetation of any disturbed areas should be performed as soon as possible with revegetation/erosion mats placed as required. Excavation cuts and soil disturbance should be kept to a minimum. Proper surface drainage, as recommended in a geotechnical engineering report should be provided and maintained by the Homeowner.

Radioactivity/Radon Gas

Based upon a Map of Radon Zones by the Colorado Department of Public Health and Environment (CDPHE) (Ref. 11), two zones of radon potential are indicated in Colorado, Zone 1 - High Radon Potential (probable indoor radon average >4 pCi/L) and Zone 2 -Moderate Radon Potential (probable indoor radon average 2-4 pCi/L). El Paso County is located within Zone 1.

Potential radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards.

CLOSING

This report has been prepared for the exclusive purpose of providing geologic hazards information and recommendations for development described in this report. RMG should be retained to review the final construction documents prior to construction to verify our findings, conclusions and recommendations have been appropriately implemented.

This report has been prepared for the exclusive use by the Client for application as an aid in the design and construction of the proposed development in accordance with generally accepted geotechnical and geological engineering practices. The analyses and recommendations in this report are based in part upon data obtained from site observations and the information presented in referenced reports. The nature and extent of variations may not become evident until

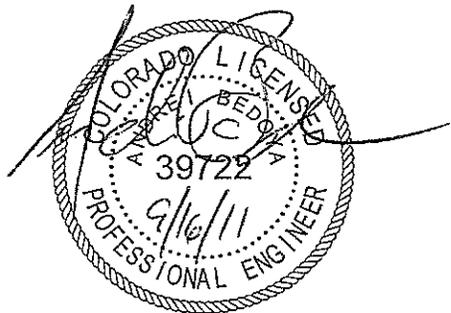
construction. If variations then become evident, RMG should be retained to review the recommendations presented in this report considering the varied condition, and either verify or modify them in writing.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

The scope of services for this project does not include, either specifically or by implication, environmental assessment of the site or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to biological or toxicological issues, are beyond the scope of this report. If the Client desires investigation into the potential for such contamination or conditions, other studies should be undertaken.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering point-of-view, please feel free to contact us.

Cordially,



Andrei Bedoya, P.E., P.G.
Geological Engineer