

June 24, 2015

GG Land Group – Colorado Springs, LLC
330 North Jefferson, Suite 1401
Chicago, Illinois 60611

Attn: Mr. Tom Galuski
E: tgaluski@gglandgroup.com
P: 312.451.1204

Re: CGS Response Letter and Proposed Phase II Scope of Geotechnical Services
Bates Student Housing Project
702 Cragmor Road
Colorado Springs, Colorado
Terracon Project Number: 23155012

Terracon Consultants, Inc. (Terracon) prepared a Preliminary Geologic Hazard Study and Geotechnical Report, dated May 15, 2015. We have reviewed the Colorado Geological Survey (CGS) comments letter dated June 4, 2015. This letter is intended to provide responses to the CGS's comments and also provide an overview of our recommended supplemental scope of field services in order to provide the final Geologic Hazard Study for the project site. For reference, we have included the CGS comments prior to our responses.

CGS Comment: *An air shaft, mapped as Air Shaft No. 7, may be located in the northern part of the site. It is not known whether this shaft, if present, has been properly sealed and capped. A subsidence event (recorded as a "cave-in"), possibly related to the air shaft, was reported to OSM in the late 1970s. Numerous subsidence events and sinkholes, some involving damage to residential structures and requiring mitigation, have been documented south and southwest of the site.*

The shaft, thought to be associated with the cave-in reported to OSM in 1979, must be located, stabilized and capped, and documentation of proper abandonment should be provided to CGS. A non-buildable setback of a minimum of 30 feet from the sealed shaft should be incorporated into development plans.

Terracon Response: We concur that there have been documented subsidence events and sinkholes to the south and southwest of the site. The mine depth is approximately 125 to 140 feet below the subject site. The mine subsidence maps also indicate the subject site is located in a zone designated to have a low risk of future subsidence (shaded in green). Due to the sloping surface terrain, the depth to the mines quickly shallows to about 50 to 75 feet at a distance of approximately 400 to 500 feet to the south. This area to the south and southwest also coincides with increased risk for future subsidence and has been designated to have moderate and high



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subsidence potential (shaded in orange and red, respectively). The documented subsidence shown on the mine subsidence maps generally occurs within the areas shaded as moderate to high potential for subsidence. Therefore, the lack of documented subsidence on the subject site correlates well with the area designated to have a low risk of future mine subsidence.

In our report, we indicated that there is a potential for a previous air shaft (No. 7) to be located within the northern portion of the site. There may have been subsidence associated with the air shaft in the late 1970's. At the time of our site exploration, no apparent depressions were observed within the approximate location of the air shaft. It has been our experience that air vents are relatively small diameter shafts (typically less than about 2 feet in diameter). As part of our supplemental site field services, we propose to perform ground penetrating radar to identify potential anomalies within the soil profile that may refine the location of the air shaft. If anomalies are encountered, we plan on performing test pits to depths of about 10 feet to observe potential soil features that may identify the location. If located, we recommend the air shaft be injected with grout to effectively plug the shaft at depth to reduce the risk of future subsidence. If the air shaft is not able to be located, alternate mitigation for support of structures may include a layer of soil and geogrid reinforcement or mat foundations for the clubhouse and pool to bridge over potential subsidence areas. It is our opinion that the recommended 30-foot setback for an air shaft that is typically less than 2 feet in diameter and will be grout injected at depth is excessive and would not be necessary.

CGS Comment: *Terracon's three deep borings are insufficient to adequately characterize the condition of mine workings, voids, and subsidence hazard for a structure this large. CGS agrees with Terracon that additional borings on approximately 40-50 ft spacing within and around the footprints of all proposed structures will be needed to adequately characterize the subsidence hazard on this site.*

Terracon Response: In general, mining maps overlaid with aeriels provide a general location of the mined areas and should not be considered to be accurate in plan view. However, this particular site is unique such that the mine "haul road", or the main corridor tunnel lines up relatively well with documented surface subsidence. The attached Exhibit A-1, shows the documented surface subsidence associated with the "haul road". Due to this identifier, it is our opinion that the mine maps and worked out areas may correlate relatively well the aerial overlays.

We concur with CGS that three borings are not sufficient to characterize the site with respect to mine activity. The borings were part of our initial phase of exploration with the intention of performing supplemental borings at a later time. We do not agree with the 40 to 50-foot spacing of borings within all building footprints. As indicated in our report, it is our intention to perform relatively closely spaced borings, at about 50 feet apart, at the locations where the designated worked out mine areas overlap the proposed building improvements only. If the supplemental borings indicate unfavorable results, we will recommend additional borings. We are proposing to perform approximately 8 to 10 supplemental mine borings as shown on the attached Exhibits A-

1 through A-4. Similarly to the initial three borings, we plan on performing gamma, caliper, and density logging of the borings.

Additional Terracon Comments

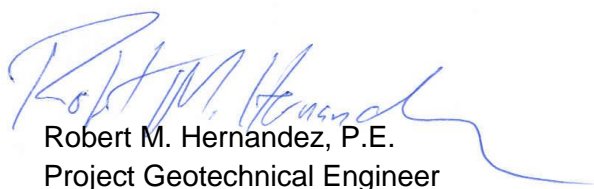
We encountered a relatively soft zone within the bedrock profile at a depth of about 110 to 115 feet below the ground surface within Test Boring B-1. The rock cored unusually fast (approximately 2 minutes) for the 5-foot core run. We recognized this as an area of concern, however, a review of the gamma, caliper, and density logging within this boring did not indicate this zone was associated with features commonly found with mining activity. Therefore, it is our opinion that the zone from 110 to 115 feet below the ground surface within Boring B-1 is associated with a layer of lower strength bedrock, not mining activity.

CLOSURE

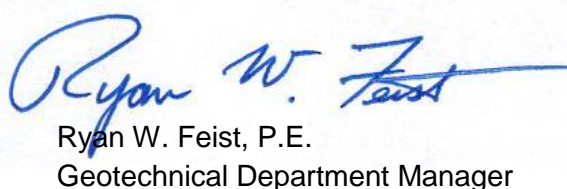
This letter has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this letter, or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.



Robert M. Hernandez, P.E.
Project Geotechnical Engineer



Ryan W. Feist, P.E.
Geotechnical Department Manager

Copies to: Addressee (1, *PDF)
Lonna Thelen, City of Colorado Springs, Planning Department (1, *PDF)
Jill Carlson, CGS (1, *PDF)

Enclosures: Exhibit A-1, Existing and Proposed Mine Borings with Proposed Layout
Exhibit A-2, Existing and Proposed Borings with Mine Map Overlay
Exhibit A-3, Existing and Proposed Borings with Proposed Building Overlay
Exhibit A-4, Existing and Proposed Borings with Mine Map and Proposed Building Overlay

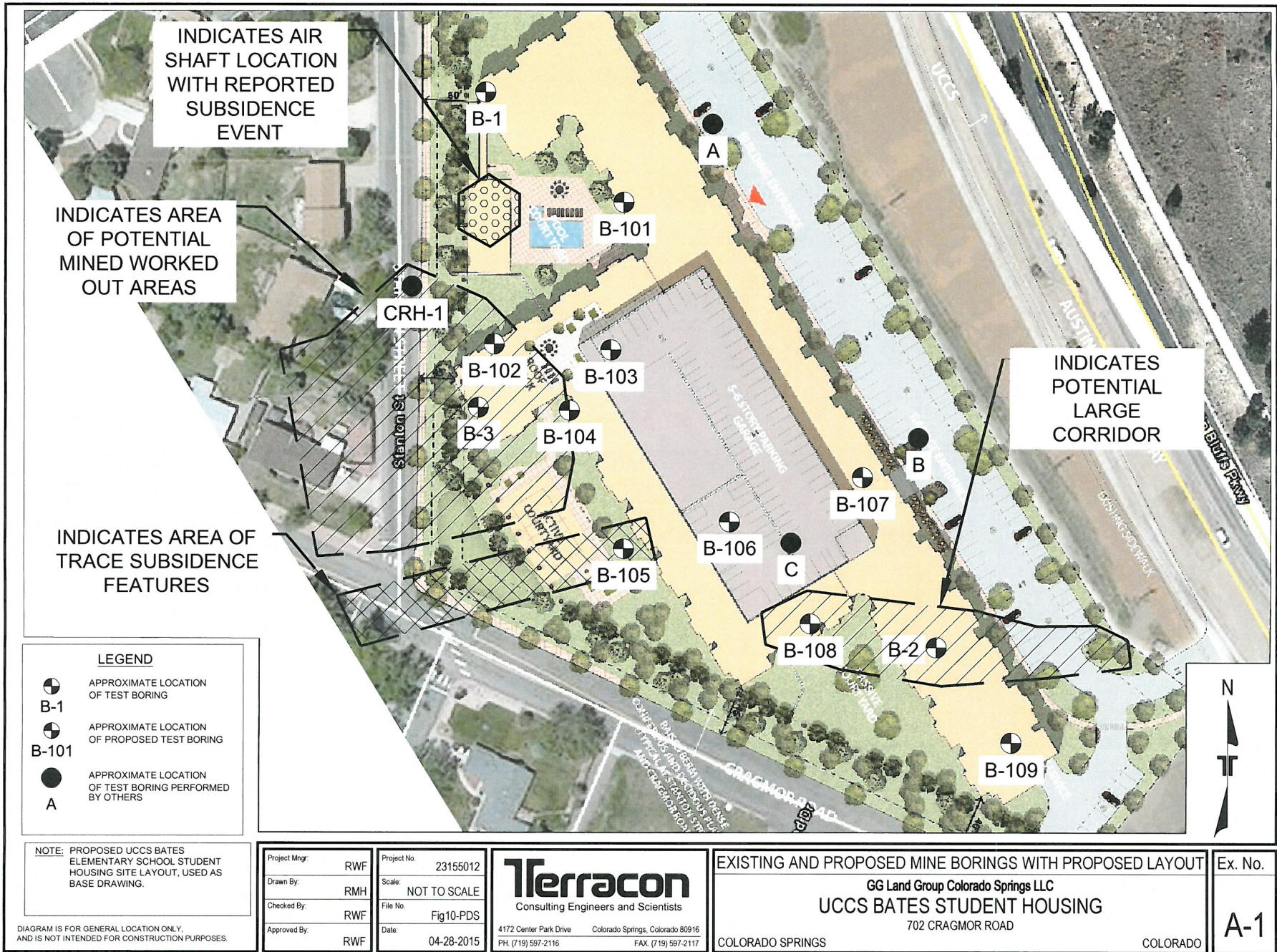


FIGURE 9

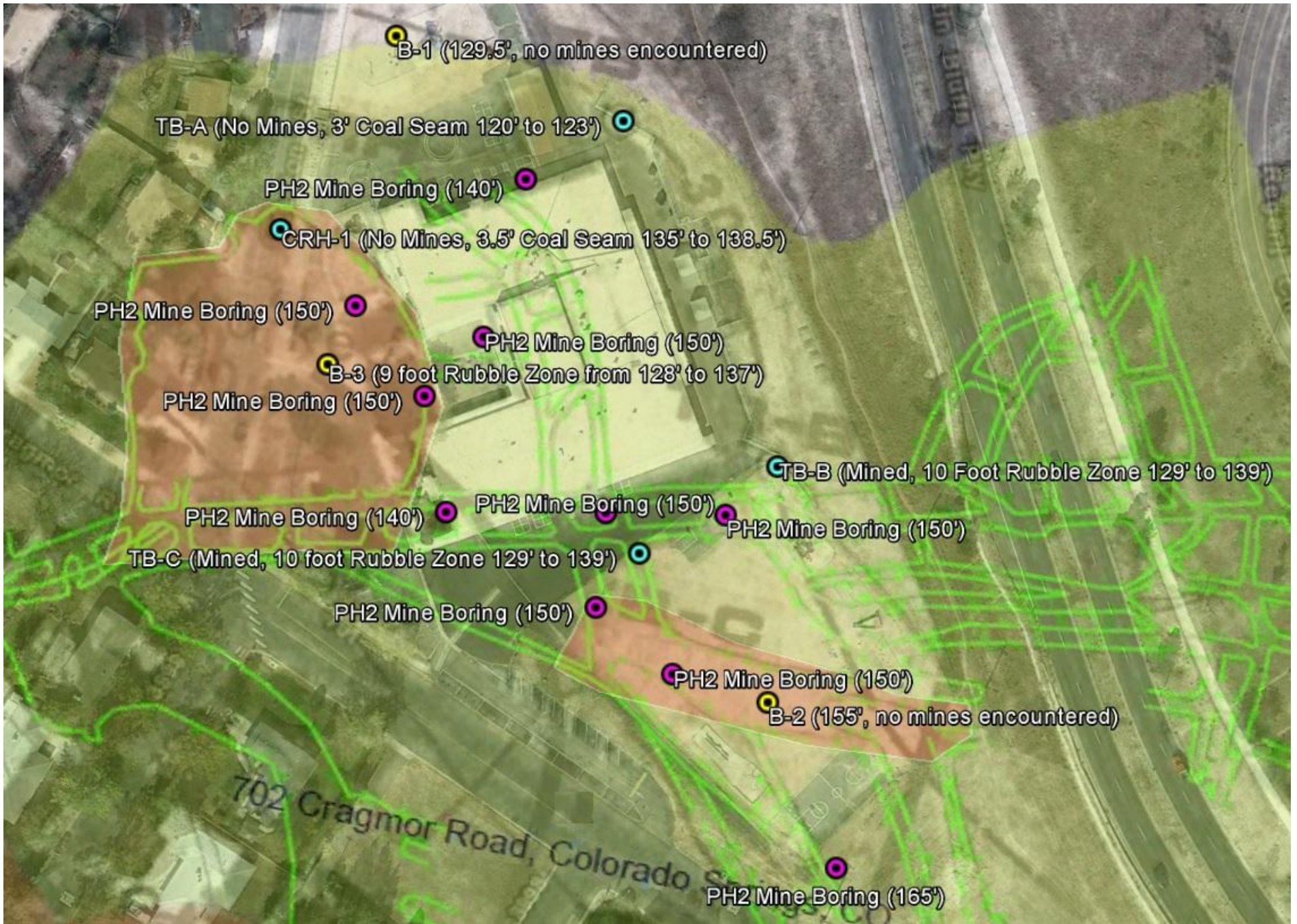


Exhibit A-2, Existing and Proposed Borings with Mine Map

FIGURE 9



Exhibit A-3, Existing and Proposed Borings with Proposed Building

FIGURE 9

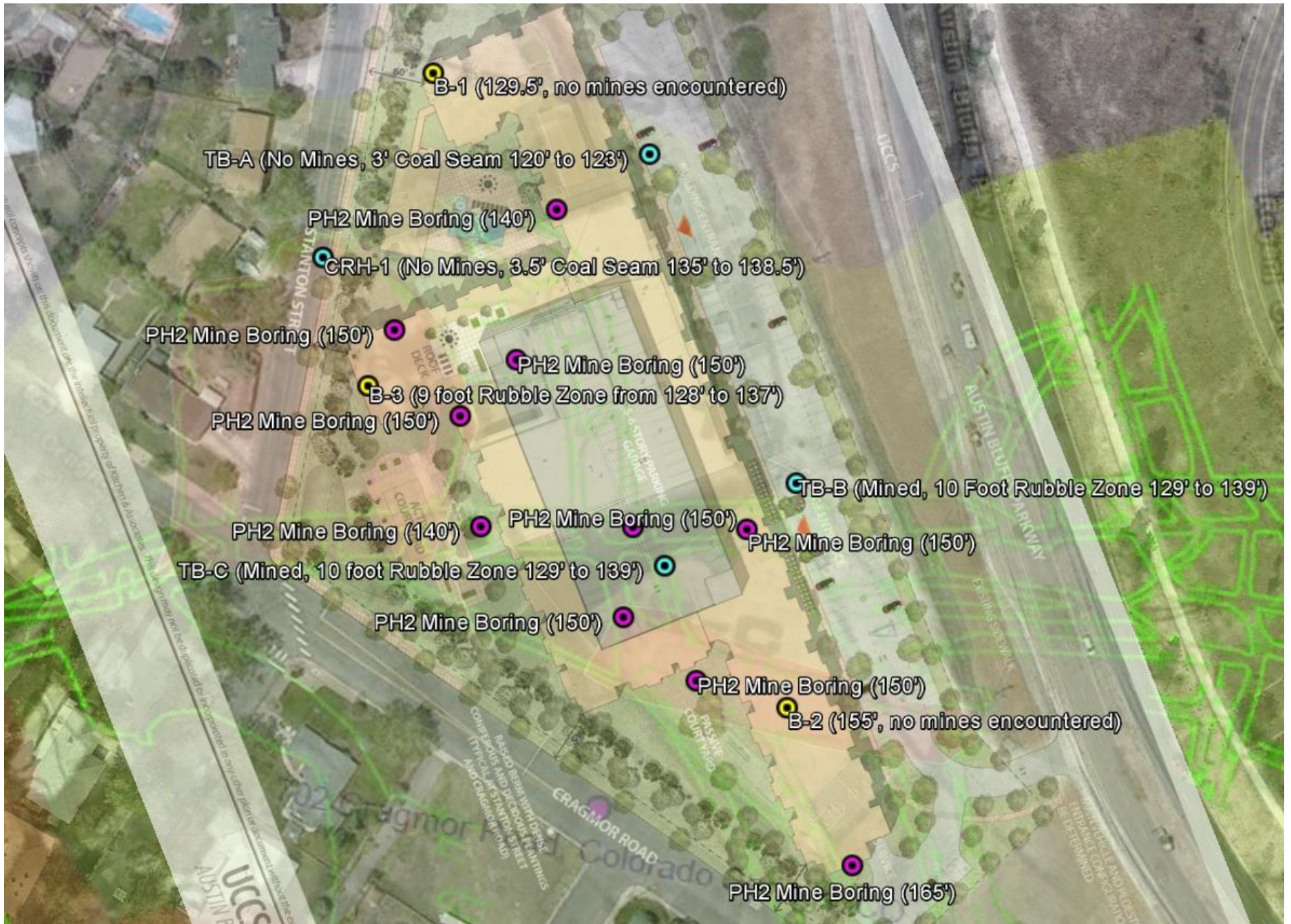


Exhibit A-4, Existing and Proposed Borings with Mine Map and Proposed Building

FIGURE 9