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April 10, 2013

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John Thompson
Thompson Holdings, LLC
P.O. Box 2015
Horsham, PA 19044

Subject: Paraiso Springs Resort – PLN040183
Stream Channel Modification

Dear John:

As a follow up to my Technical Memorandum entitled *Stream Setback Plan*, dated April 20, 2012 and based upon our site visit on March 28, 2013 with County Planning Department and California Fish & Wildlife staff, I offer the following observations and recommendations regarding stream bank modifications.

The existing stream runs west-to-east through the Project site. The upper half of the stream flows on a very intermittent basis with shallow water depths, as previously documented. In fact, it has been reported by on site personell that the stream has not flowed in almost 18 years. The existing stream capacity is estimated at approximately 4000 cubic feet per second (cfs); a one- hundred year storm event has been previously estimated to produce a post-Project flow rate of only 316 cfs, less than one tenth of the stream capacity.

The existing stream banks, in general, are heavily vegetated with native and non-native vegetation; vegetation is denser in the lower portion of the stream, where a small amount of hot-springs runoff flows constantly. Existing vegetation includes mature trees, shrubs and grasses/weeds. With the exception of those portions of the stream currently contained in culverts, the existing riparian vegetation provides a significant root structure that helps stabilize the stream banks and appears to have successfully limited stream bank erosion and migration for many years.

Due to the above-described stream bank conditions, I recommend that new erosion control measures, such as rock slope protection, be minimized and limited to the proposed stream crossings and proposed culvert removal areas. The existing riparian vegetation along the stream banks should be maintained as the primary erosion control feature for the rest of the

stream. The root mass of the mature existing trees and understory vegetation should remain effective in limiting channel bank erosion and should provide adequate protection for the proposed development.

In addition, rock slope protection or bio-mechanical erosion control measures should be employed at new bridge abutments and upstream and downstream of abutments for approximately 25 feet, to provide scour protection at these structures. The exact limits and type of scour protection will be based upon a bridge scour analysis completed during final design of the Project.

Finally, at locations where new buildings encroach within 50-feet of the existing top of bank, it is recommended that building foundations be evaluated, based upon site conditions at the time of final design and construction. It may be necessary to strengthen and deepen building foundations to provide additional protection from anticipated channel erosion or scour.

In summary, during final design of the Project, the erosion control measures identified above should be incorporated into the development for building encroachments within 50 feet of the top of stream bank.

Thank you.

Sincerely,

CH2M HILL Engineers, Inc.

David Von Rueden
Sr. Project Manager

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