Species Movement

VISTA CANYON RANCH

Los Angeles County, California

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Exhibits

PURPOSE

This document evaluates the need for a north-south species movement corridor through the proposed Vista Canyon Ranch project site. The project site is located immediately south of SR-14 and north of the Metrolink Railroad, between Fair Oaks Ranch and the Colony Townhomes and the Sand Canyon community in unincorporated Los Angeles County, directly adjacent to the City of Santa Clarita. The location of the project site is depicted in Exhibit A.

The project applicant, Vista Canyon Ranch, LLC, proposes to develop the approximately 185-acre project site with a mixed use, transit-oriented community consisting of the following:

- 1,021 attached, condominium units and 96 single-family residential units (a residential overlay could permit development of up to 1,350 residential units);
- up to 950,000 square feet of commercial floor area which would include office, retail, hospitality, entertainment and restaurant uses;
- neighborhood park ("Oak Park"), Town Green, Community Garden and various private recreational centers, as well as the associated roads, infrastructure, trails, and other amenities.

BACKGROUND

Our evaluation is supplemented by work completed by the California Wilderness Coalition, which began with the Missing Linkages conference on November 2, 2000, at the San Diego Zoo, San Diego, California, and culminated in regional designs for movement throughout California. The primary goal of the conference was a subjective attempt to identify linkages, potential linkages, and threats to linkages in each ecoregion of the state.

In general, a linkage is a feature that connects at least two blocks of habitat.[1, 2, 3, 4, 5] The assumed function of a linkage is to facilitate the movement of species between blocks of fragmented open space areas.[6, 7, 8] Participants of the Missing Links conference identified three types of linkage: (1) Landscape Linkage, (2) Connectivity Choke Point, and (3) Missing Link. A "Landscape Linkage" is a large regional corridor between blocks of habitat meant to facilitate species movement. This type of linkage may or may not be constricted, but is essential to maintain the connectivity function of a particular region. A "Connectivity Choke Point" is a narrow, often short, and impacted corridor between blocks of habitat. This type of linkage typically requires that species move through a choke point structure. Choke point structures include culverts, underpasses, overpasses, or tunnels that were not specifically

1 Hobbs, R. J., 1992. The Role of Corridors in Conservation: Solution or Bandwagon? Trends in Evolutionary Ecology 7(11):389-392
2 Hess, G. R., 1994. Conservation Corridors and Contagious Disease: A Cautionary Note. Conservation Biology 8(1):256-262
3 McEuen, A. 1993. The Wildlife Corridor Controversy: A Review. Endangered Species Update, 10, 11, &12
4 Beier, P. & S. Loe, 1992. A Checklist For Evaluating Impacts to Wildlife Movement Corridors. Wildl. Soc. Bull. 20:434-440
5 Harris, L.D., & P. Gallagher, 1989. New Initiatives For Wildlife Conservation: The Need For Movement Corridors, In Preserving Communities and Corridors. Defenders of Wildl., Washington D.C (G. Mackintosh ed.)
6 Rosenberg, D. K., B. R. Noon, and E. C. Meslow, 1997. Biological Corridors: Form, Function, and Efficacy. Bioscience: November: 677
7 Soule. M. E., 1991. Land Use Planning: Maintenance of Wildlife in a Fragmenting Urban Landscape. Journal of the American Planning Association, 199:312-322
8 Dorp, D.V., Schippers, P. & J.M. van Groenendael, 1997. Migration Rates of Grassland Plants Along Corridors in Fragmented Landscapes with a Cellular Automation Model. Lands. Ecol. 12 (1):39-50

designed for movement, but incidentally provide movement opportunities through otherwise impenetrable barriers.[9, 10] A "Missing Link" is a highly impacted area that provides limited or no movement between blocks of habitat.[11]

Regional Linkage Design

According to the California Wilderness Coalition, the project site is located in the northern portion of the "South Coast Ecoregion," which encompasses the Sierra Madre Mountains and Tehachapi Mountains to the north, the Antelope Valley, Little San Bernardino Mountains, Coachella Valley, and Imperial Valley to the east, Baja California, Mexico to the south, and extends west to the Pacific Ocean.[12] Participants of the Missing Linkages conference identified 69 potential or known linkages in the South Coast Ecoregion, including the Santa Clara River.

South Coast Wildlands, in partnership with numerous other agencies, used data provided by conference participants to develop "Regional Linkages" throughout the ecoregion. The regional linkages were developed based on the requirements of plants, invertebrates, amphibians, reptiles, birds, and mammals (small and large). There are no regional linkages on or adjacent to the project site; however, there are two regional linkages in the general vicinity.

The first regional linkage is the San Gabriel – Castaic Connector, a linkage connecting the Castaic Ranges of the Sierra Madre formation to the San Gabriel Mountains, both of which are part of the Angeles National Forest. This regional linkage is located approximately 2 miles east of the project site, east of the existing Sand Canyon community, and is described in a report titled, "South Coast Missing Linkages Project – Linkage Design for the San Gabriel – Castaic Connector," prepared by South Coast Wildlands.[13] A 2008 report titled, "East Santa Clarita Land Conservation Concept Plan and Implementation Strategy," prepared by The Riverside Land Conservancy and The Dangermond Group for the City of Santa Clarita, identified this regional linkage as one of the most threatened and the only chance for a connection to the coast between the San Gabriel and Castaic mountain ranges.[14] The San Gabriel – Castaic Connector is depicted on Exhibit B.

The second regional linkage in the vicinity of the project site is the Santa Monica - Sierra Madre Connector, a chain of linkages that connects the Santa Monica Mountains, the Simi Hills, the Santa Susana Mountains, and the Sierra Madre. This chain is located approximately 13 miles west of the project and is described in a report titled, "South Coast Missing Linkages Project – Linkage Design for the Santa Monica - Sierra Madre Connector," prepared by South Coast Wildlands.[15]

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9 Clevenger, A.P., B. Chruszcz, and K. Gunson. 2001. Drainage Culverts as Habitat Linkages & Factors Affecting Passage by Mammals. J. App. Ecol. 38:1340-1349
10 Forman, R.T., 2003. Road Ecology: Science and Solutions. Island Press: Washington, D.C.
11 Penrod, k., R. Hunter, and M. Merrifield, 2001. Missing Linkages: Restoring Connectivity to the California Landscape, Conference Proceedings. Co-sponsored by California Wilderness Coalition, The Nature Conservancy, U.S. Geological Survey, Center for Reproduction of Endangered Species, and California State Parks
12 California ecoregions are North Coast Ecoregion, Bay Area Ecoregion, Central Coast Ecoregion, the South Coast Ecoregion, Modoc Plateau and Cascades Ecoregion, Sierra Nevada Ecoregion, and the Mojave and Sonoran Ecoregions
13 Penrod, K., C. Cabanero, P. Beier, C. Luke, W. Spencer, E. Rubin. 2004. South Coast Missing Linkages Project: A Linkage Design for the San Gabriel – Castaic Connection. Produced by South Coast Wildlands, Idyllwild, CA
14 The Riverside Land Conservancy and The Dangermond Group, 2008. East Santa Clarita Land Conservation Concept Plan and Implementation Strategy
15 Penrod, K., C. Cabanero, P. Beier, C. Luke, W. Spencer, E. Rubin, R. Sauvajot, S. Riley, and D. Kamradt. 2006. South Coast Missing Linkages Project: A Linkage Design for the Santa Monica – Sierra Madre Connection. Produced by South Coast Wildlands, Idyllwild, CA

The Santa Clara River runs east – west, cutting through the north side of the project site. Within the project site, its northern bank is approximately 200 feet from SR-14. The Santa Clara River connects the two regional linkages described above. Where the Santa Clara River meets the regional linkages, it has been included within them. The regional linkages and the Santa Clara River connect portions of the Angeles National Forest and the open space that surrounds the City of Santa Clarita. Open space within and around the City of Santa Clarita is depicted in Exhibit C.

Vista Canyon Project Site

Conference participants identified the Santa Clara River as a landscape linkage and identified three potential choke point crossings east of the project site. The South Coast Wildlands did not identify the Santa Clara River as a regional linkage in itself; rather, they included portions of it within the San Gabriel – Castaic Connector and the Santa Monica - Sierra Madre Connector. The area of the Santa Clara River between I-5 and Sand Canyon Road is not included within the South Coast Wildlands' "regional linkages". However, the Santa Clara River, which flows east – west, clearly connects them. Also, South Coast Wildlands did not include the three choke point crossings identified by conference participants as part of the San Gabriel – Castaic Connector. Although the conference participants did not identify any other known or potential linkages occurring on the project site, the South Coast Wildlands report describing the San Gabriel – Castaic Connector includes an exhibit that depicts the Lost Canyon Road SR-14 Underpass as a "potential crossing structure"[16]. South Coast Wildlands believed there might be potential for movement from the project site to the north, in addition to the Santa Clara River east - west linkage. Neither conference participants nor South Coast Wildlands identified the area immediately south of the project site as a linkage.

East of the Project Site (Movement East Along the Santa Clara River)

To move east directly from the project site, species must move along the Santa Clara River. There are no other opportunities to move east from the project site, as it is directly adjacent to the community of Sand Canyon and other existing residential and commercial development at SR-14 and Sand Canyon Road. The Sand Canyon Road Bridge spans the Santa Clara River but does not present a physical barrier. Nor are there any other physical barriers that could preclude species movement from the project site east along the Santa Clara River. However, the existing bridge, homes, ranches, and commercial development create a connectivity choke point for terrestrial species. In many cases, this existing development forces terrestrial species into the active river channel, which most would not be able to use during infrequent major storm events. When dry or when average or smaller storm events occur, terrestrial species can move along the Santa Clara River toward the San Gabriel – Castaic Connector approximately 2 miles east of the project site. Upon reaching the San Gabriel – Castaic Connector, terrestrial species are able to move north or south throughout the Angeles National Forest.

16 Penrod, K., C. Cabañero, P. Beier, C. Luke, W. Spencer, and E. Rubin, March 2004. South Coast Missing Linkages Project: A Linkage Design for the San Gabriel-Castaic Connection. South Coast Wildlands, Idyllwild, CA

West of the Project Site (Movement West Along the Santa Clara River)

To move west directly from the project site, species must move along the Santa Clara River. Existing development blocks any other passage to the west. The numerous bridges that span the Santa Clara River do not present physical barriers. Nor are there other physical barriers that could preclude species movement from the project site west along the river. However, the bridges, homes, and commercial development along the river create connectivity choke points for terrestrial species, forcing them into the active river channel, which most would not be able to use during infrequent major storm events. When dry or during smaller storm events, terrestrial species can move from the project site, along the Santa Clara River, toward the South Fork of the Santa Clara River approximately 6.5 miles west, or toward San Francisquito Creek approximately 7 miles west, or under the I-5 approximately 8 miles west and toward the Santa Monica - Sierra Madre Connector, approximately 13 miles west. The South Fork of the Santa Clara River, San Francisquito Creek, and the Santa Monica - Sierra Madre Connector also connect the large blocks of habitat that surround the City of Santa Clarita.

Open areas adjacent to the Santa Clara River between I-5 and the project site are limited; residential and commercial development within the City of Santa Clarita dominate, offering very little opportunity for movement north and south away from the river. Where open areas exist and provide opportunities for movement away from the river, they dead-end into developed areas, forcing species to return to the river. For example, there is a large open area north of the Santa Clara River at Golden Valley Road; however, approved development on the north side of the River and recent development near the intersection of Plum Canyon Road and Santa Catarina Road will preclude further movement beyond the large open area. The utility corridor that extends north from this large open area is fenced where it meets Bouquet Canyon Road and Rosedell Drive. There is also a large open area south of the Santa Clara River near the intersection of Soledad Canyon Road and Bouquet Canyon Road; however, to access this area, species must cross 6-lanes of traffic on Soledad Canyon Road and a band of commercial development surrounded by fences. This property – the Whittaker/Bermite site -- is also approved for development.[17] Regardless, it is unlikely that species could negotiate the 6-lane Soledad Canyon Road (which is the primary east-west roadway in the Santa Clarita Valley) and the associated commercial development.

The only opportunities for movement away from the Santa Clara River between I-5 and the project site is via the South Fork of the Santa Clara River or San Francisquito Creek. Although numerous bridges cross the South Fork of the Santa Clara River and San Francisquito Creek, they do not present physical barriers to movement north and south away from the Santa Clara River. However, along the South Fork the bridges and bank protection design create connectivity choke points for terrestrial species forcing them into the active channel. Upland areas adjacent to San Francisquito Creek provide opportunities for movement outside its active channel and the bike trail may provide passage under bridges during major storms. As such, San Francisquito Creek appears better than the South Fork for movement.

17 City of Santa Clarita, Jeff Hogan, Senior Planner, Personal Communication via Glen Adamick

North of the Project Site

Because Lost Canyon Road is fenced immediately on the west and commercial development is immediately east, species using the Lost Canyon Road SR-14 Underpass to move north away from the project must first move a short distance along Lost Canyon Road. Upon reaching the end of Lost Canyon Road, species will find Soledad Canyon Road, a major highway. Beyond Soledad Canyon Road, there is a small open area to the northwest surrounded by residential development. To get to this area, species must cross 4-lanes of traffic on Soledad Canyon Road, which will be striped to six-lanes in the future.[18] If species are successful in crossing this road, they will find little in the way of cover or resources. The limited open areas are dominated by fuel-modified non-native grasses and are surrounded by development. Continuing northwest, species must move through a park, which also lacks cover. Species must then cross Sarita Avenue to reach a narrow open area located between single-family residences. This area is less than 20 feet (~ 6 meters) wide and about 800 feet (~ 244 meters) long.[19] If species can negotiate the narrow area, they will reach a larger open area that is also surrounded by residential development. To reach an extensive block of habitat beyond this open area, species must move north, find ways through the residential developments, cross 4-lane Sierra Highway, and negotiate a linear belt of commercial development that is surrounded by fences and walls. Exhibit D depicts the area north of the project site.

Most species are not expected to move through the Lost Canyon SR-14 Underpass; however, common urban adapted species, including raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*), may do so. The Lost Canyon Road SR-14 Underpass meets the definition of a missing link as defined by conference participants; it is a highly impacted area that provides limited or no movement between blocks of habitat.

South of the Project Site

In comparison to the north side of the project site, the current conditions on the south side of the project site are better for species movement. There are vacant, undeveloped properties and designated open space areas located between the existing homes within Sand Canyon and Fair Oaks Ranch south of the project site. Although the Metrolink Railroad is located between the project site and the vacant properties and designated open space, it does not pose a barrier to movement. A commercial horse ranch located immediately south of the project site appears porous; however, horses and ever-present activity (ranch hands, residents, etc.) likely push species around either side of the active portions of the ranch.

At its narrowest point, the distance between the homes in Sand Canyon and Fair Oaks Ranch is approximately 700 feet (~ 213 meters). If the irrigated and landscaped slope of Fair Oaks Ranch is included, the distance is approximately 1000 feet (~ 305 meters). The distance between Fair Oaks Ranch and the commercial horse ranch is 140 feet (~ 43 meters). Within this area, the horse ranch is cut into a slope, the Metrolink rail line cuts through a small hill, and there is an unpaved road and other areas that are devoid of vegetation. This development has created an island of native vegetation with steep, almost vertical drop offs, that likely limits movement in this area. The area

18 City of Santa Clarita General Plan
19 There is also a narrow area to the east; however, it is gated on its southern side.

between the horse ranch and the fence lines of the single-family homes in Sand Canyon to the east is approximately 650 feet (~ 198 meters). The east side of the horse ranch is wider and superior, from a species movement perspective, when compared to the west side described above. The area between the horse ranch and La Veda Avenue immediately to the east is approximately 600 feet (~ 183 meters). Exhibit E depicts the area south of the project site.

The author and Ron Francis detected evidence indicating that coyote, bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*) cross the rail tracks at the eastern end of the project site, generally in the area proposed for Oak Park.[20] Track studies conducted by the author in 2007 also indicate that raccoon and skunk cross the rail tracks. However, the author has not detected evidence indicating that this area has been used by mountain lion (*Felis concolor*). Based on experience and knowledge of mountain lion behavior, adult mountain lions may avoid using the undeveloped land and designated opens space south of the project site for movement due to the presence of adjacent existing development. Between 2003 and 2009, the author has conducted numerous surveys for other projects along the portion of the Santa Clarita River from Ventura County upstream to the location of the Golden Valley Bridge/Cross Valley Connector. The author has not detected mountain lions along or in any open areas adjacent to the Santa Clara River east of I-5 or at the project site. However, the author has detected numerous signs of mountain lions west of I-5, on either side of the Santa Clara River, and has observed individuals on two separate occasions. Published telemetry studies indicate that mountain lions typically avoid developed areas.[21, 22] Field evidence supports this and indicates that mountain lions avoid developed areas in the City of Santa Clarita. Even so, male juvenile mountain lions, other large mammals, and common urban adapted species may not be deterred by development.

If species move from the Angeles National Forest northbound through the project site to the Santa Clara River, they can then move east from the project site along the Santa Clara River; however, doing so returns them back to the same block of habitat. That is, they return to the section of the Angeles National Forest that is south of SR-14. Species starting from the Angeles National Forest south of the project site and travelling east would face fewer restrictions on movement by following Angeles National Forest all the way to the San Gabriel – Castaic Connector, without detouring through the project site and development along the Santa Clara River.

Alternatively, if species move from the Angeles National Forest northbound through the project site to the Santa Clara River, they could move west along the Santa Clara River. By moving west along the Santa Clara River, species can use the South Fork to move south back into the same section of Angeles National Forest, use San Fransquito Creek to move north into the other section of Angeles National Forest, or they may continue west, eventually crossing under I-5 and toward the Santa Monica - Sierra Madre Connector.

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20 Ron Francis observed a bobcat at the cluster of coast live oak (Quercus agrifolia) near the eastern end of the project site on January 8, 2008. Although Mr. Francis did not determine whether the bobcat crossed the rail tracks, it moved in that direction.
21 Beier, P., 1993. Determining Minimum Habitat Areas and Habitat Corridors for Cougars. Conservation Biology 7(1):94- 108
22 Beier, P., 1995. Dispersal of Juvenile Cougars in Fragmented Habitat. J. Wildl. Management 59(2):228 -237

Although opportunities exist for movement of species through the project site, there are better alternatives. For example, for species to move from the Angeles National Forest northbound through the project site to the Santa Clara River and then move west, they must travel approximately 10 miles to cross under the I-5; however, species moving west from the Angeles National Forest, without travelling north through the project site, need only travel 5 miles to cross under the I-5. Not only is the latter route shorter, but it is also wide open with little to no development. Similarly, if species move east from the Angeles National Forest towards the San Gabriel – Castaic Connector without travelling north through the project site, they will also travel a shorter route through an area that is wide open with little to no development.

Other Considerations

The project applicant proposes to maintain and enhance the Santa Clara River corridor through the project site. From the project site, movement can occur east or west along the Santa Clara River. The value of the Santa Clara River is clear; species can move the entire length of the river and some terrestrial species would only be precluded from doing so during infrequent major storm events. However, in determining the value to species movement of the north/south movement corridor from the River through the project site, edge effects must be considered.

Edge effects are the result of two or more contrasting environments on an ecosystem. Noise, lights, pets, people, and vehicles are major factors contributing to edge effects. For example, many species move at night and will avoid areas that have artificial lighting. Noise disturbance caused by intense human activity also tends to discourage species movement through areas surrounded by development.

On the project site, the author has observed off-road vehicle use, camping (homeless), gatherings, other unauthorized activities, and illegal dumping, which intensifies at night. All of these unauthorized uses are common on vacant, undeveloped land surrounded by development. South of the project site, edge effects on species movement result from development in Fair Oaks Ranch, development within Sand Canyon, and the commercial horse ranch located between the two. Upon completion, Fair Oaks Ranch is expected to consist of approximately 1,800 residential units. The Sand Canyon community will also continue to develop over time. The edge effects associated with noise and light alone in these two communities may preclude adult mountain lions from using the vacant land and designated open space south of the project site to move between the Angeles National Forest and the Santa Clara River; as discussed, adult mountain lions avoid developed areas. Edge effects also exist along the portion of the Santa Clarita River between the project site and I-5, along the South Fork, and to a lesser extent San Francisquito Creek

Species moving through the vacant lots and designated open spaces south of the project site increase the risk of detrimental interactions with people and their pets. Large species that move through city areas often find themselves cornered, which can result in the individual being shot and killed or tranquilized and relocated. Coyotes are a source of controversy; they often enter residential areas and take cats and dogs and a recent news program reported an

attack on a child in Orange County. While conducting surveys within the active channel of the Santa Clara River between the I-5 and the Golden Valley Connector during 2008, the author encountered a coyote. Animals typically have a healthy fear of humans; however, the individual encountered that day displayed no fear and in fact began yelping and moving towards the author, resulting in the author having to back out of the active channel. This behavior indicates that coyotes using the Santa Clara River are brazen and less fearful of humans. This behavior is learned and is cause for concern. Mountain lions are also a source of controversy. In the majority of attacks on people, the offending animals are male juveniles.[23] Although adult mountain lions may avoid use of the area south of the project site, male juveniles have potential to move through it when forced out of their natal area by adults.[24, 25]

The potential for development of the vacant lots to the south should also be considered. Most of the vacant land within Sand Canyon south of the project site is under private ownership and will likely be developed consistent with zoning standards in the future, unless a public agency or conservation organization acquires the properties. Most of this land, zoned A-1-2, would permit residential development. This zoning designation may also increase the density of development in Sand Canyon through the subdividing of existing developed parcels.

According to the "South Coast Missing Linkages Project – Linkage Design for the San Gabriel – Castaic Connector" report, California's High Speed Rail may also be constructed south of the project site. According to the report, fences will be installed where it occurs above ground. Construction of this High Speed Rail line will preclude movement between the Santa Clara River and the Angeles National Forest via the project site.

CONCLUSION

From the project site, species are not expected to move north. The Lost Canyon Road SR-14 Underpass is a missing link. Although existing development along the Santa Clara River create chokepoints in some areas, species can negotiate the length of the river, moving east or west, and eventually reach the Angeles National Forest and other open space that surround the City of Santa Clarita. Evidence suggests that deer, raccoon, skunk, bobcat, and coyote currently move south from the Santa Clara River through the project site to Angeles National Forest and vice versa. Based on the amount of species documented in the Biological Assessment, movement of other species undoubtedly occurs; however, edge affects associated with Fair Oaks Ranch are as yet to fully unfold and future development in Sand Canyon could also limit north/south movement. Currently, species moving between the Santa Clara River and the Angeles National Forest via the project site, are more likely to move through the area on the east side of commercial horse ranch rather than the area on its west side.

The only substantial areas within the City of Santa Clarita that allow for movement away from the Santa Clara River are the South Fork and San Francisquito Creek. In the past, land owners, primarily Newhall Land, have been required to set aside open areas adjacent to the Santa Clara River as upland buffers with the intent that they would

23 Busch, R. H., 1996. The Cougar Almanac: A Complete Natural History of the Mountain Lion. New York: Lyons and Burford
24 Beier, P., 1993. Determining Minimum Habitat Areas and Habitat Corridors for Cougars. Conservation Biology 7(1):94- 108
25 Beier, P., 1995. Dispersal of Juvenile Cougars in Fragmented Habitat. Journal Wildlife Management 59 (2):228 -237

facilitate movement along the Santa Clara River and provide areas of refuge during major storms. This development pattern is also evident along San Francisquito Creek.

Decision makers routinely set aside areas as movement corridors without identifying the specific blocks of habitat to be connected and often without regional perspective.[26] Given the proximity of the project site to the San Gabriel – Castaic Connector, and the existing functions of the Santa Clara River, the South Fork, and San Francisquito Creek, it may be preferable to encourage species movement around developed portions of the City of Santa Clarita rather than through them. Species should only be encouraged to move through this portion of the City of Santa Clarita via the Santa Clara River, the South Fork of the Santa Clara River, and San Francisquito Creek. Given efforts by South Coast Wildlands and the City of Santa Clarita to foster the preservation of the regional linkages, and the fact that the Santa Clara River connects two of them, it may be preferable to have all project open space set aside adjacent to the Santa Clara River as presently proposed by the project applicant.

Alternatively, if open space is to be set-aside for north/south movement between the Santa Clara River and the Angeles National Forest within the project site, the open space should be located on the east side of the project site, east of the commercial horse ranch. This area is wider and has more cover than the west side of the commercial horse ranch, and it is currently utilized by certain common species. Monica Bond of The Center for Biological Diversity suggests that corridors must be a minimum of 1,000 feet wide.[27] Bentrup suggests a minimum width of 100 feet for plants, invertebrates, reptiles, amphibians, and for birds that use habitat edges, a minimum width of 200 feet for small mammals and birds that use habitat interiors, and a minimum width of 330 feet for large mammals.[28] Paul Edelman of the Santa Monica Mountains Conservancy has in the past recommended corridor widths of at least 300 feet.[29] Other reports recommend corridors less than 200 feet in width.[30, 31] In general, the wider, the better.[32] Wide corridors provide greater habitat area with reduced edge effects, while generally promoting more opportunities for species movement.

As discussed, the narrowest point between the horse ranch and La Veda Avenue is approximately 600 feet. The proposed project includes Oak Park, which is to be located near the east side of the project site. If current function is to be maintained, Oak Park should be at or near 600 feet in width, and be aligned with the open area between the horse ranch and Sand Canyon. However, as indicated above, a smaller corridor width of approximately 300-400 feet could accommodate movement of the expected species.

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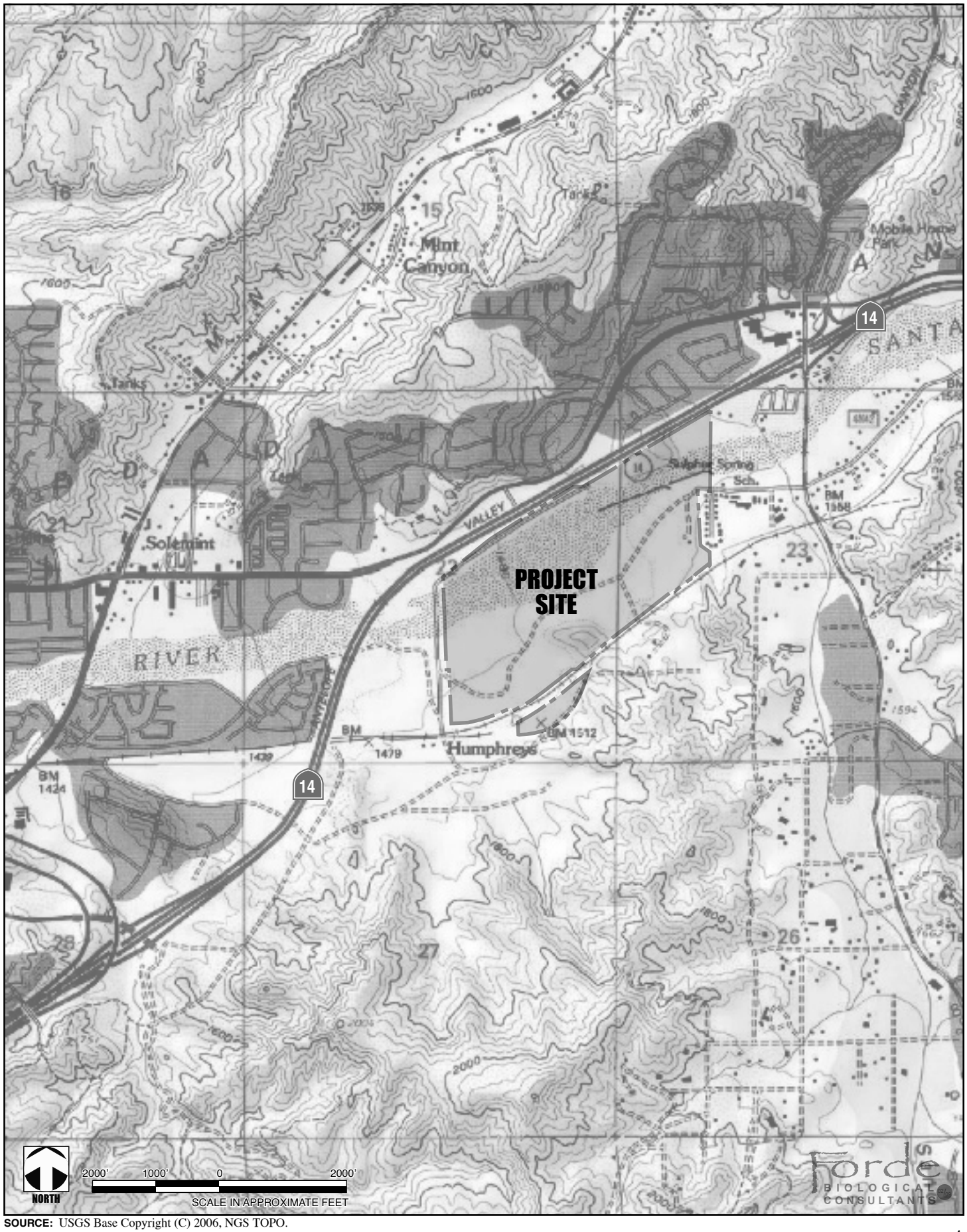
26 Beier, P. & S. Loe, 1992. A Checklist For Evaluating Impacts to Wildlife Movement Corridors. Wildl. Soc. Bull. 20:434-440
27 Bond, M., 2003 Principles of Wildlife Corridor Design. The Center for Biological Diversity
28 Bentrup, G. 2008. Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways. Gen. Tech. Rep. SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station. 110 p.
29 Paul Edelman 2001. Letter to City of Malibu Planning Department, Tentative Tract Map No. 52487
30 De Chant, T. 2007. A Future of Conservation. Northfield Habitat Corridors Community Plan, Northfield, Minnesota.
31 Indiana Department of Natural Resources, 2004. Wildlife Corridors. Indiana Department of Natural Resources, Division of Fish and Wildlife
32 Fluery, A.M. & R.D. Brown, 1997. A Framework for the Design of Wildlife Conservation Corridors with Specific Application to Southwestern Ontario. Landscape & Urban Planning 37:163-186

In addition to a typical neighborhood park, Oak Park should include appropriate habitat types (oak woodland, coastal sage, and grassland), be designed so that the majority of movement occurs through its center, and include features that preclude or minimize human and pet interaction with its center. These habitat features should also be designed to deflect movement of large mammals away from the edges and back to the center of Oak Park. An acceptable crossing under Lost Canyon Road should also be incorporated into the corridor to provide direct access to the Santa Clara River.

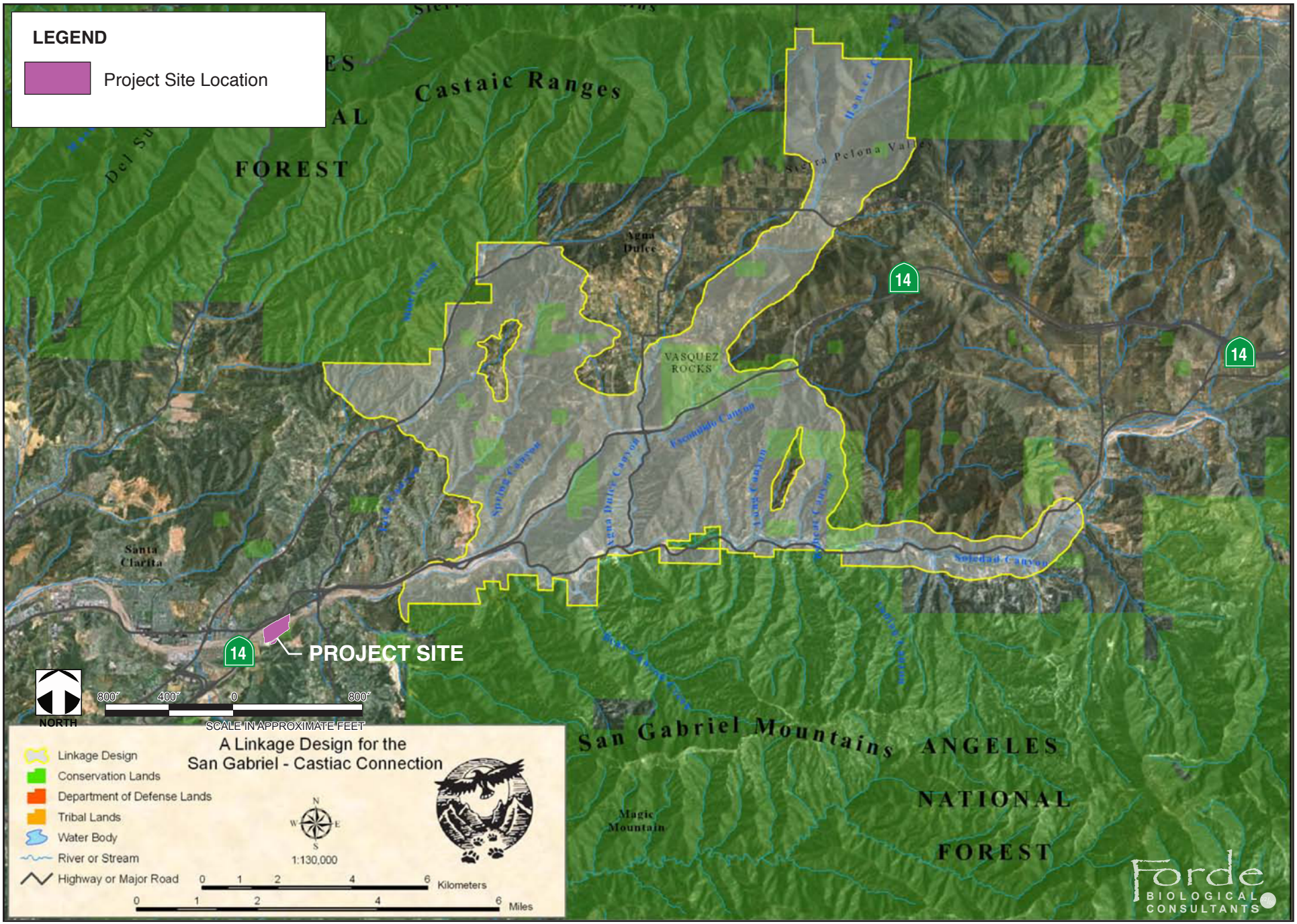


SOURCE: USGS Base Copyright (C) 2006, NGS TOPO.

exhibit A

Project Location on USGS Quad

Vista Canyon Ranch – Species Movement, July 27, 2009

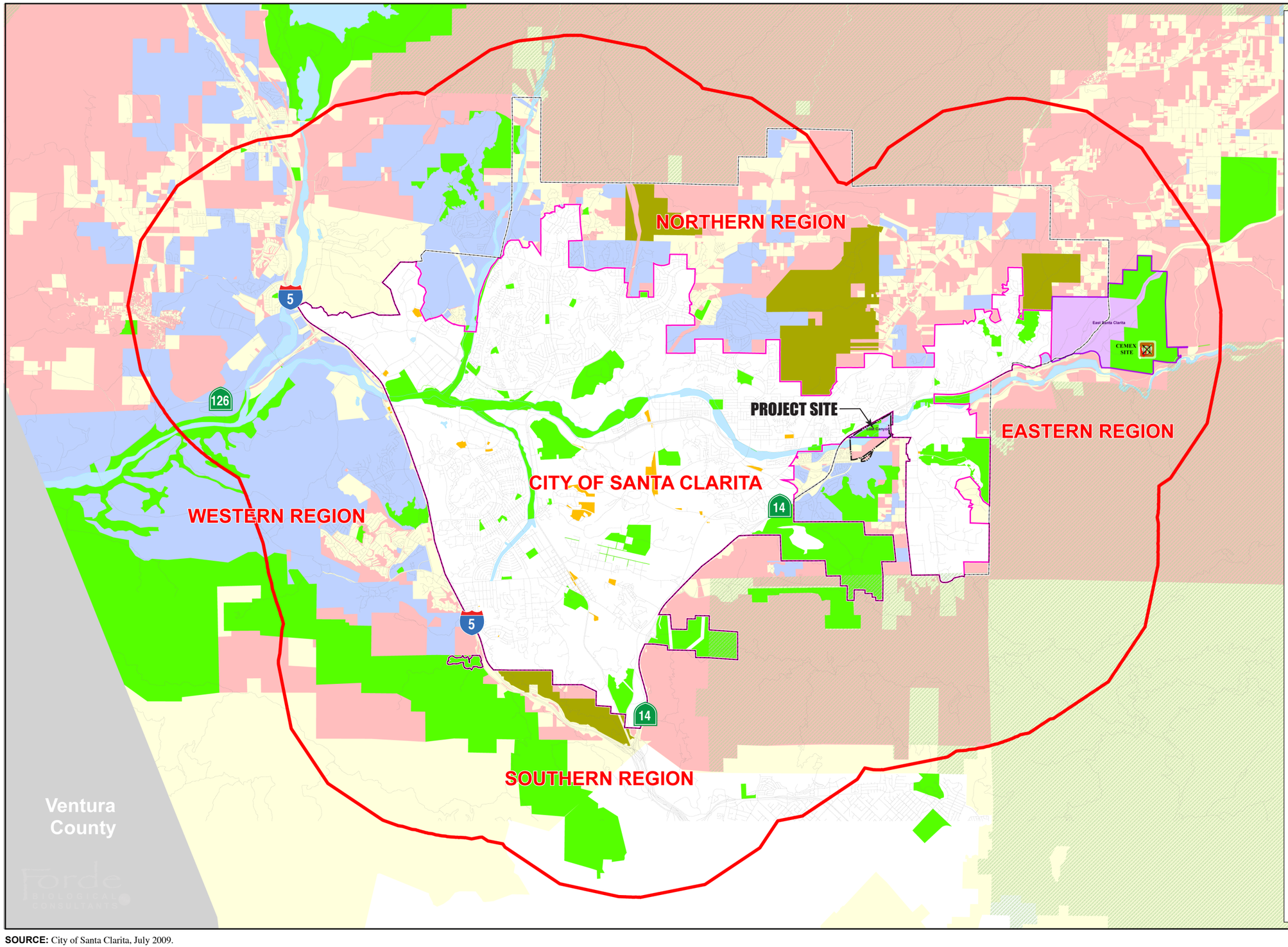


SOURCE: South Coast Missing Linkages Project: A Linkage Design for the San Gabriel-Castaic Connection. South Coast Wildlands, Idyllwild, CA. www.scwildlands.org

exhibit ***B***

Regional Linkage Map: San Gabriel – Castaic Connects

Vista Canyon Ranch – Species Movement, July 27, 2009

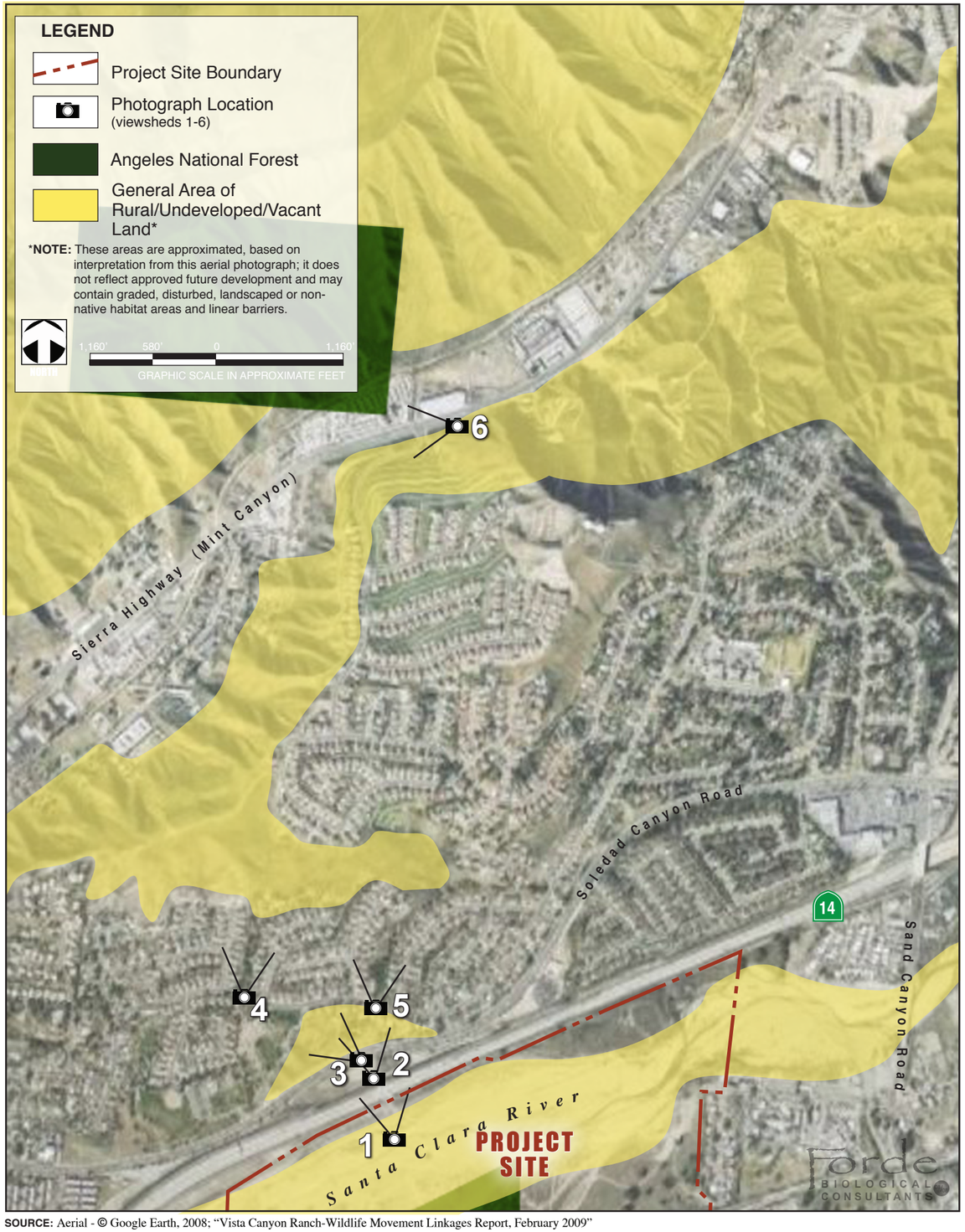


SOURCE: City of Santa Clarita, July 2009.

exhibit **C**

Surrounding Regional Open Space

Vista Canyon Ranch – Species Movement, July 27, 2009

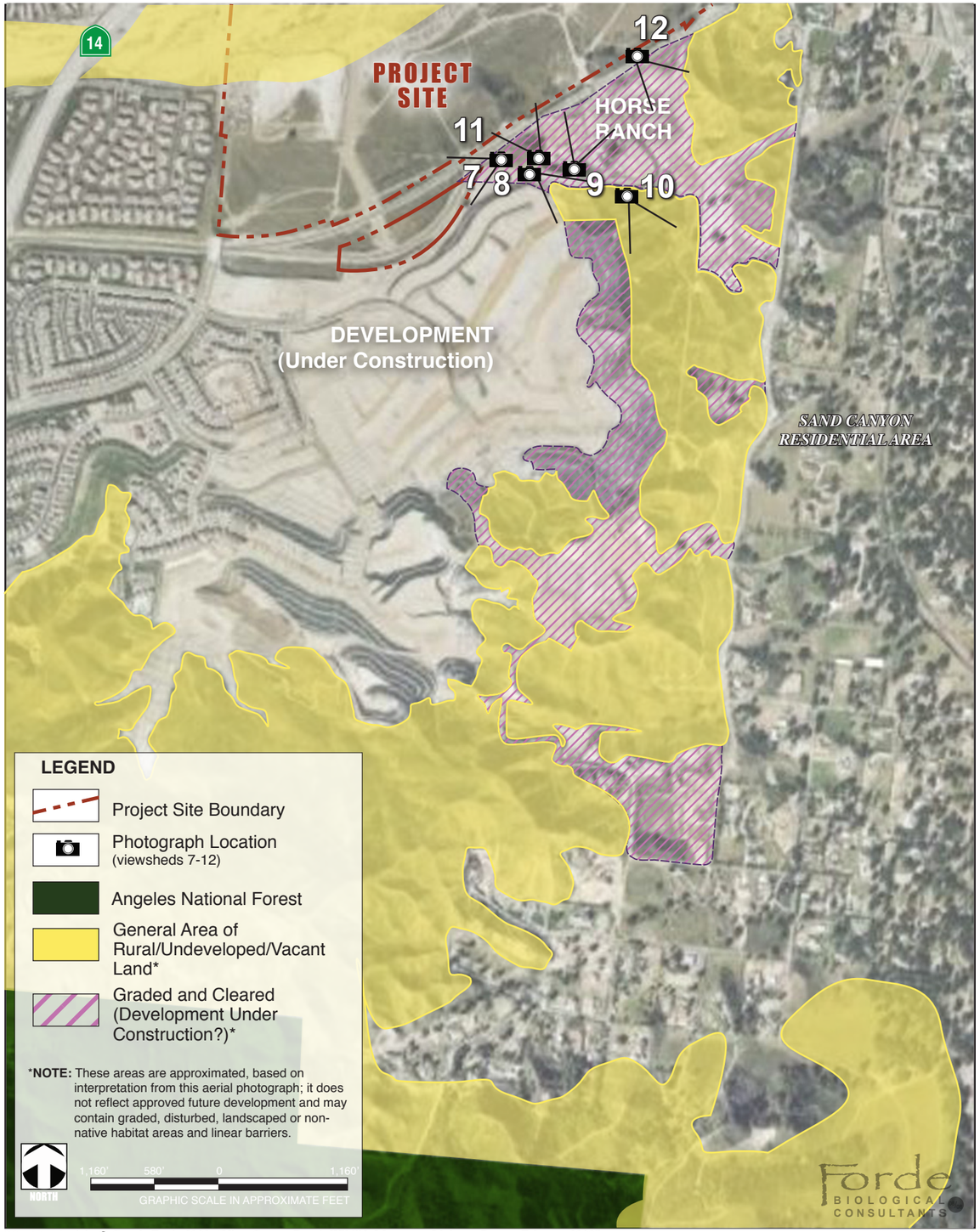


SOURCE: Aerial - © Google Earth, 2008; "Vista Canyon Ranch-Wildlife Movement Linkages Report, February 2009"

exhibit ***D***

Photograph Locations – North Section of Project

Vista Canyon Ranch – Species Movement, July 27, 2009



SOURCE: Aerial - © Google Earth, 2008; "Vista Canyon Ranch-Wildlife Movement Linkages Report, February 2009"

exhibit ***E***

Photograph Locations – South Section of Project

Vista Canyon Ranch –Species Movement, July 27, 2009