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Subject: Roadway Evaluation for Cobb Road from Rattlesnake Bridge to APN 208-341-016

Introduction

On January 20th, 2018, DTN Engineering & Consulting (Engineer) performed a roadway evaluation for Margro Advisors (Client) upon request from the property owners along Cobb Rd from Rattlesnake Bridge to APN 208-341-016.

Cobb Road, located off State Highway 36, was created as part of the Cobb Station Subdivision Map, recorded as Tract No. 289 in Book 19 of Maps, pages 27-33, Humboldt County Records, and provides access to multiple parcels. This Road Evaluation Report covers a portion of Cobb Road lying within Sections 1 and 12, T. 1 N., R.5 E., Humboldt Base & Meridian.

Currently the Client is evaluating with the resident's, methods for achieving a collaboration in repairing and maintaining Cobb Rd. One perspective currently being evaluated is a Road Maintenance Agreement (RMA). Additionally, the Client is working with a number of the Residents in securing their Humboldt County Commercial Medical Marijuana Permits. This road evaluation does not address those situations, rather it's focus is on the actual roadway prism and the erosion occurring due to drainage coming into the roadway prism naturally and from unstabilized slopes.

This road evaluation is not intended as a document for design or design criteria but is intended to help the residents understand the scope of work required and estimates of probable costs associated with construction only, design and permitting costs are assumed to be 10% of construction.

Cobb Road is not in compliance as described in Title III – Land Use and Development, Division II, Fire Safe Regulations (Ordinance) as a Category 4 roadway, but with improvements can be considered a Category 4 equivalent roadway. This road evaluation is not intended to address the Humboldt County Commercial Medical Marijuana requirements for a Category 4 equivalent roadway, but the improvements recommended for safety and drainage will accommodate the County requirements for an equivalent Category 4 roadway.

The driveways mentioned in this report haven't been evaluated in accordance with the Ordinance and only the potential issues with stopping site distance (SSD) will be mentioned.

The existing site conditions for the evaluated roadways in this Technical Memorandum consists of hilly terrain, with one Streamside Management Area (SMA), (Exhibit B) Class I creeks that are tributary to the Van Duzen River, high seismic instability (Exhibit C), there are no historic landslides mapped in that area, there are no grades exceeding 15% (Exhibit B), the speed limit on named roadways is 25 MPH and in most locations sight conditions limit the speed a vehicle can safely travel is 10-15 MPH. By count there are currently 14 parcels that are within the scope of this evaluation that has access off of Cobb Rd. Past the evaluation area Cobb Rd continues past the evaluation area and provides access to other parcels.

Roadway Evaluation

Pictures 1-3

The road evaluation begins at the gated entrance to Cobb Rd and the intersection of Rattlesnake Bridge (Pictures 1-2). At this location Cobb Rd. is within the SMA and an unidentified culvert conveys water under Cobb Rd. The roadway at this location is 16 feet wide and the grade abruptly increases to approximately 8% past the gate. As Cobb Rd proceeds to the southeasterly direction the first culvert is encountered (Picture 3). The culvert is an 18 inch CMP culvert in poor condition that is supplied by a drainage way. This culvert has previously been blocked due to sediment traveling downslope from the unstabilized PG&E easement.

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert and construct an approved turnout in accordance with the Humboldt County Ordinance for California Fire Safe Regulation. In order to prevent this culvert from clogging in the future, stabilize the PG&E easement, create a little ponded rocky area at the inlet of the culvert for sediment to settle out, and possibly increase the culvert diameter to 24 inches. Reestablishment of the existing roadside ditches are also recommended.

Pictures 4-8

Proceeding southeasterly up grade at approximately 8%, the first curve in the roadway is encountered (Pictures 4 & 5). As shown (Picture 5), there is sufficient space for two vehicles to pass, but as with the case of all pull outs at curves evaluated on Cobb Rd, they aren't in accordance with the Humboldt County Ordinance for California Fire Safe Regulation for turnouts (Exhibit D). The width

of the roadway at the turnout is approximately 16 feet and at both end of the curve the width narrows to 11.5 feet. The pictures depict erosion occurring at the edge of the inside of the curve eroding the toe of the slope. In addition, Google Earth shows a drainage developing due to the clearing in the PG& E easement above the road, this is also contributing to the erosion on the upslope side of the curve.

Proceeding southeasterly, the next curve is encountered (Picture 6) and as shown in the picture there are no turnouts, preventing the safe passage of two vehicles. At this location a 12 inch culvert exists, but at one point it was blocked and water cascaded over the road and over the downslope side of the hill (Picture 8). On the Google Earth image, the water overtopping the road is shown as well. Also, on the Google Earth image a drainageway is developing to the north, due to the clearing in the PG&E easement above the road.

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert. In order to prevent this culvert from clogging in the future, stabilize the PG&E easement, create a little ponded rocked area at the inlet of the culvert for sediment to settle out, and possibly increase the culvert diameter to 24 inches. Also, construct turnouts in accordance with the Humboldt County Ordinance for California Fire Safe Regulation at the curve. Reestablishment of the existing roadside ditches are also recommended.

Pictures 9-11

Continuing southeasterly, the first driveway is encountered (Picture 9), and just passed that driveway (Picture 10), a curve is encountered with a slope of approximately 7% upslope from the driveway. The driveway as shown (Picture 9), is steep as it intersects Cobb Rd without appropriate SSD in accordance with Humboldt County Standards for Commercial Rural Driveway (Exhibit D). Looking northeasterly (Picture 11), the upslope side of the road embankment is sloughing and as described below in sections Pictures 12-14 & 57-59, the unstabilized graded flats above the roadway on APN #208-341-011, are creating erosion and runoff coming down the hillside. The erosion is also impacting and on the inside edge of the roadway curve the runoff is eroding the toe of the slope as shown (Picture 11), causing sloughing of the hillside. The grade upslope is approximately 7%. At the drive the width of the roadway and flat area is approximately 18 feet narrowing down to 14 feet (Picture 10). At either end of the curve the roadway narrows down to 11.5 feet.

At this specific location it is recommended to improve the existing driveway for compliance with Humboldt County Standards for Commercial Rural Driveway. It is

also recommended to stabilize the sloughing of the north road embankment with engineered fill and appropriate slope armoring.

Pictures 57-59

Continuing southeasterly a previously blocked and undersized 12 inch CMP culvert exists (Pictures 57-59). Because of the erosion coming off the hillside from the graded flat above, the carried sediment is clogging the culvert forcing water over the road. One of the residents living below that part of the road has constructed a dam to prevent water from overtopping the road onto their property (Picture 57). The roadway at this location is approximately 12 feet wide with 1 foot shoulders and the roadway has minimal slope at this location.

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert. The drainage issues with APN #208-341-011 are impacting Cobb Rd and the parcels downslope. With that APN securing a permit through the Humboldt County Commercial Medical Marijuana Ordinance, the conditions of that permit should address the erosion and drainage issues created by clearing and grading the flats without proper permits and engineering. It is recommended that a site evaluation to be performed as soon as possible to begin remediation of the issues impacting the roadway. Reestablishment of the existing roadside ditches are also recommended.

Pictures 12-17

Continuing southeasterly, coming upon the horseshoe curve at APN #208-341-011 (Picture 12), which depicts the second driveway encountered. This driveway as shown also does not meet Humboldt County Standards for Commercial Rural Driveway for SSD at driveways intersecting roadways. The roadway width around the horseshoe curve expands from 12 feet at the beginning of the curve travelling southeasterly. Significant drainage is entering the roadway from the graded flat on APN #208-341-011 and is eroding the inside toe of the slope creating erosion issues, sloughing of the hillside as described in section Pictures 9-11, and the blocked culvert described in section Pictures 57-59. The roadway around the curve expands to approximately 18 feet wide with a driveway that appears to be in conformance with Humboldt County Standards for Commercial Rural Driveway is encountered with a sufficient turnout space exists allowing two vehicles to pass at the same time. After the driveway the roadway narrows in width back to approximately 12 feet with a grade of 6% approaching the next curve (Picture 22). Looking northwesterly (Picture 17) the next curve is encountered and a pull out does exist for a car to pull out, but it is placed on the opposite side of travel as the curve is approached.

At the specific location shown (Picture 17) it is recommended to construct a turnout on the north side of the roadway in compliance with Humboldt County Ordinance for California Fire Safe Regulation. A large part of the erosion and drainage issues identified in sections Pictures 9-11, Pictures 57-59, and Pictures 12-17, have been created by APN #208-341-011 due to clearing and grading for flats without proper slope stabilization. Reestablishment of the existing roadside ditches are also recommended.

Pictures 18-21

This section evaluates part of the PG&E easement clearing along with a water tank placed on the edge of a slope, along with drainage and erosion issues. The tank is shown looking downslope, Picture 25 in section Picture 22-25 below. Erosion is occurring (Pictures 19 & 20) due to un-stabilized slopes that have been created by the clearing of the PG&E easement. A 12 inch culvert that appears partially blocked (Pictures 18 & 21) on the intake side exists. There is a steel delineator marking the inlet of the 12 inch culvert (Picture 21).

At this location it is recommended to coordinate with PG&E regarding to legal responsibility for maintaining environmental control over the easement. Also, it is recommended to replace the existing culvert with a new minimum 18inch culvert.

Picture 22-25

Continuing northwesterly, the next curve and culvert location is encountered (Pictures 22-25). As depicted (Picture 22) there is a narrow turnout allowing two vehicles to pass around the curve. Additionally, there is erosion and drainage occurring downhill due to the 12 inch culvert being blocked in the past as well as the ditch on either side of the road being congested with debris. The roadway before and after the curve is approximately 12 feet with clogged ditches on either side of the traveled way. The slope of the road is approximately 8%.

At this specific location it is recommended to replace the existing culvert with a new minimum 18inch culvert and construct a turnout at the curve in accordance with the Humboldt County Ordinance for California Fire Safe Regulation. Reestablishment of the existing roadside ditches are also recommended.

A tank was identified above on the edge of a slope (Picture 25). It is recommended to evaluate the existing slopes, the load that the tank is placing on those slopes and take remediation measures as necessary including the possibility of relocating the tank.

Picture 26&27

Continuing around the next horseshoe curve, a 12 inch culvert is encountered (Pictures 26 & 27). This culvert is discharging at a steep slope down hill (Picture 27) and without armoring the drainage is causing erosion. The roadway here is approximately 12 feet wide and the grade approaches 5% approaching the next curve.

At this specific location it is recommended to replace the existing culvert with a new minimum 18inch culvert.

Picture 28-32

Continuing northeasterly around the next curve, another driveway is encountered at the midpoint of the curve, and the driveway appears to meet Humboldt County Standards for Commercial Rural Driveway. The roadway at this location is 18 feet wide sloping gently, allowing two vehicles to pass.. The width of the roadway before and after the curve are 12 feet with a 5% grade approaching (Picture 28) and a 3% slope departing the curve (Picture 29). A 12 inch culvert exists (Pictures 30 & 31).

At this specific location it is recommended to replace the existing culvert with a new minimum 18inch culvert and construct a turnout at the curve in accordance with the Humboldt County Ordinance for California Fire Safe Regulation. Reestablishment of the existing roadside ditches are also recommended.

Picture 33 & 34

At this location a gated drive (Picture 33), exists on the southside of the roadway and the northside of the roadway (Picture 34), exists a drive that is steep and carrying drainage and erosion onto Cobb Rd. The roadway width at this location is 12 feet at a 3% grade and erosion is occurring along the north side of the road, eroding the toe of the slope creating a potential sloughing situation on the hillside.

At this location a specific recommendation to stabilize the driveway at this location and construct a grated 18inch CMP pipe parallel to Cobb Rd to capture drainage from the driveway and convey it downhill minimizing erosion. Reestablishment of the existing roadside ditches are also recommended.

Picture 35-39

Continuing southeasterly around the next curve (Picture 38 & 39), the curve does have a pull out allowing two vehicles to pass. At this location the roadway widens to from 12 feet at 4% grade to 18 feet at the next driveway, which appears to be in conformance with Humboldt County Standards for Commercial Rural Driveway. Drainage appears to be coming off of the driveway serving APN #208-341-005,

flowing southwesterly along the toe of the slope eroding away the toe and creating a sloughing situation (Picture 39).

At this specific location it is recommended to construct a turnout at the curve in accordance with the Humboldt County Ordinance for California Fire Safe Regulation and to reestablish the roadside ditches are also recommended.

Picture 40 & 41

At this location a 12 inch CMP culvert exists. The roadway is 12 feet wide and the grade is gradual at approximately 3%.

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert. Reestablishment of the existing roadside ditches are also recommended.

Picture 42-44

At this location a 12 inch CMP culvert exists. The roadway is 12 feet wide and the grade is gradual at approximately 3%

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert. Reestablishment of the existing roadside ditches are also recommended.

Picture 45-49

Continuing northeasterly the next curve is encountered. The roadway approaching the curve is 12 feet in width and at the curve the roadway widens to 16 feet (Pictures 45 & 49). At the middle of the curve on the northside of the road where the roadway widens, two 12 inch CMP culverts exists (Pictures 46 & 49) with a constructed dam between them (Picture 49). The inlets are damaged, and the outlets are unarmored creating erosion downstream (Pictures 47 & 48).

At this specific location it is recommended to replace the existing culvert with a new minimum 18 inch culvert and construct a turnout at the curve in accordance with the Humboldt County Ordinance for California Fire Safe Regulation. Reestablishment of the existing roadside ditches are also recommended.

Pictures 50 & 51

Continuing southeasterly the roadway is 12 feet wide with 1-2 foot drainage ditches on either side of the road that are clogged with debris. The gradient is approximately is gradual at 2-3%. There is a large container stored on the south side of the roadway (Picture 51) creating a traffic hazard.

It is recommended to immediately remove the container. Reestablishment of the existing roadside ditches are also recommended.

Pictures 52 & 53

Continuing southeasterly the roadway is 12 feet wide with 1-2 foot drainage ditches on either side of the road. The gradient is also gradual at 2-3%. On the northside of the roadway exists a stabilized slope that looks as if it were a driveway at one time. The stabilization with both mulch and fiber rolls is appropriate and should be used as an example for stabilizing the slopes that are mentioned in the Summary and Recommendations section of this report below. There is a container stored on the south side of the roadway creating a traffic hazard (Picture 53).

It is recommended to immediately remove the container. Reestablishment of the existing roadside ditches are also recommended.

Pictures 54 – 56

Continuing southeasterly the roadway is 12 feet wide with 1-2 foot drainage ditches on either side of the road. The gradient is approximately is gradual at 2-3%. At this location the road evaluation is terminated and there are two driveways at this location as Cobb Rd continues in a southerly location serving four additional parcels.

It is recommended to construct a turnaround in accordance with the Humboldt County Ordinance for California Fire Safe Regulation. Reestablishment of the existing roadside ditches are also recommended.

Summary and Recommendations

Cobb Rd has numerous drainage issues caused by drainage and erosion coming from graded flats for green houses above the road, the clearing of vegetation through the PG&E easement without proper slope stabilization, undersized culverts, drainage ditches clogged with debris, and the roadway not have a positive cross slope in most location creating ponding.

The roadway itself does not meet criteria for a Category 4 road or even a Category 4 equivalent. The roadway is under 18 feet in width and has little to no shoulders since the shoulder area is primarily used by the clogged drainage ditches. There are pull outs at most curve location, but not at all locations, and the turnouts or widened areas that exist, do not conform to the Humboldt County Ordinance for California Fire Safe Regulation. There are also locations that debris, garbage, storage containers, and vehicles are kept along the roadside creating potential traffic

hazards and environmental impacts. Some driveways intersecting Cobb Rd do not have sufficient SSD to safely, driveways do not have culverts under them conveying water under the driveway, and the roadway is not properly shaped with appropriate surfacing to shed water and provide adequate tire traction in adverse weather conditions.

The Engineer recommends the following actions:

- Construct turnouts at the curve locations where no turnout exists to the Humboldt County Ordinance for California Fire Safe Regulation. (\$2500 - \$3500 per location). Total engineer's opinion of probable cost for 8 new turnouts equals \$20K-\$28K
- Improve existing turnouts to County standard. (\$1250 - \$1750 per location) Total engineers opinion of probable costs for 12 turnout improvements, one before and one after each curve for traffic in each direction equals \$15K-\$21K.
- Perform Engineering to evaluate existing culvert sizes and replace those culverts that are undersized (18 inches minimum) and also those culverts that are damaged or corroded. The replacement shall include rock armoring erosion control, and in accordance with Humboldt County standards. (\$2500 - \$3500 per culvert). There are seven locations that culverts will need to be replaced with a minimum of an 18 inch culvert. Total engineer's opinion of probable cost for 7 replacements equals \$17.5K-\$24.5K.
- After the roadway is regraded and roadside drainage ditches improved it is highly recommended that 18 inch culverts be constructed at each driveway (\$1500-\$2500 per location). Total engineer's opinion of probable costs for 7 18 inch culverts at 7 driveways equals \$10.5K-\$15.5K.
- Construct water bars on Cobb Rd at locations in accordance with Exhibit E, Page 7, Table 2, Water Bar Spacing Recommendations. The costs of water bars are included in the total cost for roadway re-grading and shaping below.
- Regrade the roadway providing positive drainage with a crowned road. Total engineer's opinion of probable cost for regrading \$6.5K - \$7.5K.
- Construct turnaround in accordance with the California Fire Safe Regulation at APN #208-341-004 and at the end of Cobb Rd at APN #208-341-016 (\$1500 - \$2000). Total engineer's opinion of probable cost for 2 turn arounds equals \$3K-\$4K
- Clean and improve existing roadside ditches. Total engineer's opinion of probable cost for cleaning and improving roadside ditches equals \$2.5K-\$10K depending on improvements.
- Construct water bars on the portions of roadway where grade is steep every 100 feet (Cost included in roadway regrading).

- Resurfacing of the roadway. Options are as follows:
 - o 2 inches of gravel (\$8500 - \$15000)
 - Dust control will be necessary with the gravel option. Types of dust control accepted by the State of California are as follows:
 1. Polymer based
 2. Calcium Chloride
 3. Magnesium Chloride
 4. Brine
 - o Lime stabilization w/ dry lime, (\$4500 - \$6500).
 - o Lime stabilization w/ lime slurry, (\$17500-\$25000)
 - o Pavement (4inch) w/ AB base (6inch), (\$250000 - \$300000) Cost prohibitive and not evaluated as part of the total cost.
- Clear garbage, debris, and grow soil pile on Cobb Rd (Costs are incidental)
- Stabilize the sloughing of the hillside shown in Picture 11 with geogrid and rip rap (\$2500-\$4000).

Total engineers estimate of probable costs would be between \$86K± - \$130K± depending upon the options selected for surfacing. Paving has not been included in this estimate of costs due to the high costs, which appears to be costs prohibitive.

With the implementation of the improvements above and also improvements to drainage and slope stabilization along the roadway, drainage issues will be greatly reduced. The properties that have cultivation activities occurring and are in the County permitting process is being foreseen to have permitting conditions issued that will alleviate most of the offsite erosion impacting the roadway and other properties. The PG&E easement should be evaluated for impacts and jurisdiction to provide slope stabilization reducing erosion caused by this clearing.

If a construction project is developed to address the issues identified, be aware that the project would have to go through Humboldt County Design Review. The Design Review process will identify the permitting required and any other relevant site investigations. After Design Review engineering would begin by developing construction documents for a building permit. Both design review and engineering will require survey and geotechnical evaluation. The costs associated with those tasks associated with design review and engineering are approximately 10% - 15% of the cost of construction. As part of the design, survey will be required, and it would be appropriate for the surveyor to identify existing easements and right-of-way along Cobb Rd and also the PG&E easement. The cost of survey and geotechnical evaluation is not included in the percentage listed above.

A Traffic Management Plan is recommended to be developed between the Applicant, owners and operators of the residences and Marijuana cultivation facilities along Cobb Rd. Also, a Road Association may be considered to provide regular maintenance to the roadways evaluated in this Technical Memorandum.

Funding

There are a number of funding opportunities for this work including grants and/or loans through the California State Water Resources Control Board, USDA, and CalEPA. The research regarding the Grant qualifications and requirements is beyond the scope of this Technical Memorandum.

Other funding opportunities include evaluation of the feasibility for developing a timber harvest plan.

EXHIBIT A

Exhibit A - Photo Location Map

Overall Location of Photos Taken 1/20/2018



Exhibit A - Location of Pictures 1-8

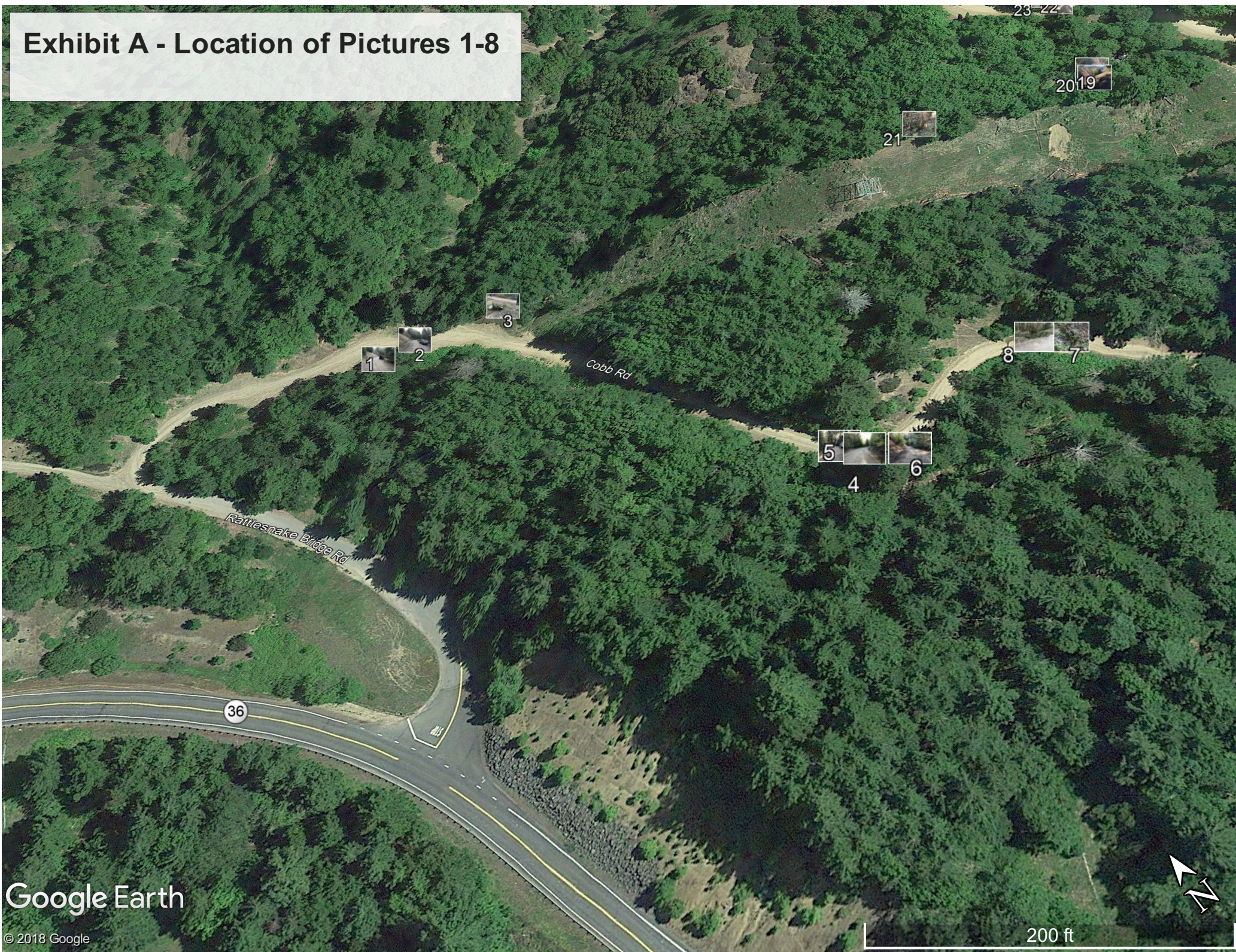


Exhibit A - Location of Pictures 9 & 57-59-18

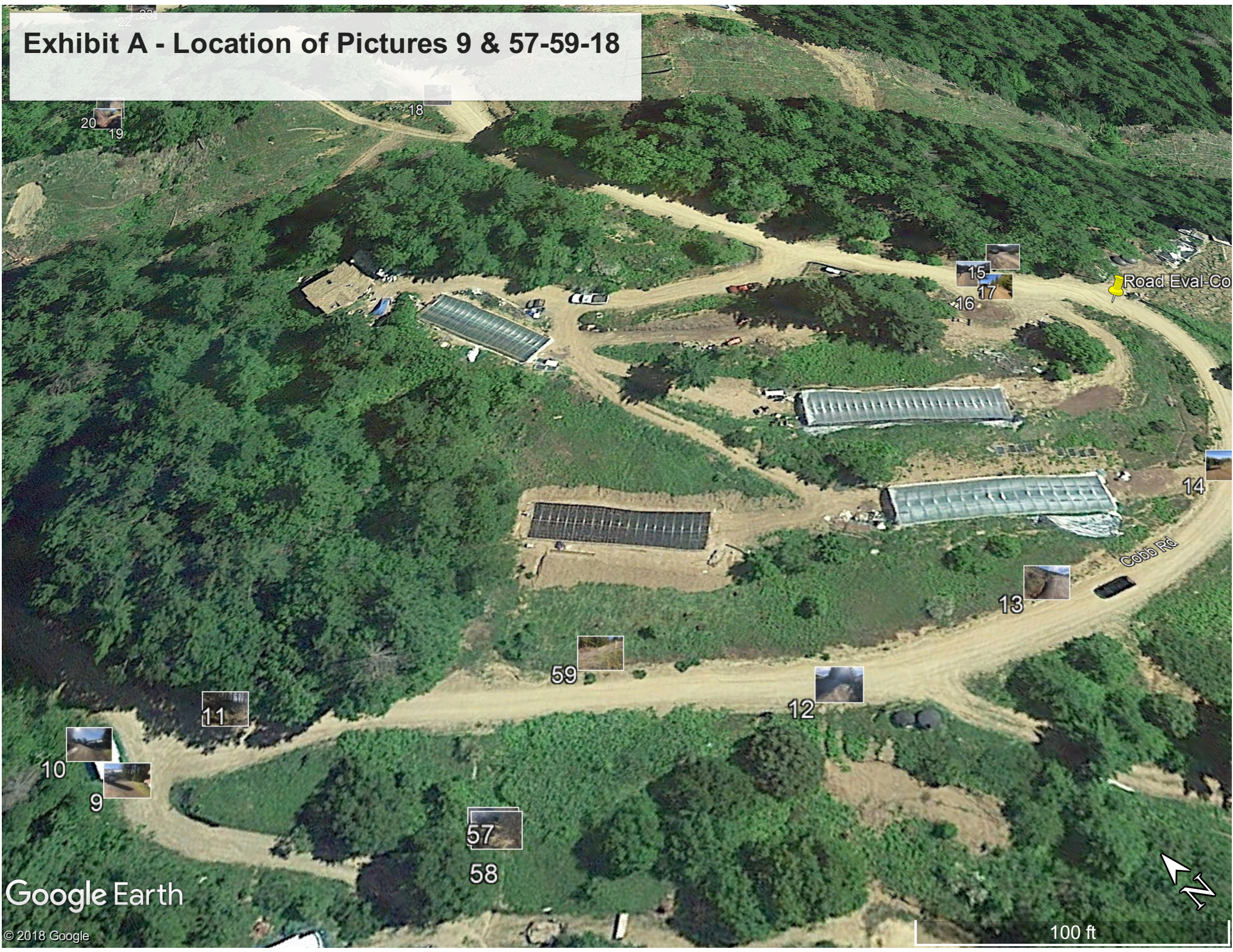


Exhibit A - Location of Pictures 19-29



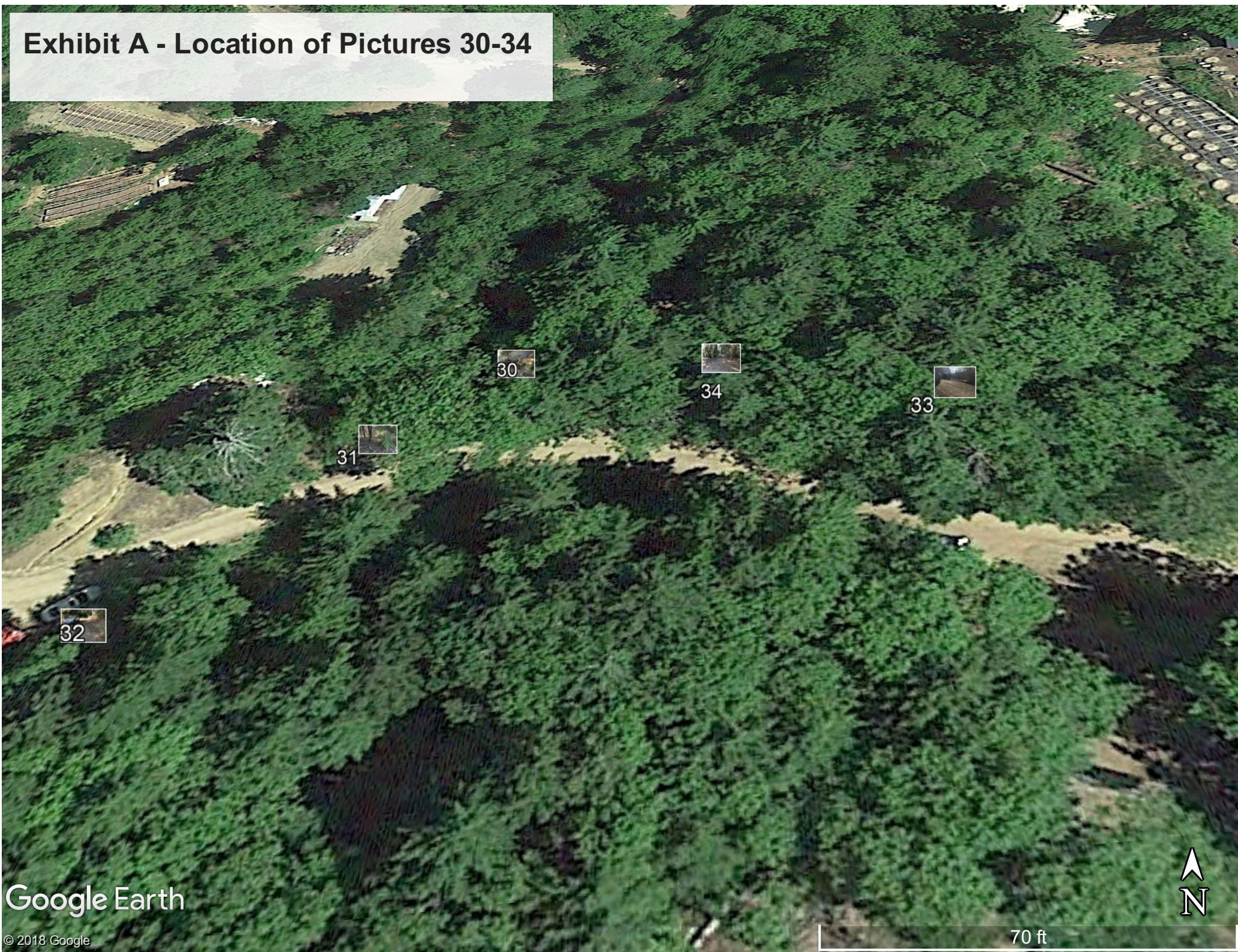
Google Earth

© 2018 Google



1000 ft

Exhibit A - Location of Pictures 30-34



Google Earth

© 2018 Google



70 ft

Exhibit A - Location of Pictures 35-41

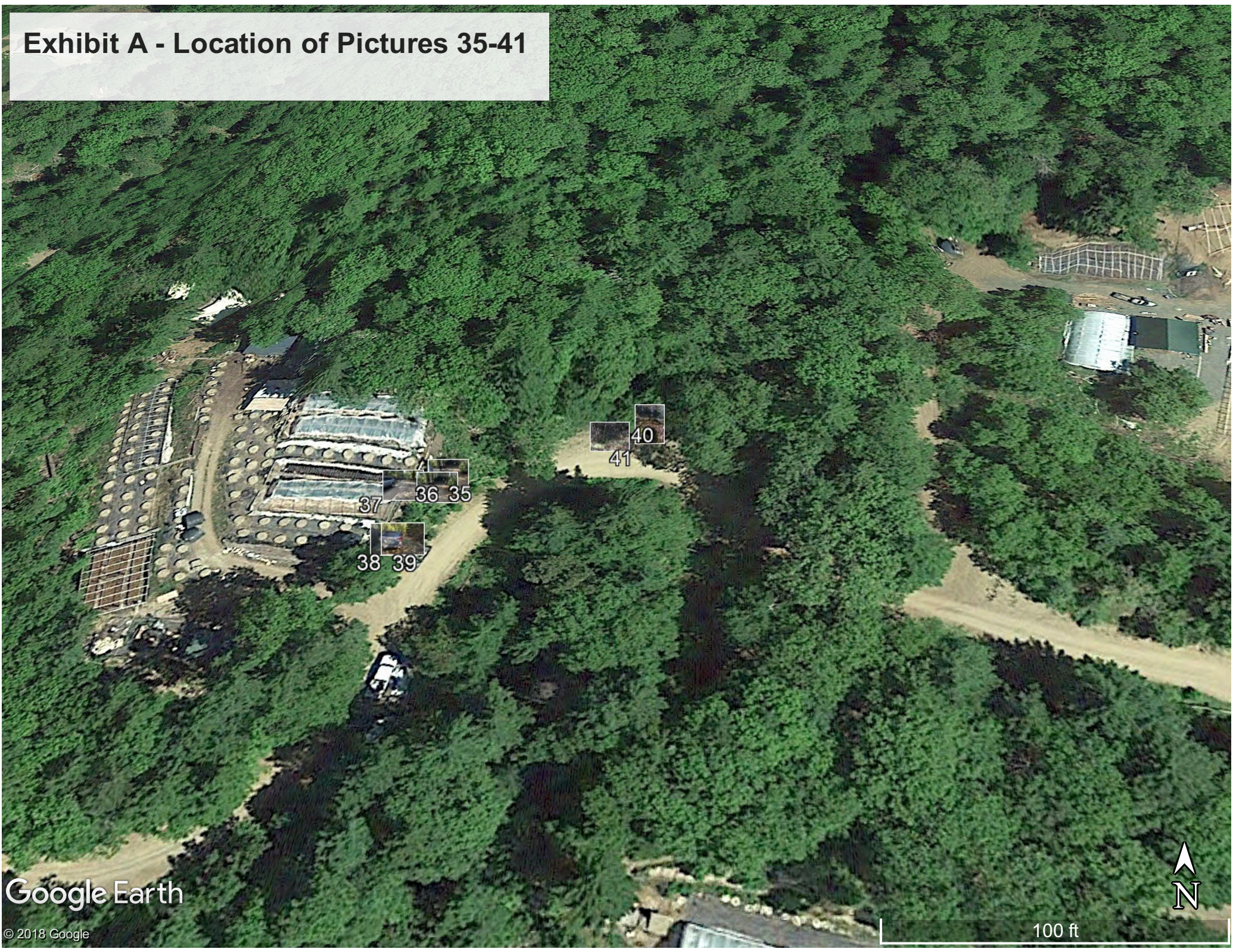


Exhibit A - Location of Pictures 42-49



Google Earth

© 2018 Google



90 ft

Exhibit A - Location of Pictures 50-56

50
51

52
53

54-56
55

Google Earth

© 2018 Google

100 ft





Picture #1 Gate @ Cobb Rd & Rattlesnake Bridge looking E.



Picture #2 Cobb Rd & Rattlesnake Bridge looking E. @ curve..



Picture #3 Cobb Rd at Curve in Picture #2 looking @ 12" CMP



Picture #4 Cobb Rd @ curve looking NW



Picture #5 Cobb Rd @ curve in Picture #4 looking SE



Picture #6 Cobb Rd looking E. @ curve



Picture #7 Cobb Rd @ 12" CMP inlet at curve



Picture #8 road washout due to culvert being clogged.



Picture #9 Cobb Rd @ unsafe driveway



Picture #10 Cobb Rd looking SE towards curve & drive in #9



Picture #11 Cobb Rd looking NE @ sloughing of embankment



Picture #12 Cobb Rd looking SE @ curve & driveway



Picture #13 Cobb Rd looking NE @ erosion due to drainage



Picture #14 Cobb Rd looking SW towards curve.



Picture #15 Cobb Rd looking SE towards curve in 14 w/ erosion



Picture #16 Cobb Rd looking SE towards curve in 14 @ drive



Picture #17 Cobb Rd looking NW towards curve



Picture #18 Cobb Rd @ 18" culvert outlet looking W @ esmt.



Picture #19 On PG&E esmt looking SW



Picture #20 On PG&E esmt looking SW @ erosion.



Picture #21 On PG&E esmt looking NE @ outlet from Cobb Rd



Picture #22 Cobb Rd SE towards curve



Picture #23 Cobb Rd looking NW @ curve



Picture #24 Cobb Rd looking @ culvert @ PG&E esmt (tank)



Picture #25 Cobb Rd outlet of 12" culvert looking @ tank



Picture #26 Cobb Rd inlet of 12" culvert in Picture 27.



Picture #27 Cobb Rd outlet & erosion from culvert @ Picture 26



Picture #28 Cobb Rd looking E towards curve



Picture #29 Cobb Rd looking NW towards curve



Picture #30 Cobb Rd 12" culvert inlet



Picture #31 Cobb Rd 12" culvert outlet



Picture #32 Cobb Rd looking W towards curve.



Picture #33 Cobb Rd looking @ driveway



Picture #34 Cobb Rd looking N. @ driveway w/ erosion



Picture #35 Cobb Rd looking SW towards curve



Picture #36 Cobb Rd looking SW at driveway



Picture #37 RVF Cobb Rd looking SE towards curve



Picture #38 RVF Access Rd looking NW towards curve pullout.



Picture #39 Cobb Rd looking SE towards curve



Picture #40 Cobb Rd looking @ 12" culvert inlet



Picture #41 Cobb Rd looking @ outlet of 12" culvert in Picture 40



Picture #42 Cobb Rd looking @ inlet of 12" culvert



Picture #43 Cobb Rd inlet of 12" culvert Picture #44 Cobb Rd outlet from culverts in Pictures 42 & 43.



Picture #45 Cobb Rd looking NE @ curve



Picture #46 Cobb Rd looking at 12" crushed CMP inlet



Picture #47 Cobb Rd outlet of 12" culvert in Picture 46



Picture #48 Cobb Rd outlet of 12" culvert in Picture 46



Picture #49 Cobb Rd @ double 12" culvert w/ dam in middle



Picture #50 Cobb Rd looking SW towards curve.



Picture #51 Cobb Rd looking NE at storage container in road



Picture #52 Cobb Rd looking NW towards properly stabilized slope



Picture #53 Cobb Rd looking NW @ abandoned RV in road



Picture #54 Cobb Rd looking E @ driveway



Picture #55 Cobb Rd looking SE @ road end



Picture #56 Cobb Rd at road end looking NW.



Picture #57 Cobb Rd @ outlet of culvert where water tops road



Picture #58 Cobb Rd outlet of culvert in Picture 57



Picture #59 Looking uNW @ erosion @ outlet of culvert in Picture 58

EXHIBIT B



ArcGIS Web Map

Humboldt County Planning and Building Department

Printed: January 22, 2018

Web AppBuilder 2.0 for ArcGIS

Map Disclaimer:
While every effort has been made to assure the accuracy of this information, it should be understood that it does not have the force & effect of law, rule, or regulation. Should any difference or error occur, the law will take precedence.

Highways and Roads

- Principal Arterials
- - - Minor Arterials
- Major Collectors
- - - Minor Collectors
- Local Roads
- - - Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

Blue Line Streams

- Perennial >4
- - - Intermittent
- - - Subsurface

- Perennial >4
- - - Intermittent
- - - Subsurface

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Private or Unclassified
- Major River or Stream
- - - Perennial 1-3

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

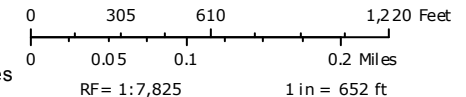
- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

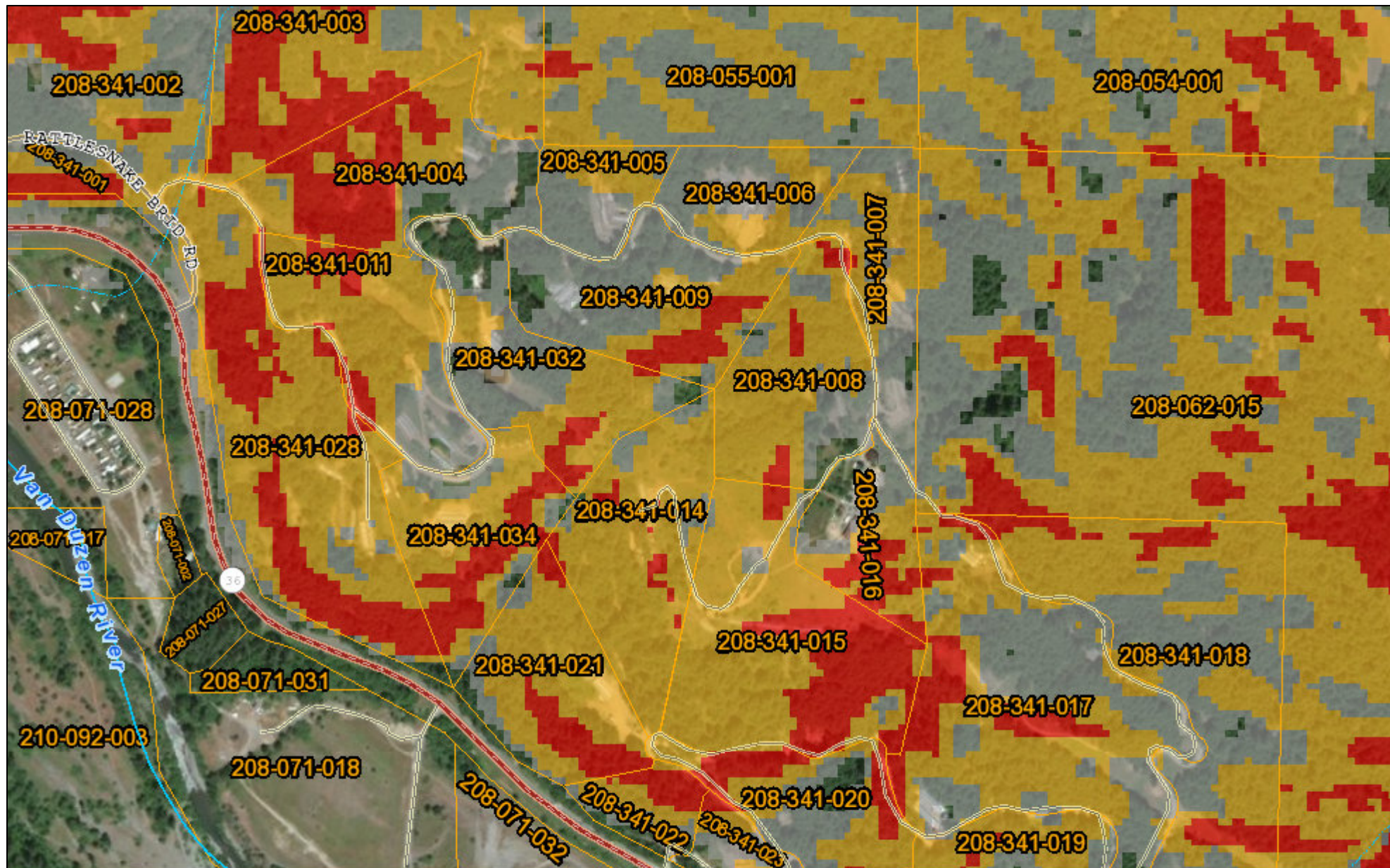
- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval

- Parcels
- Historic Landslides
- Topographic Contours 40ft
- Minor Interval
- Major Interval



Sources: NRCS
Humboldt County GIS
California Coastal Commission GIS/Mapping Unit, 2014
Healthy Rural Roads
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

EXHIBIT C



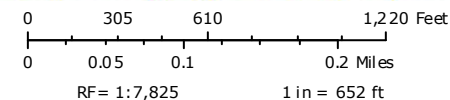
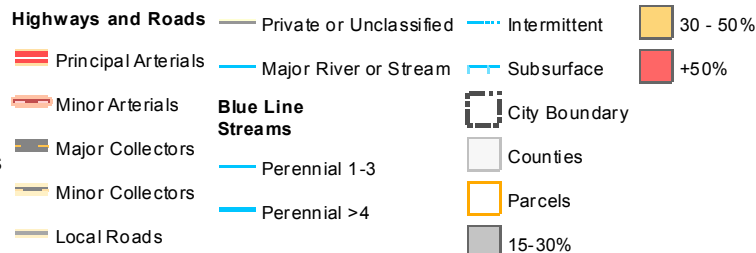
ArcGIS Web Map

Humboldt County Planning and Building Department

Printed: January 30, 2018

Web AppBuilder 2.0 for ArcGIS

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Sources: NRCS
Humboldt County GIS
California Coastal Commission GIS/Mapping Unit, 2014
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EXHIBIT D

CHAPTER 2

EMERGENCY ACCESS

3112-1. ROAD AND DRIVEWAY ACCESS - INTENT.

Road and street networks, whether public or private, unless exempted under Section 3111-3(b), shall provide for safe access for emergency wildland fire equipment and civilian evacuation concurrently, and shall provide unobstructed traffic circulation during a wildfire emergency consistent with Sections 3112-2 through 3112-13. (Ord. 1952, § 1, 12/17/1991)

3112-2. APPLICATION OF DESIGN STANDARDS.

The design and improvement standards as referenced in these regulations shall be those as set forth in the Appendix to Title III, Division 2, of the Humboldt County Code, and in the County Roadway Design Manual. Application of these design and improvement standards shall be consistent with the intent as prescribed in Section 3112-1, and shall be based upon: (Ord. 1952, § 1, 12/17/1991)

- (a) legal requirements, (Ord. 1952, § 1, 12/17/1991)
- (b) sound engineering principles and practices and engineering geological evaluation of necessary, (Ord. 1952, § 1, 12/17/1991)
- (c) traffic safety considerations, (Ord. 1952, § 1, 12/17/1991)
- (d) economy of design and maintenance, and (Ord. 1952, § 1, 12/17/1991)
- (e) allowance for the special nature of Humboldt County roads and traffic problems. (Ord. 1952, § 1, 12/17/1991)

Interpretation of these standards shall be provided by the Director of Public Works. (Ord. 1952, § 1, 12/17/1991)

3112-3. ROAD WIDTH.

All roads shall be constructed to a minimum Road Category 4 road standard of two ten (10) foot traffic lanes, not including shoulders, capable of providing for two-way traffic flow to support emergency vehicle and civilian egress. This standard may be modified where an exception has been granted pursuant to Sections 3111-7 through 3111-10 of this ordinance, and the development is made subject to the following provisions. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

- (a) A traffic lane meeting the standard for Road Category 2 (12 feet) shall be considered as meeting the requirements of this section for a single lot division into two (2) parcels, where all the following conditions are met: (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
 - (1) The subdivision is conditioned so as to limit site development as follows: (Ord. 1952, § 1, 12/17/1991)

For a parcel or parcels having a minimum parcel size of less than 20 acres, not more than one (1) dwelling unit shall be permitted for each parcel. (Ord. 1952, § 1, 12/17/1991)

For a parcel or parcels having a minimum parcel size of 20 acres or more, not more than two (2) dwelling units shall be permitted for each parcel. (Ord. 1952, § 1, 12/17/1991)

- (2) Rights to further subdivide the parcels created by the land division would be conveyed to the county until such time as the full road segment was improved to a minimum of Road Category 3 or 4 for traffic lane, as appropriate. (Ord. 1952, § 1, 12/17/1991)
 - (3) Inter-visible turnouts are installed in conformance Section 3112-8 of these regulations. (Ord. 1952, § 1, 12/17/1991)
- (b) In mountainous terrain and/or where geologic or other natural features make infeasible full development of two ten (10) foot wide traffic lanes, a traffic lane meeting the standard for Road Category 3 (16 feet) shall be considered as meeting the requirements of this section for subdivisions of three (3) to eight (8) parcels, where all the following conditions are met: (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (1) The subdivision is conditioned so as to limit site development as follows: (Ord. 1952, § 1, 12/17/1991)
- For a parcel or parcels having a minimum parcel size of less than 20 acres, not more than one (1) dwelling unit shall be permitted for each parcel. (Ord. 1952, § 1, 12/17/1991)
- For a parcel or parcels having minimum parcel size of 20 acres, not more than two (2) dwelling units shall be permitted for each parcel. (Ord. 1952, § 1, 12/17/1991)
- (2) Rights to further subdivide the parcels created by the subdivision would be conveyed to the County until such time as the full road segment was improved to a minimum of Road Category 4 for a traffic lane. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
 - (3) The roadbed width shall include a minimum of two-foot (2') wide bladed shoulders on each side of the traffic lane. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (c) In mountainous terrain and/or where geologic or other natural features make infeasible full development of two ten (10) foot wide traffic lanes, a traffic lane meeting the standard for Road Category 3 (16 feet) shall be considered as meeting the requirements of this section for subdivisions of not more than nineteen (19) parcels, where all the following conditions are met: (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (1) The requirements of Section 3112-3(b) are satisfied. (Ord. 1952, § 1, 12/17/1991)
 - (2) The minimum parcel size for the subdivision is forty (40) acres or larger. (Ord. 1952, § 1, 12/17/1991)

3112-4. ROADWAY SURFACE.

The surface of all roadways shall provide unobstructed access to conventional drive vehicles, including sedans and fire engines. The surface shall conform to the standards of a Road Category 4 roadway. Where Road Category 2 or 3 has been approved pursuant to Section 3112-3, the surface shall conform to the standards for these categories, as appropriate. Roadways shall be designed and maintained to support the imposed load of fire apparatus weighing at least 75,000 pounds. Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

3112-5. ROADWAY GRADES.

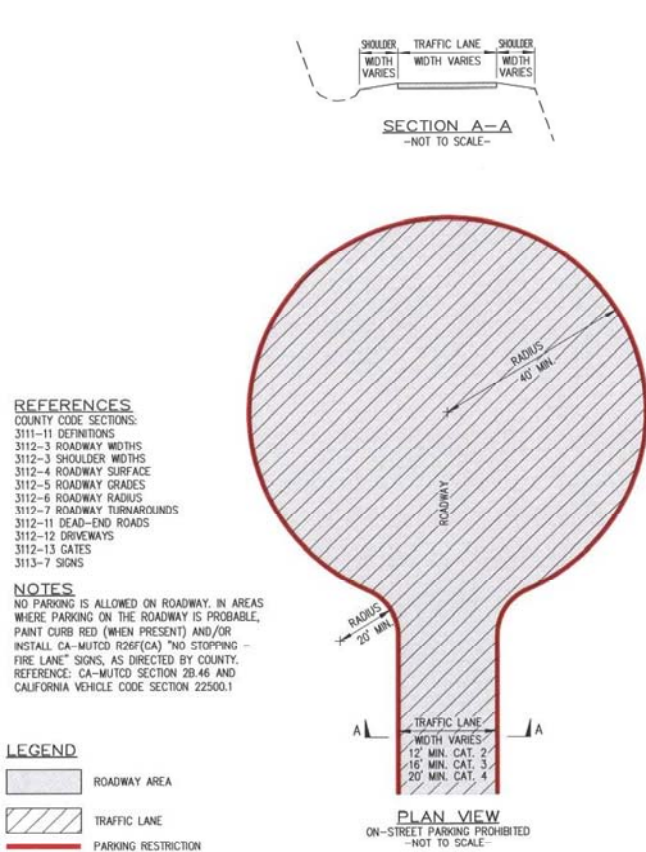
The grade for all roads, streets, and private lanes shall conform to the standards for Road Category 4. The grade for driveways shall conform to the standards for Road Category 1. No roadway grade in excess of 16 percent shall be permitted unless it has been demonstrated to be in conformance with the County Roadway Design Manual. (Ord. 1952, § 1, 12/17/1991)

3112-6. ROADWAY RADIUS.

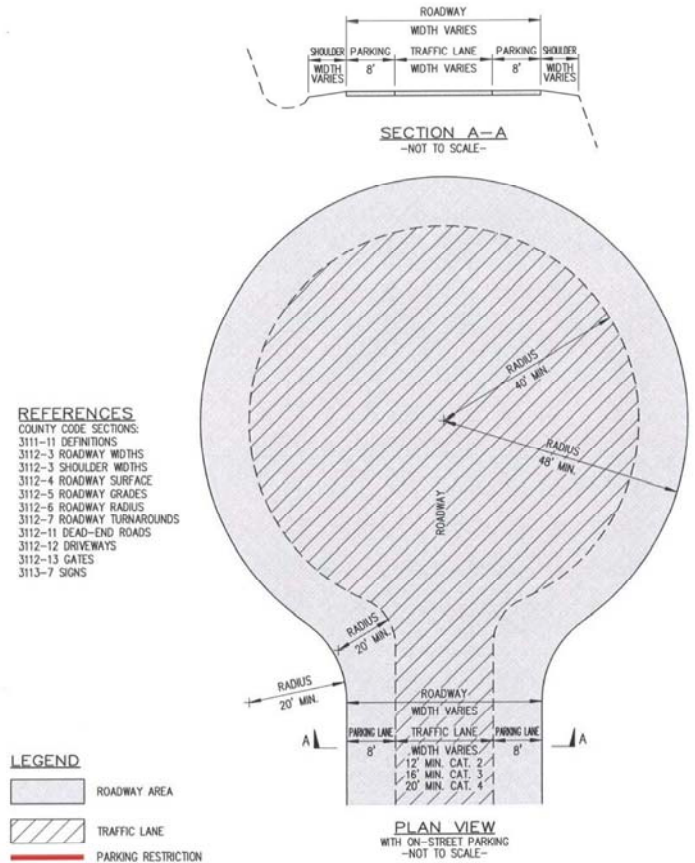
- (a) The roadway radius for all roads, and private lanes shall conform to the standards for Road Category 4. The minimum roadway radius for driveways shall conform to the standards for Road Category 1. No roadway shall have a horizontal inside radius of curvature of less than 50 feet unless it has been demonstrated to be in conformance with the County Roadway Design Manual. (Ord. 1952, § 1, 12/17/1991)
- (b) Curve alignments shall provide for curve widening on low radius curves to compensate for off tracking characteristics of trucks and trailers. Additional surface width of four (4) feet shall be added to curves of 50-100 feet radius; two (2) feet to those from 100-200 feet. Design of curve alignments shall be in conformance with the County Design Manual. (Ord. 1952, § 1, 12/17/1991)
- (c) The length of vertical curves in roadways, exclusive of gutters, ditches, and drainage structures designed to hold or divert water, shall not be less than 100 feet. Design of vertical curves shall be in conformance with the County Roadway Design Manual. (Ord. 1952, § 1, 12/17/1991)

3112-7. ROADWAY TURNAROUNDS.

Turnarounds are required on driveways and dead-end roads as specified in these regulations. The minimum turning radius for a turnaround shall be 40 feet from the center line of the road, not including the parking lane. If a hammerhead "T" is used, the top of the "T" shall be a minimum of 60 feet in length. If a slip "T" design is used, the projection shall have a minimum depth of forty (40) feet. Turnaround designs shall conform to the diagrams below in Figures 3112-7A, 3112-7B and 3112-7C, as applicable. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

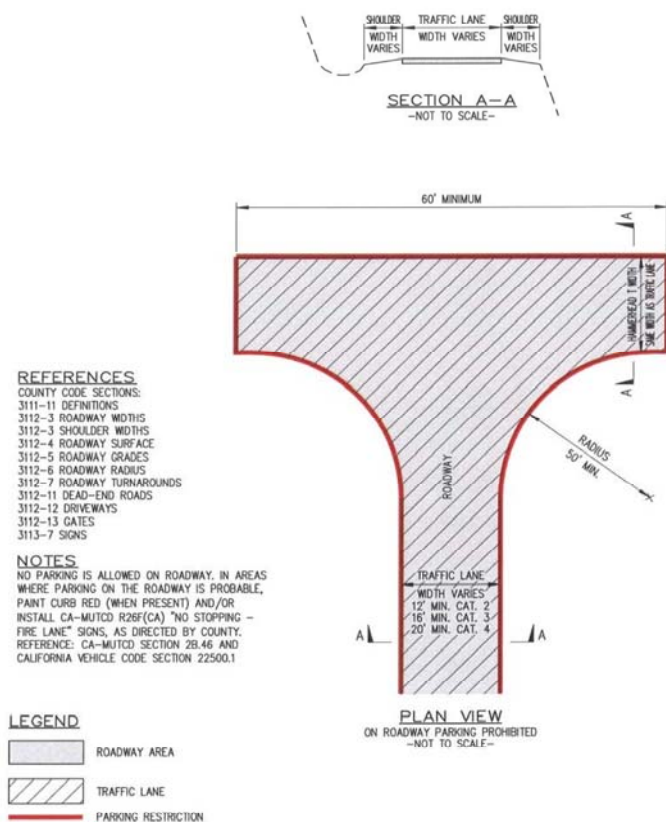


Type 1
On-Street Parking Prohibited

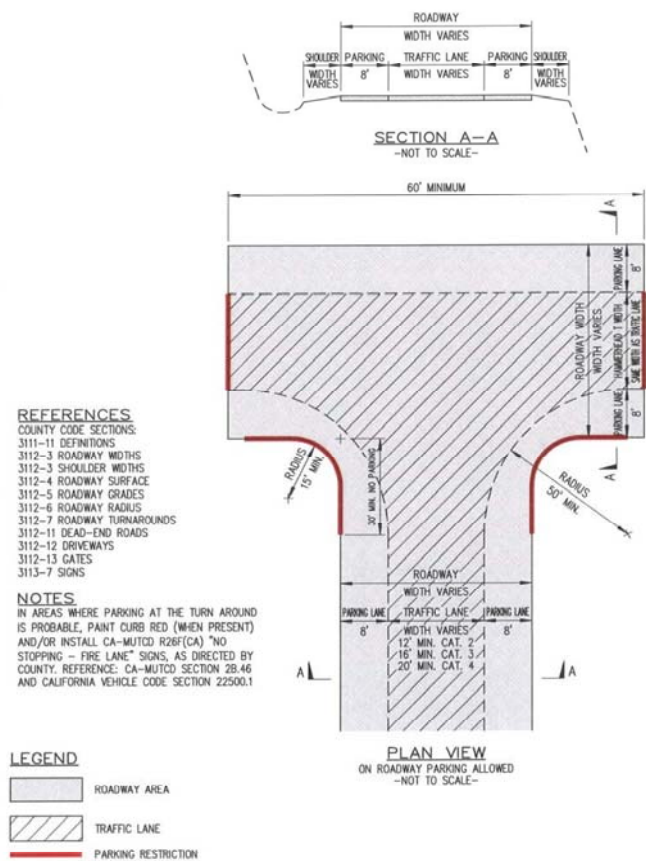


Type 2
On-Street Parking Allowed

FIGURE 3112-7A
Cul-de Sac

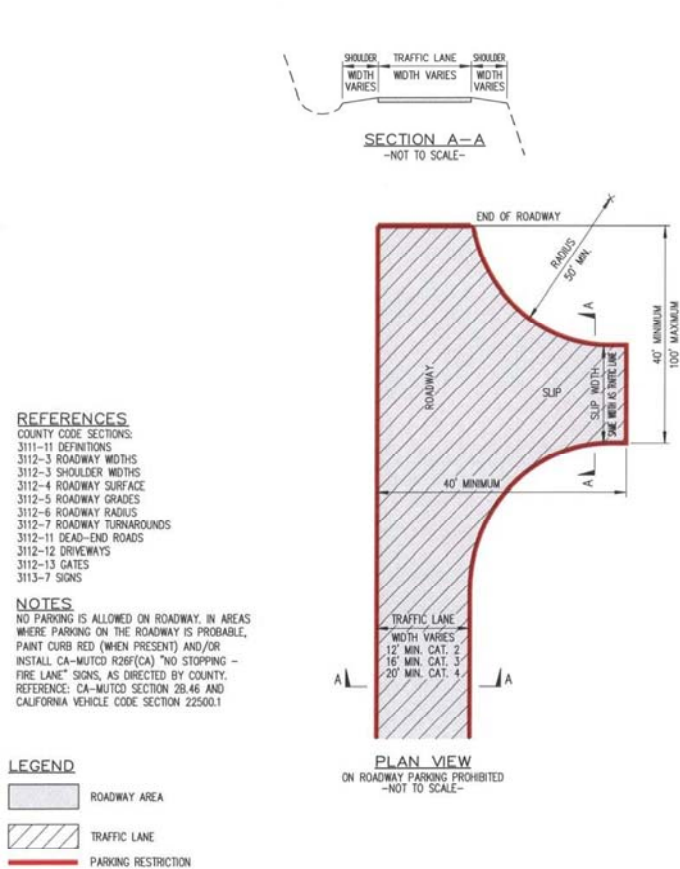


Type 1
On-Street Parking Prohibited



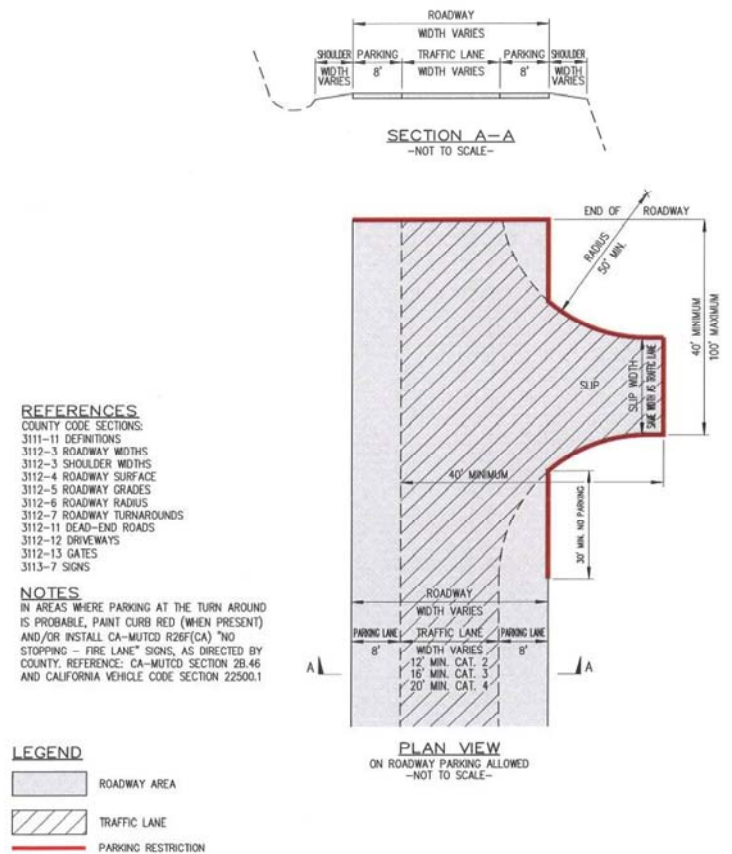
Type 2
On-Street Parking Allowed

FIGURE 3112-7B
Hammerhead "T"



Type 1
On-Street Parking Prohibited

FIGURE 3112-7C
Slip "T"

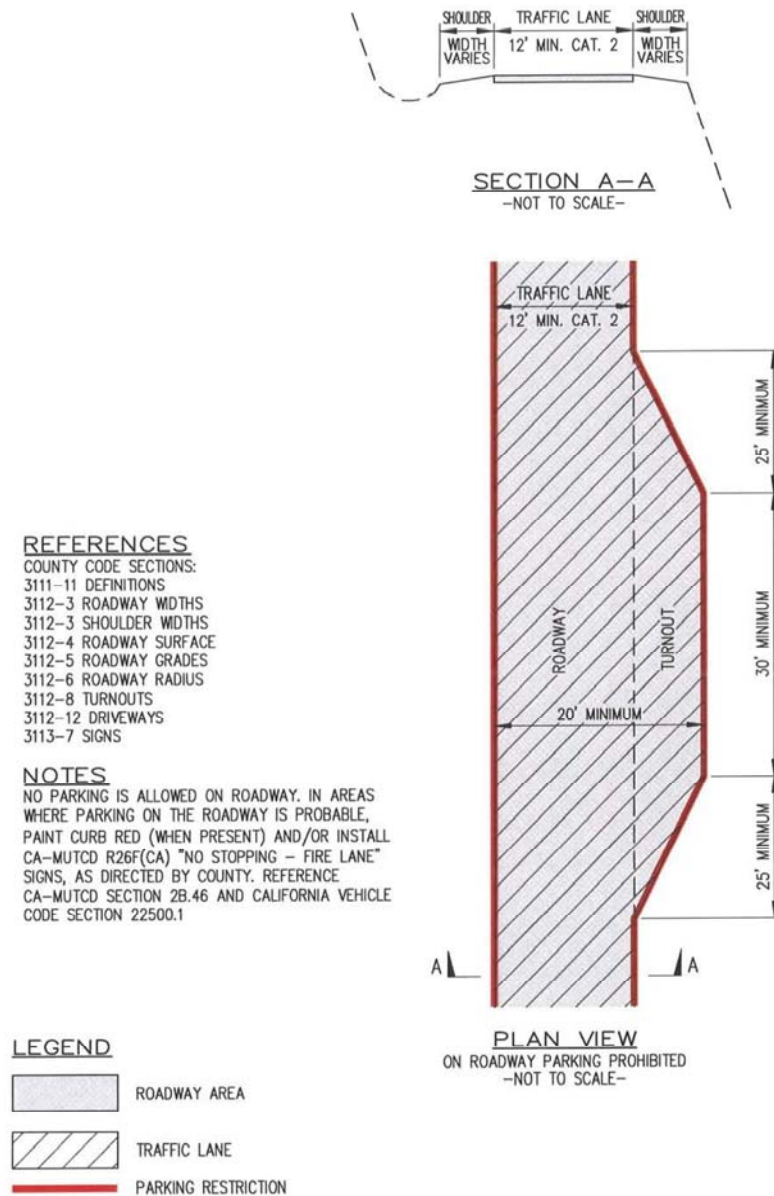


Type 2
On-Street Parking Allowed

3112-8. ROADWAY TURNOUTS.

Turnouts shall be designed in conformance with the County Roadway Design Manual. Turnouts shall be required on roadways constructed to the standard of Road Category 2 and at locations as specified in these regulations. Turnouts shall be a minimum of twenty (20) feet wide, to include width of adjacent traffic lane, and thirty (30) feet long with a minimum of 25 foot taper on each end (eighty (80) feet total length). Turnout designs shall conform to the diagram below. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

FIGURE 3112-8
Roadway Turnout



3112-9. ROADWAY STRUCTURES.

- (a) All driveway, road, street, and private lane roadway structures shall be constructed to carry at least the maximum load and provide the minimum vertical clearance as required in California Vehicle Code Sections 35250, 35550, and 35750. Where a bridge, culvert or an elevated surface is part of a fire apparatus access road, the roadway structure shall be constructed and maintained in accordance with the American Association of State and Highway Transportation Officials Standard Specifications for Highway Bridges, 17th Edition, published 202 (known as AASHTO HB-17), hereby incorporated by reference, or an equivalent or greater AASHTO standard as may be from time to time adopted. Roadway structures shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. The minimum vertical clearance shall be 15 feet at all points on the surface of the roadway. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

- (b) Appropriate signing, including but not limited to vehicle load, vertical clearance, one-way road, or single lane conditions, shall be posted at both entrances to bridges. This requirement may be omitted for bridges on private roads and driveways where compliance with paragraph (a) of this section has been demonstrated to the satisfaction of the Director of Public Works. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, barriers or signs, or both, as approved by the Department of Public Works, shall be installed and maintained. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (c) A bridge with only one traffic lane may be authorized by the County; however, the bridge shall provide for unobstructed visibility from one end to the other and shall have intervisible turnouts at both ends. (Ord. 1952, § 1, 12/17/1991)
- (d) The County may allow a flatcar bridge having a width of not less than nine (9) feet to be used as a roadway structure on a private lane or driveway provided the requirements of Section 3112-9(c) are satisfied. No exception request shall be required for the reduced roadway width. (Ord. 1952, § 1, 12/17/1991)

3112-10. ONE-WAY ROADS.

All one-way roads shall be constructed to provide a minimum, not including shoulders, of one ~~ten~~ twelve (12) foot traffic lane. The County may approve one-way roads. All one-way roads shall connect to a two-lane roadway at both ends, and shall provide access to an area currently zoned for no more than ten (10) dwelling units. In no case shall it exceed 2,640 feet in length. A turnout shall be placed approximately at the midpoint of each one-way road. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

3112-11. DEAD-END ROADS.

- (a) The maximum length of a dead-end road, including all dead-end roads accessed from that dead-end road, shall not exceed the following cumulative lengths, regardless of the number of parcels served: (Ord. 1952, § 1, 12/17/1991)

parcels zoned for less than one acre	800 feet
parcels zoned for 1 acre to 4.99 acres	1350 feet
parcels zoned for 5 acres to 19.99 acres	2640 feet
parcels zoned for 20 acres to 39.99 acres	5280 feet
parcels zoned for 40 acres to 159.99 acres	7500 feet
parcels zoned for 160 acres or larger	Unlimited

All lengths shall be measured from the edge of the roadway surface at the intersection that begins the road to the end of the road surface at its farthest point. Where a dead-end road crosses areas of differing zoned parcel sizes, requiring different length limits, the shortest allowable length shall apply. (Ord. 1952, § 1, 12/17/1991)

- (b) Where parcels are zoned 5 acres or larger, turnarounds shall be provided at a maximum of 1320 foot intervals. (Ord. 1952, § 1, 12/17/1991)
- (c) Each dead-end road shall have a turnaround constructed at its terminus. (Ord. 1952, § 1, 12/17/1991)

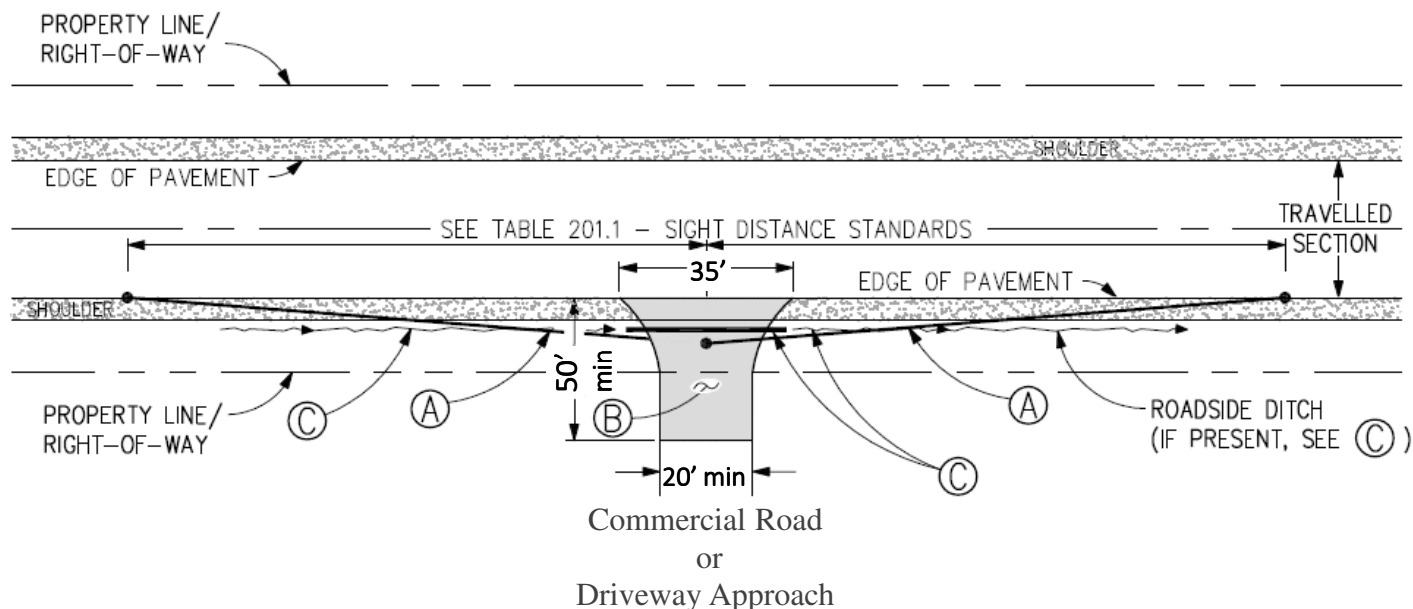
3112-12. DRIVEWAYS.

- (a) All driveways shall be constructed to provide a minimum Road Category 1 standard of one ten (10) foot traffic lane and fourteen (14) feet of unobstructed horizontal clearance (two (2) feet on each side of the traffic lane). The minimum vertical clearance shall be 15 feet along its entire length. Driveways in excess of 1320 feet in length shall be constructed to the standard for Road Category 2 of one twelve (12) foot traffic lane. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

- (b) Driveways exceeding 150 feet in length, but less than 800 feet in length, shall provide a turnout near the midpoint of the driveway. Where a driveway exceeds 800 feet, turnouts shall be spaced at intervisible points at approximately 400 foot intervals. The location and spacing of turnouts shall be in conformance with the County Roadway Design Manual. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (c) A turnaround shall be provided at all building sites on driveways over 300 feet in length, or 200 feet if required by the local fire agency, and shall be within fifty (50) feet of the building. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)

3112-13. GATE ENTRANCES.

- (a) Gate entrances shall be at least two (2) feet wider than the width of the traffic lane(s) serving the gate, and a minimum width of fourteen (14) feet of unobstructed horizontal clearance and unobstructed vertical clearance of fifteen (15) feet. (Ord. 1952, § 1, 12/17/1991; amended by Ord. 2540, Section 1, 11/17/2015)
- (b) All gates providing access from a road to a driveway shall either: (Ord. 1952, § 1, 12/17/1991)
 - (1) be located a minimum of thirty (30) feet from the roadway, or (Ord. 1952, § 1, 12/17/1991)
 - (2) if located closer than thirty (30) feet from the roadway, turnout(s) shall be constructed near the gate entrance to allow parking next to the traffic lane(s) for use from each direction of travel. The location of the turnouts shall permit safe turning movements and maintain adequate sight visibility. (Ord. 1952, § 1, 12/17/1991)
- (c) All gates providing access from a road to a driveway shall open to allow a vehicle to stop without obstructing traffic on that road. (Ord. 1952, § 1, 12/17/1991)
- (d) Where a one-way road with a single traffic lane provides access to a gated entrance, a forty (40) foot turning radius shall be used. (Ord. 1952, § 1, 12/17/1991 ; amended by Ord. 2540, Section 1, 11/17/2015)
- (e) Security gates shall not be installed without approval and where security gates are installed, they shall have an approved means of emergency operation acceptable to CAL FIRE and the local fire agency. The security gates and the emergency operation shall be maintained operational at all times. (Added by Ord. 2540, Section 1, 11/17/2015)



NOTE

All proposed driveway or road encroachments onto any County maintained road of within County right-of-way will be reviewed by the Department of Public Works on a case-by-case basis. This policy may result in modification to the standards or requirements set forth on this sheet.

(C) ROADSIDE DRAINAGE

The construction of any driveway approach shall not adversely impact or alter existing roadside drainage. The installation of a culvert pipe under the driveway approach in the existing ditch may be required if flow levels warrant it. Pipe size, length and location shall be determined by the Department of Public Works.

(A) SIGHT VISIBILITY LINE (TRIANGLE)

An area of unobstructed sight visibility shall be established and maintained beginning at a point 8 feet back from the edge of the existing pavement and extending each direction from the centerline of the new driveway approach.

(B) DRIVEWAY APPROACH SURFACING

If the existing County road surface is paved, the new driveway approach shall be paved with 2 inches of Type B asphalt concrete (or sufficient seal coat) on top of a minimum of 4 inches of aggregate base. The paved area shall extend a minimum of 50 feet back from the edge of the existing pavement and be flared approximately 35 feet at the intersection with the County road. The driveway shall intersect the County road at a 90° angle. The driveway grade shall not exceed 2% in the first 25 feet.

SIGHT DISTANCE STANDARDS

Design Speed ⁽¹⁾ (mph)	Stopping ⁽²⁾ (mph)	Passing ⁽³⁾ (mph)
20	125	800
25	150	950
30	200	1100
35	250	1300
40	300	1500
45	360	1650
50	430	1800
55	500	1950
60	580	2100
65	660	2300
70	750	2500
75	840	2600
80	930	2700

(1) See Topic 101 for selection of design speed.

(2) Increase by 20% on sustained downgrades >3%



COUNTY OF HUMBOLDT
DEPARTMENT OF PUBLIC WORKS
1106 SECOND STREET * EUREKA * CA * 95501
TEL (707) 445-7377 * FAX (707) 445-7409

Commercial Rural Driveway No. 1

STD DWG

SHT 1 OF 1

EXHIBIT E