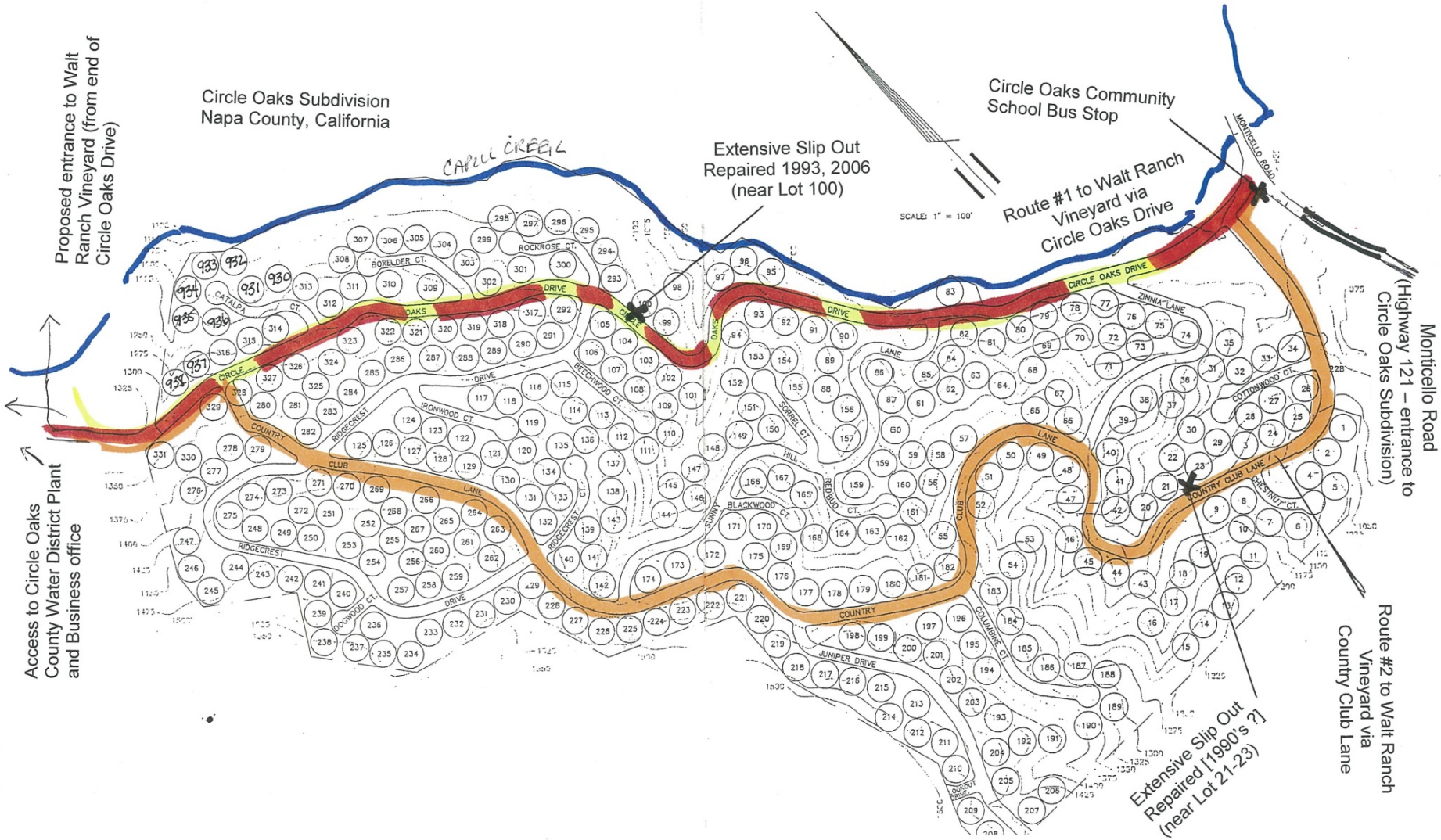
Impacts to Circle Oaks Drive

This is what road failure look like.

Highway 121 road failure, March 2016, 1-1/2 miles from Circle Oaks Drive

Circle Oaks Drive Areas of Slippage



Areas of Road Failure

Areas of Failure addressed in geotechnical report and addressed in public comments, April 2016

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Vacaville, California 95688
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KC ENGINEERING COMPANY
A SUBSIDIARY OF MATERIALS TESTING, INC.

Project No. VV4147
17 October 2016

Mr. David Heitzman
Defenders of East Napa Watersheds
23 Rockrose Court
Napa, CA 94558

Subject: Circle Oaks Drive
Napa County, California
GEOLOGIC AND GEOTECHNICAL REVIEW & RECONNAISSANCE

References:
1) Draft Environmental Impact Report
Walt Ranch Erosion Control Plan
By Analytical Environmental Services, dated July 2014
2) Final Environmental Impact Report
Walt Ranch Erosion Control Plan
By Analytical Environmental Services, dated March 2016

Dear Mr. Heitzman:

INTRODUCTION

At your request, **KC ENGINEERING COMPANY** in association with Joyce Associates, have reviewed specific sections of the referenced Environmental Impact Reports (EIR) to determine whether Circle Oaks Drive was adequately evaluated with respect to the proposed impacts of heavy construction equipment traffic and future vineyard operations truck traffic. Our review summary and comments are presented herein.

In addition, we performed a geologic and geotechnical reconnaissance on 9/6/16 of portions of Circle Oaks Drive in the Circle Oaks Subdivision in Napa County, California. The subject areas are located on Circle Oaks Drive between the intersections with Rockrose Court and Sunnyhill Lane, as shown on the attached "Site Map" included in the Appendix of this report. The purpose of our services was to evaluate the current road conditions, as well as the potential impact from heavy construction equipment and truck traffic related to the proposed Walt Ranch Vineyard operations.

Two areas of extensive pavement distress were observed. The largest area (Area A) is along a straight portion of Circle Oaks Drive approximately 300 feet north of the intersection with

"The purpose of our services was to evaluate the current road conditions, as well as the potential impact from heavy construction equipment and truck traffic related to the proposed Walt Ranch Vineyard operations."

Sunnyhill Lane. The second area (Area B) is located along the inside of a bend approximately 300 feet south of the intersection with Rockrose Court.

EIR REVIEW

The referenced EIR reports provide detailed geologic and traffic study information regarding the Walt Ranch project. However, specific geologic and/or geotechnical investigations were not performed for the portion of Circle Oaks Drive that are proposed to be impacted by use of the road.

On page 2-43 of the Draft EIR, Environmental Impact Section 4.7-4 states that "Construction traffic and subsequent operational traffic of the Proposed Project could increase wear-and-tear of area roads; this would be a potentially significant impact." The second bullet of the Mitigation Measure for 4.7-4 states that "Circle Oaks Drive shall be assessed by an independent third party consultant prior to the start of construction and following completion of construction. If the third party determines that roadway deterioration has occurred as a result of construction traffic, the applicant shall pay to have the roadway resurfaced to restore the pavement to at least pre-construction condition, unless the resurfacing is already expected to occur within a year or sooner in conjunction with other planned or proposed roadway improvements." It is noted that page 5-39 of the Final EIR, Section 4.7-4 states the same mitigation measure, with the addition that the applicant shall repair damage to sub-surface infrastructure.

Based on our review of the EIR's and the County Planning Department's website, Circle Oaks Drive has not been assessed by an independent geotechnical or geologic consultant. In our opinion, the EIR is inadequate and incomplete because it did not perform an assessment, nor subsurface investigation and analysis of the significant impact to Circle Oaks Drive, and it did not propose adequate mitigation measures. The EIR failed to divulge the Vineyard operation impacts to roads and subsurface infrastructure. In addition, proposed mitigation measure 4.7-4 failed to address and provide mitigation measures for impacts to the road and subsurface infrastructure due to future operations of the vineyard project.

AREA A

Area A includes an area of extensive road settlement and cracking located along a linear portion of Circle Oaks Drive. The road in this area was constructed by cut/fill techniques and the eastern lane consists of a large fill embankment. The fill bank appears to extend down the slope approximately 25 vertical feet and has inclinations of about 1.5H:1V (horizontal to vertical). In this area we observed severe pavement cracks over a zone approximately 300 feet in length (see attached photographs). The cracks range up to approximately 1 inch in width and extend approximately to the centerline of the existing road. Some of these cracks have vertical offsets in excess of 1 inch. In addition, our observations found that the area has been repeatedly repaved to compensate for previous settlement in the area of more than 1 foot. Circle Oaks

"In our opinion, the EIR is inadequate and incomplete because it did not perform an assessment, nor subsurface investigation and analysis of the significant impact to Circle Oaks Drive, and it did not propose adequate mitigation measures. The EIR failed to divulge the Vineyard operation impacts to roads and subsurface infrastructure."

Drive in this area is not adequately sloped into the hill, but rather towards the outer embankment fill slope.

Our observations also indicate that during times of high flow from heavy rainfall events, water coming down the road sheets flows onto the roadway reaching the area of the cracks and top of fill slope. According to Mr. Heitzman, water does flow across the roadway in this area during major storms. We also observed evidence of erosion on the slope below this area. In our opinion, the future stability of the road embankment in this area is a critical concern. The fill portion of the roadway roughly northeast of the centerline is already experiencing excessive movement with cumulative movement since construction of more than 12 inches. The numerous open cracks allow the infiltration of water into the subgrade and the underlying fill. Experience on previous projects has shown that embankments of this type can fail suddenly as a result of heavy rain and the infiltration of water into road cracks. The result can be failure of the fill embankment and loss of the road, as well as underground utilities.

AREA B

The second area of concern (Area B) is along the inside of the bend located approximately 300 feet south of the intersection with Rockrose Court. The area consists of a fill placed along the flank of a ravine. As shown on the attached photographs, extensive pavement cracking and some road subsidence is occurring in this area. Similar poor drainage concerns exist in this location, wherein collects rain water sheets down toward and into the cracks.

CONCLUSIONS

The addition of heavy truck traffic from the proposed Walt Ranch Vineyard operations to the roadway will significantly exacerbate the existing road damage and increase the design Traffic Index. The EIR failed to perform an adequate analysis of current and future road stability of Circle Oaks Drive, and it failed to divulge the impacts to the road and subsurface infrastructure. In addition, proposed mitigation measure 4.7-4 failed to address and provide mitigation measures for impacts to the road and subsurface infrastructure due to future operations of the vineyard project. It is assumed that all vineyard construction and future operations traffic would be on Circle Oaks Drive, however, any alternative route should also be evaluated for road impacts and slope stability considering the historical instability of the roads in the Circle Oaks Community.

Unless corrective actions are taken, pavement damage and road subsidence will continue to worsen in both Areas A and B. In our opinion, corrective measures should be implemented as soon as possible to avoid further damage and related safety hazards.

Of particular concern is the ongoing subsidence and pavement distress occurring in Area A. Our observations indicate that more than one foot of vertical movement has occurred in the area since construction of the road. The observed cracking indicates that soil creep, settlement and instability of the roadway fill is ongoing. Experience on similar projects has shown that

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"Of particular concern is the ongoing subsidence and pavement distress occurring in Area A."

infiltration of water into roadway cracks can result in sudden failure of the fill embankment. Additional heavy equipment and truck traffic from the proposed uphill vineyard operations will likely result in additional distress to the road. Failure of the road embankment would result in a significant life safety hazard to vehicles traveling on the roadway. Failure of the fill embankment could also damage underground sewer and water facilities in the roadway.

In our opinion, the County should retain a qualified Geotechnical Engineering consultant to perform an evaluation of both areas and provide recommendations for pavement rehabilitation and slope stabilization. The investigation should include test borings and laboratory shear strength and R-value testing to establish the subsurface soil conditions and to determine the embankment slope stability factor of safety. Geotechnical road stabilization and repair recommendations should be provided based on the findings of the field and lab investigation. A Civil Engineering consultant should also be retained to evaluate the site and road hydraulics, perform an analysis of surface water drainage and provide mitigative design drawings. A traffic study should also be performed to evaluate the appropriate traffic index and pavement section.

LIMITATION

Our services have been performed in accordance with generally accepted geologic and engineering principals and practices. This warranty is in lieu of all other warranties, either express or implied. Our services have been provided at the request of Mr. David Heitzman of the organization *Defenders of East Napa Watersheds*.

Should you have questions or require additional information, please contact our office at your convenience.

Respectfully Submitted,

KC ENGINEERING CO.

David V. Cymanski, G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
DAVID V. CYMANSKI
GE 2585
EXP. 6-30-18
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JOYCE ASSOCIATES

James M. Joyce, C.E.G.
Principal Engineering Geologist

PROFESSIONAL GEOLOGIST
JAMES M. JOYCE
No. 1517
CERTIFIED ENGINEERING GEOLOGIST
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Copies: 1 email

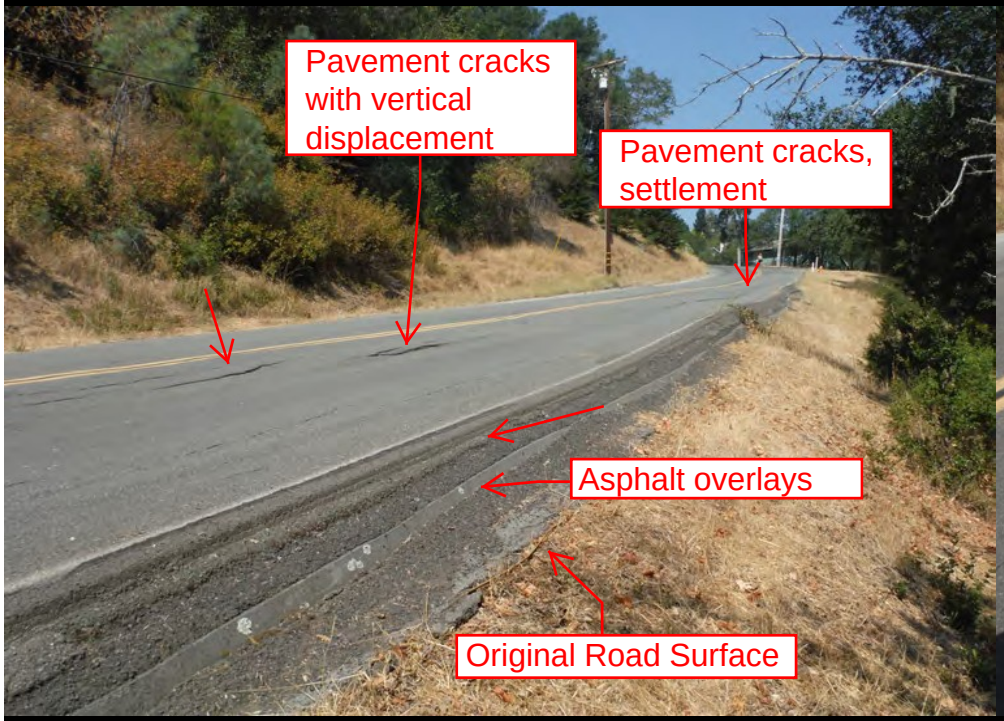
"Additional heavy equipment and truck traffic from the proposed uphill vineyard operations will likely result in additional distress to the road. Failure of the road embankment would result in a significant life safety hazard to vehicles traveling on the roadway."

Circle Oaks Drive

Area A – asphalt overlays indicate previous road settlement

Area A – pavement cracks with vertical displacement

Circle Oaks Drive



AREA A – looking northwest

Circle Oaks Drive

Area A – looking southeast

Road Conditions, 11/2014: 189 – 214 Circle Oaks Drive

Road Conditions, 11/2014: 189 – 214 Circle Oaks Drive

New cracks in road, 3/2016

Road Conditions, 11/2014: 189 – 214 Circle Oaks Drive

Comparative Level of Road Damage by Vehicle Weight

Vehicle	Approximate vehicle weight in pounds	Comparative level of damage
9 ton big-rig	18,000	410.0625
Hummer H2	8,600	21.3675
Chevy Tahoe	5,500	3.5745
Toyota Highlander	4,250	1.2744
Average Car	4,000	1.000
RAV 4	3,550	0.6204
Prius	3,050	0.3380
Smart Car	1,800	0.0410
Fat Man on a Freakishly Heavy Bicycle	350	0.00006

Source: City of Minneapolis Road Department

254 Circle Oaks Drive, Road Failure Repair, 2006

Early stage of landslide repair

Source: Napa County Public Works Department