California
Department of Conservation
California Geological Survey

Gavin Newsom, Governor
David Shabazian, Director

Memorandum

To: Midpeninsula Regional Open Space District
Attention: Coty Sifuentes-Winter, Senior Resource Management Specialist
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Governor's Office of Planning & Research

Mar 01 2021

STATE CLEARINGHOUSE

From: Patrick Brand
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DATE: March 1, 2021

SUBJECT: Review of Draft Program Environmental Impact Report for the Proposed Wildland Fire Resiliency Program (SCH# 2020049059)

Dear Mr. Sifuentes-Winter,

The Department of Conservation, California Geological Survey (CGS) is pleased to provide you with this review of the Draft Program Environmental Impact Report for the Proposed Wildland Fire Resiliency Program (SCH# 2020049059). We understand that the Midpeninsula Regional Open Space District (Midpen) proposes to implement a Wildland Fire Resiliency Program (WFRP) to comprehensively direct management to reduce wildland fire severity and risk, and that the proposed WFRP is intended to help guide Midpen's vegetation and fuel management activities. The actions of the WFRP may be applied on all Midpen's Open Space Preserves (OSPs) and other areas under Midpen management. The project area covers about 60,000 acres in portions of San Mateo, Santa Clara, and Santa Cruz Counties.

Project documents describe that the WFRP will include 1) a vegetation management plan that focuses on "non-fire" vegetation management, 2) a prescribed fire plan to also reduce wildland fire risks, 3) a wildland fire pre-plan program to help firefighting efforts in the event of a wildland fire, and 4) a monitoring plan to monitor site conditions before, during, and after treatments or fire events. It is reported that the wildland fire pre-plan program could involve improvements to existing road rights-of-way (i.e. widening, grading) or potential construction of new access roads in areas where adequate access is lacking.

The majority of the Midpen holdings are within the wildland-urban interface and it is reported that many of the OSPs abut small areas of low-density residential development. Additionally, it appears that numerous public roads and highways are located within or near the project area. Project documents indicate that a known concern is "addressing how fire management actions could impact slope stability and induce landslides and mitigating for any associated effects". Based on these observations, it appears that, in addition to environmental concerns such as impacts to aquatic resources, there are potential for impacts to public safety and infrastructure.

We reviewed the draft EIR, with focus on "Section 4.6 – Geology and Soils" and associated mitigations. Section 4.6 provides a generalized geologic overview of the project area that utilizes regional scale, generalized geologic data to present the basic geology and soils framework for the Midpen lands. The overview presented in Site 4.6 does not provide site-specific information at a level appropriate to evaluate specific projects that will be performed under the Proposed WFRP.

Our comments, provided below, are roughly grouped into four categorical subjects;

- Geology and Slope Stability,
- Roads and Erosion,
- Public Safety,
- Qualified Licensed Professionals.

<u>Comments regarding Geology and Slope Stability:</u>

- References listed in Section 4.6 are incomplete. For example, "Ellen, Mark, Wieczorek, Ramsey, & May, 1997" does not describe that this document is USGS Open-File Report 97-745-E, nor the scale of the source mapping. Another example is "USGS, 1997", which is simply listed as "Landslides, USGS GIS dataset", but appears to be from USGS Open-File Report 97-745-C.
- Section 4.6 presents an incomplete assessment of landslides and slope stability in the project area. We have the following comments:
    - Landslide mapping used for Figure 4.6.3 does not show "historic and projected landslides" as described in the figure title, but instead utilizes mapping that summarizes slopes into areas as "mostly", "many", and "few" landslides. The legend of Figure 4.6.3 indicates that areas of "many landslides" are depicted in a darker shade. The source map (Wentworth and others, 1997) indicates that these areas are "mostly landslides".
    - Section 4.6, "Slope Failures and Landslides" describes that "the most common landslide type encountered in the Midpen lands is a debris flow", and then primarily only discusses this type of landslide and the associated hazards. The referenced map (Ellen and others, 1997) that supports this conclusion is a predictive map that depicts source areas that are likely to produce debris flows during a future storm (though debris flow sources from the January 1982 storm are depicted as well). It is unclear how this conclusion was reached as other maps (i.e. Cooper-Clark and Associates, 1975; Brabb and Pampeyan, 1972), data (such as CGS Seismic Hazard Zone Maps and Reports; i.e. CGS, 2002), and information in county safety plans that identify additional landslide features are not referenced in this section and do not appear to have been evaluated or discussed.
    - Section 4.6, "Slope Failures and Landslides" references McClelland et al, 1998 to describes a correlation between slope steepness and overall potential for slope instability, and Figure 4.6.4 seems to use slope steepness as a direct proxy for potential for slope instability. The referenced article appears to focus on smaller, historic landslide features (excluding larger scale features such as rockslides and earthflows), and the referenced article does not draw

any conclusions about correlations between slope stability and slope steepness. This information is apparently interpreted from Table 4 of the referenced article by the draft EIR author. This data is drawn from different geologic setting in Idaho with little similarity to the current project area. Table 1 in McClelland et al (1998) shows that the Idaho study area is predominantly underlain by granitic and high-grade metamorphic parent material, neither of which are present in the Midpen project area. While there is certainly correlation between slope steepness and shallow-seated landslides, many other factors need to be considered in evaluating potential for slope instability (i.e. geological conditions, drainage characteristics, slope configuration, vegetation, climate, removal of underlying support, etc.). Additionally, it has been our experience that this correlation between slope steepness and potential for slope instability is less applicable to larger scale landslide types such as rockslides and earthflows. For example, observations in the San Francisco Bay Region show that earthflows occur on slopes as gentle as 25 to 30 percent (Keefer and Johnson, 1983).

    - Table 4.6-2 describes that alluvium deposits "are typically those that are most susceptible to landslides and slope instability". This statement is overly simplistic. It is our experience that areas of alluvial fans suggest locations of a repeated debris flow process. Where alluvial fans are recognized the proposed vegetation treatment upslope of the fan should include geologic evaluation of the potential for possible reactivation or formation of debris flows and resultant downslope impacts. Colluvial filled hollows (concave slopes) also pose a potential for debris flows and shallow-seated landsliding depending on the type of anthropogenic disturbance. Alluvium located in low lying and relatively flat areas (for example a flood plain) is less likely to be susceptible to landsliding processes.
    - Table 4.6-2 seems to describe that "bedrock in the Franciscan Complex generally exhibits high stability on natural slopes". The Franciscan Complex bedrock is considered high sheared and inherently weak, and as such is prone to landsliding.

- "Mitigation Measure Geology-2" intermingles erosion control and slope stability measures, and it seems that erosion control measures are also often intended to mitigate slope stability concerns. It is our opinion that slope stability concerns are not adequately addressed by the proposed mitigation. It seems that the mitigation measures identified only apply to areas where post operation ground cover will be less than 70 percent or where slope gradients exceed 35 percent. As discussed previously, landslides may still be present on slopes less than 35 percent slope. Additionally, slope gradients are often variable across a given landscape and it is unclear how slope gradient for a project area is to be determined. For example, will mitigation measures only apply to portions of a project area that exceed 35 percent slopes, or is an average slope gradient used to apply the mitigations measures to an entire project site?
- "Impact Geology and Soils-3, Manual and Mechanical Techniques and Chemical Application" describes that "most landslides that occur after tree removal can be attributed to reduced soil cohesion from root decay". The section goes on to discuss

loss of root strength after tree removal and seems to describe that leaving roots intact after vegetation removal will act to minimize the potential for slope failure and landslides. This is not true for non-sprouting species. While root strength is significant, this analysis does not also consider decreases in evapotranspiration after vegetation removal. This decrease reduces the amount of water intercepted and transpired by the canopy and can result in increased ground saturation, which could contribute to a decrease in slope stability in areas that are sensitive to groundwater changes or underlain by landslide features.

- "Mitigation Measure Geology-4" recommends to "consult GIS data to determine if expansive soils may be present within the proposed construction site". The specific GIS data that can be utilized for this purpose is unclear and not defined in the draft EIR.

Comments regarding Roads and Erosion:

- Existing Roads and Skid Trails. The draft EIR (including, but not limited to, "Impact Geology and Soils-2, Access and Vehicle Travel") does not appear to completely evaluate or address the potential impacts of using of existing roads and associated watercourse crossings, potential improvements to roads, and potential use of skid trails on soil erosion and land sliding. For example, poorly constructed, drained, and/or maintained roads and watercourse crossings commonly result in significant erosion and sediment delivery to aquatic resources. Erosion and sediment delivery at non-functioning or poorly functioning crossings can be exacerbated by vehicle use. The draft EIR does not discuss watercourse crossings. Evaluating watercourse crossings prior to use and upgrading them to modern standards as necessary would minimize the potential for erosion and sediment delivery. The draft EIR describes that skid trails may be cleared of vegetation for use to access forest treatment areas. Installing waterbreaks on skid trails following use would disperse runoff and minimize concentrated flows that can lead to erosion and sediment delivery. These concepts are presented in many documents and manuals, including Keller and Sherar (2003), McClelland and others (1998), the "Handbook for Forest, Ranch & Rural Roads" (Weaver, Weppner, and Hagans, 2015), and the California Forest Practice Rules (CAL FIRE, 2020) which presents guidelines for planning, designing, constructing, reconstructing, upgrading, maintaining, and closing roads. Registered Professional Foresters (RPF) should be utilized to conduct such evaluations.
- Proposed Roads. The draft EIR (including, but not limited to, "Impact Geology and Soils-2, Wildland Fire Pre-Plan") does not appear to completely evaluate or address the potential impacts of the potential construction of roads. , Poorly designed and located and/or constructed roads (i.e. located on steep slopes, built across unstable areas, etc.) can possibly lead to erosion, sediment delivery and landsliding. These concepts are presented in many documents and manuals, including Keller and Sherar (2003), McClelland and others (1998), the "Handbook for Forest, Ranch & Rural Roads" (Weaver, Weppner, and Hagans, 2015), and the California Forest Practice Rules (CAL FIRE, 2020) which presents guidelines for planning, designing, constructing, reconstructing, upgrading, maintaining, and closing roads. Registered Professional Foresters (RPF) should be utilized to conduct such evaluations.

- "Mitigation Measure Geology-2, Steep Slopes Control Measures" describes that heavy equipment use on slopes greater than 35 percent will be avoided "unless specialized equipment is used that does not impact slope stability". Please describe or provide of examples of such specialized equipment. It is unclear what personnel can make such a determination that the equipment will not impact slope stability.
- "Mitigation Measure Geology-2, Steep Slopes Control Measures" recommends avoiding installation of spur roads or staging areas "on steep slopes, particularly over 50 percent slope, where feasible". If avoiding steep slopes is not feasible, then "appropriate design and control measures" such as those in Keller and Sherar (2003) are to be implemented; however, road construction techniques on steep slopes exceeding 50 percent should be specifically addressed in the draft EIR. Sidecast road fills on steep slopes are commonly prone to failures and instability. Based on this observation, McClelland (1998) recommends avoiding fills on slopes steeper than 55 percent or full-bench and endhaul if it is necessary to have the road located on a slope steeper than 55 percent; and similarly, Keller and Sherar (2003) recommend avoiding sidecasting fills on slopes steeper than 50 to 60 percent. The 2020 California Forest Practice Rules (CAL FIRE, 2020) also provides guidance on road construction on steep slopes. Cal Fire should be consulted prior to operations.

Comments regarding Public Safety:

- PUBLIC SAFETY. "Impact Geology and Soils-1" does not acknowledge the potential for direct or indirect substantial adverse effects, including the risk of loss, injury, or death, involving landslides, but instead defers to "Impact Geology and Soils-3" for analysis. As described in the introduction, there does appear to be potential public safety concerns related to landsliding given the potential proximity to public roads and infrastructure. Acknowledging this hazard here would likely raise the significance level determination. The 2021 California GEOLOGIST AND GEOPHYSICIST ACT (California Department of Consumer Affairs, 2021) describes laws intended to have qualified geologists and/or engineers evaluate slope stability conditions and the process for enforcement actions.

Comments regarding Qualified Licensed Professionals:

- Under "Mitigation Measure Geology-2", paragraph two (page 4.6-33) describes that prior to operations, "the area shall be inspected for signs of erosion or slope instability". The mitigation does not describe what qualified personnel are necessary to inspect the area or provide criteria for what constitutes signs of slope stability issues other than "slumped soil". The mitigation does not describe standard practices such as reviewing available geologic and landslide mapping of the specific project area or reviewing recent, high quality topographic date derived from LiDAR data to assess the presence of previously unmapped landslides. LiDAR data is available for all of San Mateo, Santa Clara, and Santa Cruz counties.
- Paragraph two (page 4.6-33) also states that appropriate measures to prevent slope instability shall be made by qualified personnel that are described as a SWPPP developer or practitioner. These personnel are not qualified to evaluate landslides and potential impacts to slope stability or develop recommended mitigations to minimize impacts to slope stability. The California 2021 GEOLOGIST AND GEOPHYSICIST ACT (California Department of Consumer Affairs, 2021) describes laws

intended to have qualified geologists evaluate slope stability conditions and the process for enforcement actions.

- “Mitigation Measure Geology-2, Steep Slopes Control Measures” describes that a geologist shall perform an assessment only in cases of steep slopes (greater than 35 percent) that are located above infrastructure or sensitive habitat, if “intensive tree removal” is proposed. California law (the 2021 GEOLOGIST AND GEOPHYSICIST ACT) indicates a California licensed certified engineering geologist and/or a professional engineer with experience in evaluating slope stability should provide this type of evaluation where public safety is a concern. Additionally, as discussed previously, landslides and potential slope stability issues may be present on slopes less than 35 percent. As well, it is unclear what criteria are used to determine if tree removal is “intensive”.
- Based on these observations regarding “Mitigation Measure Geology-2”, we recommend that a focused, site-specific evaluation of geology and slope stability by a California licensed Professional Geologist (PG) with experience in evaluating slope stability may be necessary for specific projects. In areas where possible impacts to public safety are a concern a California licensed certified engineering geologist (CEG) and/or a professional engineer with experience in evaluating slope stability should provide this type of evaluation. A preliminary screening of specific projects by qualified personnel (e.g. a PG or CEG) could determine if this type of additional geologic evaluation with additional mitigations is necessary. For reference, CGS Note 45 (CGS, 2003a) presents guidelines for geologic reports prepared for similar types of environments and operations (Timber Harvest Plans), and CGS Note 50 (CGS, 2003b) presents a discussion of factors affecting landslides in forested terrain.
- Regarding the practice of forestry, we reiterate the California Forest Practice Rules (CAL FIRE, 2020) presents rules, laws and guidelines for planning, designing, constructing, reconstructing, upgrading, maintaining, and closing roads, vegetation management plans, and timber operations. Registered Professional Foresters (RPF) should be utilized to conduct such evaluations. CAL FIRE should be consulted prior to operations.

We hope this information is helpful. Please call us with any questions.

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