City Council Meeting
02-22-21
Item 6.A.

Council Agenda Report

To: Mayor Pierson and the Honorable Members of the City Council

Prepared by: Cotton Shires and Associates / GeoDymanics, Inc., Geotechnical Consultants

Reviewed by: Yolanda Bundy, Environmental Sustainability Director
Rob Duboux, Public Works Director

Approved by: Reva Feldman, City Manager

Date prepared: February 10 2021 Meeting date: February 22, 2021

Subject: Big Rock Mesa Landslide, Status and Development Review

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RECOMMENDED ACTION: Receive and file report on Big Rock Mesa Landslide Assessment District related capital improvement options with the Big Rock community.

FISCAL IMPACT: This report was prepared by Cotton Shires and Associates / GeoDymanics, Inc., the City's geotechnical consultants. To date, the costs associated with the review and preparation of this report total $20,000. There is sufficient funding in the Adopted budget for Fiscal Year 2020-2021 for these expenses.

It is anticipated that an additional $25,000 will be needed for consultants to prepare for and participate in public meetings related to this issue. If the Council determines additional analysis is needed, the budget will need to be amended accordingly and funds will need to be appropriated from the General Fund Undesignated Reserve.

WORK PLAN: This item was not included in the Adopted Work Plan for Fiscal Year 2020-2021. This project is part of normal staff operations.

DISCUSSION: On November 9, 2020, City Council directed the Environmental Sustainability Department (Geotechnical Consultants) to prepare a report addressing questions and concerns raised by Homeowners during the Public Works Department presentation of the Big Rock Mesa Landside Assessment District (LAD) by Yeh & Associates on October 6, 2020, and in subsequent emails. The City Council directed

staff to pursue an additional Big Rock Mesa Landslide Assessment District and related capital improvement options with the Big Rock community; and "*to bring back a review of the safety factor and development impacts in the Big Rock area.*"

The purpose of the presentation is to address the second part of the City Council's November 9 request. Staff initially provided written responses to some of these issues in memoranda[1] prepared in response to homeowner's questions. To fully address these two issues, staff have reviewed previous technical studies of the Big Rock Mesa (BRM) landslide, the history of development, a summary of the BRM landslide site characteristics, geologic review procedures, and applicable codes and regulations. How development applications are reviewed from a geotechnical perspective, how does land development affect, individually and cumulatively, the factor of safety of the BRM landslide and what can be inferred about the state of stability (both current and future) from the application of LAD data from Yeh & Associates work, to the Bing Yen & Associates[2] stability model, are also addressed.

Geology Consultants have prepared this report at the request of City Council in response to concerns raised by homeowners residing on the Big Rock Mesa Landslide. It is intended to be a summary to provide background information at the City Council's request. It is not intended to be a presentation of all information relevant or available regarding the history of development, data and reports on Big Rock Mesa Landslide. There may be other relevant information and topics relevant to development on and stability of Big Rock Landslide that are not covered in this report.

Introduction to and Role of City Consultants

The Cotton Shires and Associates, Inc./GeoDynamics, Inc. (CSA/GDI) team has been providing services to the City of Malibu's Environmental Sustainability Department (ESD) since May of 2015, and the professionals have served both the ESD and the Public Works Department since 1993 while employed by other geotechnical firms. The Geotechnical Consultants who prepared the above referenced memoranda and this report are Mike Phipps, PG, CEG, key contact and contract manager, Christopher Dean, PG, GE, Principal Engineering Geology reviewer, and Lauren J, Doyel, PE, GE, Principal Geotechnical Engineering reviewer. Ali Abdel-Haq, PE, GE, Principal Geotechnical Engineering reviewer provided senior technical review for the geotechnical memoranda incorporated into this report.

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[1] Four memoranda by City staff were provided as follows: Geology and Geotechnical Review for Development in the Big Rock Mesa Landslide Area dated October 22, 2020; Geology Responses to questions posed by Christopher Cunningham on 12-4-2020, dated December 23, 2020; Geology Response to additional question posed by Christopher Cunningham, on 1-5-2021, Planning Commission Hearing for 20272 Inland Lane dated January 8, 2021; Environmental Health Division Onsite Wastewater Treatment Systems (OWTS) for Developments in the Big Rock Mesa Landslide Area dated October 21, 2020. These memoranda are included as attachments to this report.

[2] Bing Yen & Associates, 1992, Geotechnical Engineering Evaluation of the Big Rock Mesa Landslide, prepared for Los Angeles County Improvement District 2692R2, dated February 26, 1992, 444p.

Mike Phipps, PG, CEG, Principal Engineering Geologist (CSA), is a Professional Geologist and Certified Engineering Geologist in California with over 34 years of experience in hillside and coastal geologic site characterization studies, including landslide investigations and remediation studies within the City of Malibu and Santa Monica Mountains. Mike has consulted to the city in various capacities since late 1993, including oversight of landslide maintenance area work, over a dozen emergency response matters for both the Environmental Sustainability and Public Works departments, numerous landslide evaluations and repairs, geotechnical investigations for City facilities and parks, defending the City as an expert witness on landslide cases, and peer review of hundreds of projects. He has abundant geologic and geotechnical experience in Malibu and has a 27-year history of successfully providing professional service to the City.

Chris Dean, PG, CEG, Supervising Engineering Geologist (CSA), holds a master's degree in Engineering Geology, is a Professional Geologist and Certified Engineering Geologist in California, and has more than 38 years of experience as a geologist, including 31 years as an engineering geologist in southern California. Mr. Dean has been a consultant to the City of Malibu for 25 years. Since 1996, he has been the acting City Geologist for the City of Malibu. He is responsible for technical geologic reviews of new residential and commercial development, additions and remodels to existing structures, subdivisions, lot line adjustments, swimming pools and accessory structures, onsite wastewater treatment systems, and rebuilds from fire damage. He has served as geologic consultant to the Public Works Department for in-house projects as well as consultant to City Public Works staff regarding the three landslide assessment districts.

Lauren Doyel, PE, GE, Principal Geotechnical Engineer (GDI), holds a master's degree in Civil Engineering (Geotechnical) and has over 35 years of experience in geotechnical engineering including both onshore and nearshore development, peer review and failure analysis, focusing on Southern California. She has investigated and evaluated some of the largest landslides in California including Big Rock Mesa, Abalone Cove, Flying Triangle, and Love Creek. From 1999 to 2006, Ms. Doyel served as the Supervising Engineer and Project Manager for all three landslide assessment districts in the City of Malibu, and then served as a senior technical advisor for the districts until 2012. She has served as project engineer and manager for the Public Works Department projects including the repair of Corral Canyon Road in 2006. She has been a peer reviewer in Malibu since 1999 (both geotechnical and coastal engineering), most recently in support of the 2018 Woolsey Fire rebuild developments. She has worked on the Big Rock Mesa Landslide since 1985, when she observed drilling on the Hansch property (20600 Rockcroft) as part of geotechnical evaluations of the 1983 BRM landslide reactivation.

Ali Abdel-Haq, PE, GE, Principal Geotechnical Engineering reviewer has over 31 years of professional experience in geotechnical engineering in the State of California, and 3 years of experience on projects throughout the United States. He is

currently a senior geotechnical engineering reviewer for Malibu. He has performed geotechnical and coastal engineering reviews for over 18 years for various projects for the cities of Simi Valley, Calabasas, Agoura Hills, Rosemead, Palmdale, Moorpark, Santa Clarita, County of Santa Barbara, Hidden Hills and Malibu. His review work includes extensive slope stability analyses for hillside developments that included landslides and required mitigation measures to comply with regulatory agencies requirements.

The role and responsibilities as peer reviewers for the Environmental Sustainability Department is differentiated from design consultant roles working for the project owner, whether public or private. The role of a peer reviewer is to assure the adequacy of geotechnical reports (which include both geology and geotechnical engineering evaluations) submitted in support of a proposed project. Reports must address the site conditions, meet the standard of practice and requirements set forth in the California Building Code, the City of Malibu code, and the City's geotechnical guidelines[3], regulations and requirements in planning (feasibility) and building plan check (design level).

Yeh & Associates (Yeh) was recently selected (2020) by the City of Malibu to replace Fugro Consultants as the Landslide Assessment District's Geotechnical Consultant. Yeh specializes in evaluating Geologic Hazards and providing mitigation recommendations. Yeh's role under contract to the City is to monitor and maintain the monitoring and dewatering facilities on Big Rock Mesa for the Public Works Department, and to recommend capital improvements and supervise the installation of these improvements. Loree Berry, PE is the Project Manager for the LAD, and she presented the status report on the Big Rock Mesa LAD to City Council on October 6, 2020.

Brief History of Big Rock Mesa

Big Rock Mesa (BRM) is a large 160-acre historically active landslide that is one of over 90 mapped landslides within the City of Malibu (Figure 3). The City boundary encompasses over 21 miles of shoreline where the Santa Monica mountains meets the Pacific Ocean. The roughly ¾ mile wide city limit encompasses a geologically complex area with multiple geohazards: active faults, active landslides, seismic shaking and ground failure hazards, and coastal hazards (erosion, sea level rise and tsunami). Figure 1 Big Rock Mesa Area is an aerial photo of BRM taken in 2001 and depicts development of the area essentially as it exists now. The 1992 BYA report provides a summary of the history of development of Big Rock Mesa[4] which is summarized in Figure 2 Historical Trends. This figure depicts a brief history of development and activity of the BRM landslide, from the beginning of the Tract

[3] Guidelines for the Preparation of Engineering Geology and Geotechnical Engineering Reports and Procedures for Report Submittal" (November 2013). See References for hyperlink to the guidelines.

[4] IBID Table 2-1 p. 38-39.

development on the main mesa area up to the present, compared to rainfall, a key contributing factor to the reactivation of BRM landslide. A brief development summary of BRM follows, and an exhaustive geologic description and history can be found in the technical publications referenced in this report, principally the Bing Yen and Associates, Inc. 1992 report[5] and a technical paper[6] that presents a forensic analysis of the BRM landslide principally authored by the late Dr. James Slosson, PG, CEG, RGP, former California State Geologist (1973-1975).

This pattern of land development is not unique in what is now the City of Malibu, nor in southern California during the period of rapid development in the 1960s. Since the 1920s, residential development was constructed on numerous ancient or dormant landslides that were largely unrecognized prior to the development of modern building and grading codes, and the advent of professional geological and geotechnical (soil) engineering practice. Some of these landslides, including Big Rock Mesa, Rambla Pacifico, Las Flores Mesa-Eagle Pass, Calle del Barco, and multiple locations on Malibu Road were later re-activated by successive heavy rainfall years, among other factors.

Early development history

The BYA report contains a summarized history of BRM development. In 1937, there were about 9 homes on BRM, scattered mostly in the western extension[7]. The land was principally owned by Rindge Ranch which operated several large capacity water wells on the mesa. In the late 1950s, as development pressure from Los Angeles expanded westward along the Pacific Coast Highway, Cave Corporation proposed two residential tracts on BRM in the lower mesa area. At that time Los Angeles County geologists thought the main lower mesa area represented an uplifted marine terrace, which explained the landform. In 1963 the tracts were approved by Los Angeles County and grading began in 1964.

At the time the tracts were approved, the factors of safety were believed to be well above 1.5[8] However, in the mid to late 1950s, Rindge Ranch ceased operating some of the large capacity water wells, and groundwater levels began to rise in the lower mesa. Between 1957 and 1967, groundwater levels rose over 200 feet in the Central Mesa area[9.] In 1964, concerned by the potential rise in groundwater levels and the potential destabilizing effects on the bluff, Los Angeles County required the installation of horizontal gravity drains (hydraugers) in the bluff face on the lower east mesa. In the early 1970s, when the groundwater table was rising due to the cessation

[5] IBID p.8

[6] Slosson, James and Gerard Shuirman (1992), “Malibu Landslide: Massive Litigation” in Forensic Engineering, Environmental Case Histories for Civil Engineers and Geologists, pp18 -86.

[7] BYA 1992, Table 2-2, pp 40-47.

[8] Slosson and Shuirman, 1992, p.

[9] BYA 1992, Figure 2-2.1, Relative groundwater trends with respect to home development, p. 52.

of pumping of large water wells by Rindge Ranch and increased rainfall, additional dewatering was required. A few of the former water wells were turned back on, but additional dewatering facilities were needed. Unfortunately, the Homeowners Association, which had been formed to maintain these hydraugers, was not interested in investing in more dewatering as recommended by the County and various geotechnical consultants, the groundwater levels continued to rise. In 1975 the homeowners voted to dissolve the drainage district due to the high-cost estimate, perhaps not fully understanding the consequences (potential reactivation of the large landslide mass). The BYA report presents an extensive summary of observed and documented distress and deformation activity in Big Rock Mesa, both local and across the mesa, starting in late 1960s and becoming apparent in the mid-1970s.[10.]

By 1980 there were a total of 216 houses on the mesa, 105 houses in the upper mesa and western extension, and 111 houses on the lower mesa,[11] and groundwater levels were only 20 to 30 feet below the ground surface in some areas.

Landslide Reactivation and Geotechnical Evaluation

The main BRM landslide mass encompasses approximately 160 acres, and an area of about 79 acres immediately to the west is commonly referred to as the Western Extension (see Figure 3). Gross movement of the BRM landslide was first widely recognized in 1983, although there were signs of incipient movement in previous heavy rainfall years. In December 1983 Los Angeles County formed CI 2629 (a capital improvement project/district) to conduct a geotechnical investigation and install landslide mitigation measures. An emergency dewatering program was implemented and 14 dewatering wells and 34 hydraugers were installed to supplement the existing 4 wells and 13 hydraugers. The emergency dewatering system lowered the high-water level which caused the onset of the landsliding.[12]

In 1988, BYA was hired by the Los Angeles County CI 2629 to investigate and provide a geotechnical engineering evaluation of the landslide, evaluate the stability of the landslide, and provide recommendations for stabilization. The study encompassed four years and resulted in the 1992 BYA report for L.A. County, which characterized the geology and groundwater regime of BRM, summarized development and changes in groundwater elevations from the mid-‘1950s until reactivation of the landslide, identified five principal regions within the landslide complex, evaluated slope stability and developed factors of safety for each of these areas, and performed parametric analyses to evaluate the effect of the rise in groundwater (as a result of rainfall) on the factor of safety. This seminal study remains the definitive geotechnical engineering evaluation of the landslide, and the

[10] IBID, Table 2-2, Summarized Table of Distress/Deformation Activity in Big Rock Mesa, P.40-47.

[11] BYA, 1992, p. 12.

[12] IBID p. ES-2.

data, analyses, conclusions and recommendations are still relevant to current conditions.

In 1998, after the wettest year of record in southern California since the 1983 reactivation of the BRM landslide, rising groundwater levels and landslide creep movement prompted re-formation of the LAD into its current incarnation, BRM LAD 98-1.

Recent Development

Since the reactivation of the BRM landslide, there have been two primary sources of construction on the Mesa, fire rebuilds and limited additions/repairs or remodels to existing development. In 1993, approximately 50 homes were destroyed in the Malibu-Old Topanga Fire as well as a handful of accessory structures. The 1994 fire rebuild guidelines, developed by City geotechnical consultants with input from City staff and an ad-hoc committee (and subsequently adopted by the City Council), allowed for replacement of these homes based on permitted square footage plus up to 25%. Other development allowed by City codes/regulations include remodels, repairs, OWTS replacement/repair and other limited additions.

The guidelines/codes under which these additions were reviewed by City Geotechnical Consultants are discussed in subsequent sections. Any development that had a net negative effect on the project site itself, or on surrounding properties (including the BRM landslide) would be highly unlikely to be approved by City Geotechnical Consultants and the Environmental Health Division under the guidelines and policies applicable to development review.

Development Regulations and Review

City Geotechnical Consultant reviews proposed development within the City of Malibu in both the Planning (feasibility) and subsequent Building Plan Check (engineering design level) stages within the context of the current California Building Code, City Municipal Code, and Planning Regulations and policies as embodied in the City's current Local Coastal Plan (LCP) and Local Implementation Plan (LIP). Applicable development regulations are governed by the type of development proposed. Proposed developments are evaluated by Geotechnical Consultants in accordance with the City of Malibu "Guidelines for the Preparation of Engineering Geology and Geotechnical Engineering Reports and Procedures for Report Submittal" (November 2013) (Geotechnical Guidelines), including the requirement for engineering geology and geotechnical engineering reports to be submitted pursuant to Section 111 of the Los Angeles County Code (as adopted and amended by the City in the Malibu Municipal Code).

Proposed projects on landslides are scrutinized in detail. Part of the evaluation for development or remodel of existing structures (as described) includes coordination with the City Environmental Health Division and Public Works Department to

determine impacts to local slope stability, slide mass stability, potential sources of water that could infiltrate into the unstable land mass, and location of Onsite Wastewater Treatment Systems (OWTS) with respect to dewatering facilities. Due to geologic conditions in the BRM Landslide area and factors discussed above, development is limited by type and location on the landslide mass. The important factor is to maintain or reduce infiltration of surface water (rainfall, septic effluent, and irrigation) to the groundwater table. This can be achieved through a variety of development practices including by control of surface drainage, impermeable surfaces that direct surface runoff to storm drains, OWTS utilizing drip dispersal methods (evapotranspiration) of effluent disposal, subdrainage collection under pools and shallow structures, landscaping that is water efficient, and irrigation systems that have moisture monitoring and rainfall shutoff features.

Geotechnical Project Review

Depending on the type and size of the development proposed, within the context of the geotechnical review, there are several categories of development from a geotechnical perspective, and the Geotechnical Guidelines specify requirements for and findings that must be supported by analysis in geology and geotechnical engineering reports [13]:

- New construction.
- Remodels.
- Additions to existing structures.
- Swimming pools and spas (treated as new structures).
- Repairs to existing structures/remedial grading.
- Onsite Wastewater Treatment Systems

BRM is a neighborhood of existing residential development located on a large historically active landslide incorporated into a LAD, with the purpose of dewatering to maintain low groundwater levels and therefore improve the stability of the landslide mass. Although the current factors of safety are unknown, according to the most comprehensive study specific to the BRM landslide (BYA 1992), the landslide mass does not have, nor could it easily attain, static (long-term) or pseudo-static (short term, seismic) factors of safety that meet the standard of care for new development (1.5 for static and 1.0. for pseudo-static). For this reason, development of vacant land within the active BRM Landslide has generally not occurred since the landslide commenced movement in 1983 and continuing through Malibu cityhood in 1991 to today.

[13] City Geotechnical Guidelines 2013, Section 3.2.

Development that has occurred within the Big Rock Mesa Landslide since incorporation of the City has consisted of additions, remodels, pools, and fire rebuilds (approximately 50 homes). Efforts have been pursued by applicants to develop new single-family residences in the BRM Landslide, as well as on other historically active landslides within the City on previously damaged properties (either by landslides or the 1993 fire). These development applications would require approval of a variance to the City's Local Coastal Program-Local Implementation Plan's slope stability (factor of safety) requirements for new development that are in Chapter 9.4.D of the LIP.

Proposed developments are evaluated by Geotechnical Consultants in accordance with the City Geotechnical Guidelines, including the requirement for engineering geology and geotechnical engineering reports to be submitted pursuant to Section 111 of the Los Angeles County Code (as adopted and amended by the City in the Malibu Municipal Code).

Coordination with Environmental Health Division

Changes to the Onsite Wastewater Treatment System (OWTS) have a direct effect on the groundwater, especially in landslides. City Geotechnical Consultants work in the same office space as the Environmental Health staff and work together during project review. This issue is addressed as part of project review under multiple sections of the Geotechnical Guidelines.

- Any changes to the proposed OWTS require a supporting geology report as outlined in the Guidelines.[14]
- Individual projects must be evaluated by the Project Geotechnical Consultant for potential adverse effects not only to the lot itself, but also the surrounding properties.
- Section 3.2.2 Remodels: "Remodels proposing an enlargement of the on-site wastewater treatment system in landslide-prone areas such as Big Rock Mesa, La Costa, Las Flores Mesa/Eagle Pass, and Malibu Road may require some level of review, determined by City Geotechnical Staff on a case-by-case basis."
- Section 5.7 Mandatory Building Code Statements: "Project Geotechnical Consultants are responsible for providing a complete finding in accordance with Section 111 of the Malibu Building Code for all proposed developments, including on-site wastewater treatment systems. The complete finding should be included with update reports. Section 111 of the Malibu Building Code states that the geotechnical engineering report "shall contain a finding regarding the safety of the building site for the proposed structure against hazard from landslide, settlement or slippage and a finding regarding the effect that the

[14] City Geotechnical Guidelines 2013, Section 5.8 and other applicable sections as referenced.

proposed building or grading construction will have on the geotechnical stability of property outside of the building site…."

- Section 5.7 Mandatory Building Code Statements: "It is critical that the Project Geotechnical Consultants provide specific recommendations regarding foundations, utility lines, wastewater disposal, surface and subsurface drainage, and fills that meet or exceed this objective, and that they clearly explain how each of these recommendations complies with the objective."
- Section 5.8 On-Site Wastewater Treatment Systems (OWTS): "The following discussions are guidelines for consultants to use when evaluating OWTS from a geotechnical perspective. Project Geotechnical Consultants need to demonstrate that the effluent from the proposed OWTS (including leach fields, seepage pits, or drip irrigation systems) will not adversely affect the stability of the subject site or adjacent properties in accordance with Section 111 of the Malibu Building Code. That is, it should be demonstrated that the dispersal of effluent into the subsurface on the property will not contribute to landsliding, settlement, or slippage and that the disposal of effluent will not adversely affect adjacent properties. Project Geotechnical Consultants are expected to provide a written statement in accordance with Section 111 of the Malibu Building Code regarding the OWTS."

Origins and purpose of Section 110/111 of LACC (Title 26)

These code sections have been in place for more than four decades and were developed by Los Angeles County specifically for circumstances involving proposed development where potential geologic hazards exist, including landslides[15]. They are included in Appendix A for reference (A5 LA County Code Sections 110-11_adopted 2019) Code section 111 requires the project geotechnical consultants to prepare and submit technical investigation reports in which they make specific findings, including: 1) a finding regarding the safety of the site of the proposed work against hazard from landslide, settlement or slippage; and 2) a finding regarding the effect that the proposed work will have on the geotechnical stability of the area outside of the proposed work. The underlying premise for these required findings is safety—that the project will not endanger the health or safety of the occupants, adjoining land, or the public. With the knowledge that proposed development projects in the BRM Landslide area are located on or adjacent to a large historically active landslide (and are thus potentially subject to "landslide, settlement or slippage"), and depending upon the nature of the findings made by the project geotechnical consultants as required by Section 111, Section 110 of the Los Angeles County Code ("Prohibited Uses of Building Sites") has been applicable to many proposed development submittals for

[15] 1991 County of Los Angeles Code sections were originally Sections 308 and 309 and were renamed when the County reorganized the building code in 1995 under Ordinance 95-0065. Summary of Code changes can be found here: http://lacounty-ca.elaws.us/code/coor_title26_appa

sites located on the main landslide mass since before cityhood. Projects have been geotechnically approved provided that the project geotechnical consultants prepare the required technical investigation reports and make the required findings pursuant to Section 111 of the code, and if necessary, depending upon the Section 111 findings, including a finding of "safe for the intended use" per Section 110.2.3.2. Alterations/repairs, remodels and additions that do not increase the gross floor area of the existing residence by more than 25% are reviewed under the provisions of Sections 110.2.3.3 and 110.2.3.4 of the code. These code sections require that conditional findings be made by the Project Geotechnical Consultant that the proposed work complies with the provisions of Section 110.2.1. Those provisions are findings similar to Section 111 findings: that property outside the site of the proposed work will not be damaged by activation or acceleration of a geotechnically hazardous condition and such activation or acceleration could be attributed to the proposed work on, or change in use of, the site for which the permit is requested.

An "Assumption of Risk and Release" for geotechnical hazards is signed by the property owner(s) and recorded at the City (on behalf of the Los Angeles County Recorder) prior to permit issuance.[16] This document is an acknowledgment by the property owner that the property is potentially subject to hazard from landslide, settlement or slippage, but has been determined by the project geotechnical consultant to be safe for the intended use. The document runs with the land (deed) and is therefore binding on all successors in interest of the property and will appear on any title report for a property on which it has been recorded. This requirement is applicable city-wide and is not unique to the BRM landslide area.

All other new development applications must submit reports and make specific findings in accordance with Section 111 of the Building Code and must meet the 1.5 FOS for long term (static) and 1.0 FOS for short term (seismic) requirements in the City's LCP/LIP and Geotechnical Guidelines.

LCP (2002 forward), Section 9.4, and Variances

The slope stability development standard outlined in LIP Section 9.4.D for new development is two-fold: a minimum FOS of 1.5 is required for long term static stability, and a minimum FOS of 1.0 is required for short-term pseudo-static (seismic) stability. Where applicable, the City has allowed applicants representing properties in the historically active Big Rock Mesa Landslide to apply for a variance to the Factor of Safety requirement in LIP Chapter 9 (Section 9.4.D) in accordance with Section 13.26.5(B) of the City of Malibu's LIP (Page 243). This referenced section of the LIP requires the City to make several findings before a variance can be granted. Each finding must be supported by substantial evidence. The second of these required findings reads as follows: "The granting of such variance will not be detrimental to the

[16] The "Assumption of Risk and Release" is a document developed by the City Attorney of Malibu. An example of the current version of the ARR is included as Attachment 11.

public interest, safety, health, or welfare, and will not be detrimental or injurious to the property or improvements in the same vicinity and zone(s) in which the property is located."

The applicant must retain an licensed geotechnical consultant to perform an investigation of the property that conforms to the City's 2013 Guidelines, with the knowledge that the proposed development cannot meet the required 1.5 FOS and thus will need a variance. The applicant and their consultants must ultimately provide the City with reports that adequately support the required findings for the variance. The City's geotechnical reviewers (presently CSA/GDI) review the Project Geotechnical Consultant's discussions regarding the Big Rock Mesa Landslide Assessment District reports, dewatering, the variance, and the submittal of their quality control maintenance manual (QCMM). Approval of the project from a geotechnical perspective cannot be granted until all the findings and conditions of the variance have been adequately addressed and implemented in the plans. An "Assumption of Risk and Release" for geotechnical hazards must be signed by the property owners and recorded with the County Recorder, prior to permit issuance, as it is required by Section 110.2 of the Building Code, as originally developed by the County of Los Angeles.

The "Assumption of Risk and Release" (ARR) is utilized and recorded on the property title when development is permitted by the building code in areas with known geological hazards, including those potentially subject to hazard from landslide, settlement, or slippage. The underlying requirements of ARR's and the building code are that the Applicant's California state-licensed professionals, a Certified Engineering Geologist and licensed Civil (Soils) Engineer, must prove (supported by data and analysis in reports submitted to and reviewed by the City) that the proposed development is "safe for the intended use" and does not pose a risk to neighboring properties.

Environmental Health Review

Melinda Talent, R.E.H.S., Environmental Health Administrator, and staff summarized their review of development projects on BRM in their memorandum dated October 21, 2020 and incorporated in full below. City Geotechnical Consultants coordinate reviews of development projects with Environmental Health staff as the issues of geology, groundwater and infiltration for OWTS are inter-related and especially sensitive on the BRM landslide.

"Developments in the Big Rock Mesa Landslide area are evaluated by Environmental Health staff for the siting, design and operation of OWTS. Part of the evaluation for new developments or remodel of existing structures includes coordination with City Geotechnical Consultants to determine impacts to the landslide area and loading rates of wastewater (effluent) into the unstable land mass.

Proposed new OWTS and remodels to existing developments are evaluated for conformance with the Statewide OWTS Policy; Local Agency Management Program (LAMP); Malibu Municipal Code (MMC) Chapter 15.40 and 15.42, Regulation of OWTS and Technical Standards; and OWTS Manual. MMC contains general requirements for OWTS under Chapter 15.40.040, which requires that the property must support OWTS design capacity and soil absorption conditions to properly absorb the wastewater from proposed improvements. This section of MMC also requires that the OWTS be sited, designed, installed and maintained to ensure health and safety for the public and environment such that sewage will not discharge onto the ground, be dangerous to health, or drain to any stream within City of Malibu. This also includes any discharge or potential discharge to groundwater. The Big Rock Mesa Area contains several groundwater wells for monitoring and extraction. Setbacks from OWTS components to these facilities must be addressed by the project geologist and OWTS designer.

MMC also contains specific criteria for design of OWTS. Chapter 15.42.030 includes setback distances to water wells, streams, groundwater and unstable land masses. Technical standards under Chapter 15.42 also address site evaluation, geological reports and OWTS design reports which must include discussions on soils conditions and absorptive capabilities of the property. Sites that do not meet standard design criteria may be evaluated for alternative sewage disposal options as determined by the Administrative Authority on a case-by-case basis.

Due to soils conditions in the Big Rock Mesa Landslide Area and factors discussed above, standard OWTS dispersal components such as seepage pits and leach lines may not be appropriate for OWTS sited in this area. Systems utilizing drip dispersal methods for effluent disposal are best suited for these properties where groundwater levels, water well locations, slope or soil absorption rates are a concern."

Factor of Safety and Big Rock Mesa

Definition of Factor of Safety (FOS)

The following is a simplified explanation of FOS, and a more detailed definition and discussion can be found in the BYA report, and the technical literature referenced in this report.

Factor of Safety (FOS) is a geotechnical term that is technically defined as the ratio of shear forces that exist along a specific surface versus the limit equilibrium forces, limit equilibrium being the state at which a surface is about to fail or move. To simplify, it can be thought of as the ratio of forces resisting movement vs. the forces driving movement, i.e., the forces at the moment of failure. A FOS of 1.5 means that the existing forces resisting movement are 1.5 times greater than the forces required to cause movement.

The FOS is evaluated by modeling a slope utilizing slope stability analysis with standard accepted software programs, and evaluating the forces acting on the slope under representative conditions using a 2-dimensional model (a “slice” through the slope). The slope model is based on information collected through field investigation and interpreted by technical professionals. Important elements include slope geometry, geologic model of the slope (from geologic cross-sections) that include type, distribution and strength of soil/rock, groundwater presence and position in the slope, and external forces (structures on or in the slope, and for seismic analysis, transient earthquake forces). The analysis is designed to find the surface with the lowest FOS within the slope model. When modeling landslides, the specific landslide failure surface defined by the field investigation is analyzed using observed or predicted groundwater conditions, and materials strengths derived from laboratory testing or derived from analysis of specific known conditions.

Standard of practice for new development is to require that a site have a FOS of 1.5 under static conditions (long term site conditions including critical or worst-case groundwater conditions) and a FOS of 1.0 or greater under seismic loading conditions[17]. Factors of safety are by nature transient. Many slopes may have static factors of safety that are less than FOS 1.5 but never fail. Under seismic loading conditions, a slope may have a FOS of 1.0 or less but undergo very small movements. A landslide has on occasion, an overall factor of safety (FOS) of 1.0 or less than 1.0 when exhibiting ground movement. When not moving, the FOS is 1.0 or greater.

Big Rock Mesa Landslide Factor of Safety, Findings of BYA 1992 Report

The purpose of the BYA 1992 geotechnical evaluation was to model the BRM landslide, evaluate the conditions under which the landslide reactivated, and evaluate the FOS under various dewatering conditions. The results are summarized in Table 7.6, Stability Analyses of the Main Mesa, following. This table presents the results of stability analyses using three-dimensional analyses for the overall BRM area, and two-dimensional analyses along representative geologic cross-sections through the landslide within specific regions, for both prevailing conditions (November 1991) and maximum attainable factor of safety by dewatering.

- Three dimensional analyses, Main Mesa: Prevailing factor of safety in November 1991 was about 1.25, and the maximum attainable factor of safety attainable by dewatering was 1.4.
- Two-dimensional analyses, five cross-sections through Main Mesa Area: Prevailing factor of safety in November 1991 ranged from 1.23 to 1.30, and the

[17]ASCE/SCEC 2002, “Recommended Procedures for Implementation of SMG Special Publication 117 Guidelines for Analyzing and Mitigation Landslide Hazards in California https://www.tugraz.at/fileadmin/user_upload/Institute/IAG/Files/32_Landslide_Mitigation-DMG_SP117.pdf

maximum attainable factor of safety attainable by dewatering ranged from 1.3 to 1.50.

Table 7.6 Summary of Static Factors of Safety, Big Rock Mesa (BYA 1992).

TABLE 7-6

SUMMARY OF AVERAGE PREVAILING AND MAXIMUM ATTAINABLE GROSS FACTORS OF SAFETY

REGION	PREVAILING GROSS FACTOR OF SAFETY	MAXIMUM ATTAINABLE FACTOR OF SAFETY*
BRM LANDSLIDE AREA:		
* Basal Slide Surface of Main Slide Mass	1.25	1.4 +
* Central Region	1.25	1.4 +
* Southeastern Zone	1.2	1.4
* Eastern Bluff	1.2	1.4
* Central Bluff	1.2	1.3
* Western Bluff	1.2	1.4
* Headscarp Area	1.0+ to 1.2	Site Specific
WESTERN EXTENSION:	1.25 +	1.4 +
* South-Facing Slope	1.1	Site Specific

NOTE:

* See text (Section 7.1) for a discussion of maximum attainable factor of safety.

Significant findings in the BYA report conclude that, on average, the calculated FOS for most of the regions on the active landslide is 1.25 or less in November 1991, and "are likely to be the maximum attainable by the existing dewatering system…"[18]. Furthermore, the report states that "Factors of safety are transient in nature."

Other significant findings presented in the report with respect to FOS include the following[19]:

- Stability of all the regions within BRM landslide are interdependent, and failure or movement, or improvement of stability, of one of the regions will affect the other regions.
- The stability evaluation was "aimed at assessing the gross stability of the main mass and it's subregions, and represents an average…" and "estimates the prevailing (November 1991) factors of safety as well as the maximum factors of safety attainable by additional dewatering for the BRM Main Mesa…"
- "The factor of safety was between 1.0 and 1.05 during the period of late 1983 to mid-1984 when the emergency dewatering program was being implemented. In other words, the average groundwater level measured after this period represented a condition under which the main mass movement had slowed down significantly but still, locally, exhibited creep-like movement."
- "…factors of safety of about 1.4 to 1.5 were determined for both the deeper and the 1983 sliding surfaces when the groundwater is lowered near or below the 1983 basal rupture surface. Thus, for the BRM landslide area, this factor of safety of 1.4 to 1.5 is the maximum factor of safety attainable."
- FOS under seismic loading conditions varies depending on methodology and analysis, and the area of BRM being evaluated. The FOS was evaluated by region by BYA using displacement analysis (Under Section 8 – Seismic Stability). The analyses demonstrated that all regions of BRM landslide had a seismic factor of safety of less than 1.0; in other words, movement would occur the seismic loading conditions applied. Estimated maximum seismic displacement for the geotechnical cross-sections and loading modeled varies, and ranges from 0.2 to 0.7 feet in the central and eastern mesa regions, 1.1 feet in the bluff region, and 2.3 feet in the headscarp region (below 20600 Rockcroft).[20]
- A general relationship was developed by BYA between rise or fall of groundwater levels and a corresponding decrease or increase in the FOS, presented in Figure 9.1 (BYA 1992) below. An important underlying assumption

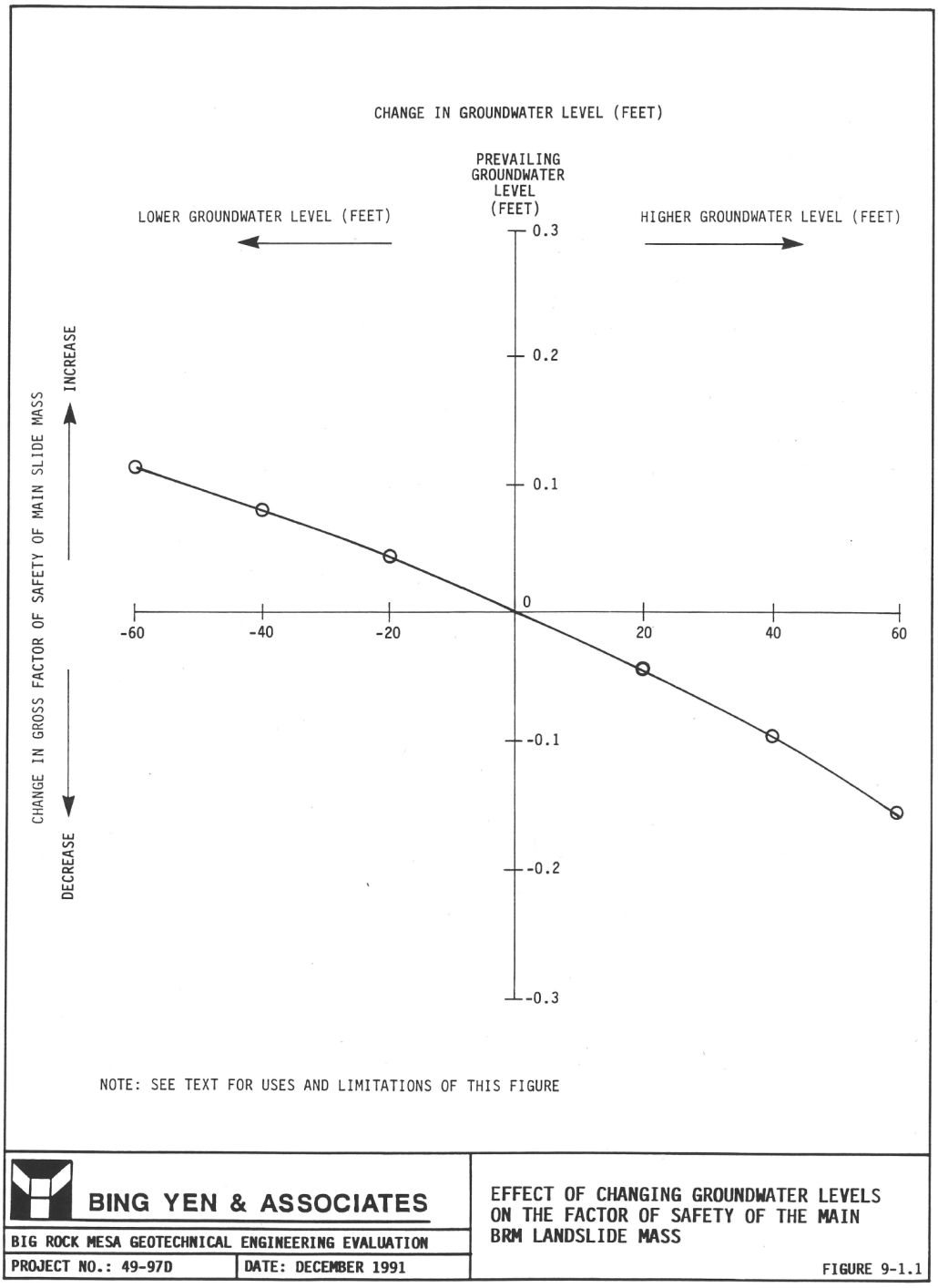
[18] BYA 1992, p. ES-6.

[19] BYA 1992, page references in order of bullet points: p. ES-2; p.7-1 (section 7 – Static Stability). , p.7-9, p. ES-6

[20] BYA 1992, p.8-4.

in applicability of this relationship is that water import remains at about 132 kpgd. (Water usage trends from 1984 to 2019 are presented in Figure 4 Historical Data Trends, Water Usage, Yeh & Associates (2020).

Effect of groundwater level on Factor of Safety (Figure 9.1 from BYA 1992).



Current Conditions and Factor of Safety

No re-evaluation of gross slope stability of the BRM landslide has been undertaken since the comprehensive evaluation presented in the 1992 BYA report. The report was a four-year long effort, based on intensive geologic mapping, field observations and rigorous analysis and was correspondingly expensive (at the time, approximately $1 million). However, BYA presented an evaluation of the effect of groundwater levels on the prevailing factor of safety, as discussed above. Some empirical correlations can be drawn from observations of the groundwater levels, rainfall, and slide movement, or lack thereof, since that report.

Following significantly above-average rainfall years, such as in 1995, 1998, and 2005, minor creep movements of certain portions of the Big Rock Mesa landslide were documented and reported in the annual monitoring reports published by the City's consulting geotechnical firm managing the Assessment District. These creep movements were detected in slope inclinometers (sensitive measurement devices within the landslide mass) with measured displacements generally less than 0.1 inch. During creep movement of a portion of the landslide, the FOS is, by definition, temporarily at or slightly below 1.0 until the dewatering facilities lower the water levels such that the slide creep movement slows and then ceases. It is important to review the relative water usage during these periods of creep movement, as the higher the water usage, the greater affect rise in groundwater level due to a wet year or succession of years has on the FOS.

The current FOS of the Big Rock Mesa landslide complex has not been analyzed as it was in the 1992 BYA report. Requiring individual property owners to perform slope stability analyses of the entire BRM landslide would not provide any new information regarding the FOS of the landslide from what is known already and is cost and time prohibitive. However, a gross generalization can be drawn, based upon the analyses presented in the BYA report and current LAD data that the FOS are likely similar, i.e., an average of approximately 1.20 to 1.25 as presented in the Table 7.6 (BYA 1992) based on the following:

- Similar volume of groundwater import, although current import is slightly higher as indicated by Yeh in Figure 4 Historical Data Trends – Water Usage. In 1984, 132 kgpd (132,000 gallons per day) was imported compared to an average of 140 kgpd in 2019, with a gross average of 152 kgpd over the period 1984 to 2019.
- Figure 5 Historical Data Trends – Water Levels (Yeh, 2020) presents a comparison of current groundwater levels to November 1991. These data indicate that since 1983-1984, groundwater levels are from 61.7 to 148 feet lower within the landslide mass than in 1983 at the time of landslide

reactivation, an average of about 90-100 feet decrease in groundwater levels across the BRM landslide.[21]

- Shear strength of the material along the landslide base failure surfaces is similar now to the strength presented in the 1992 report.

BYA Figure 9.1 depicts the fundamental inverse relationship between groundwater level and FOS derived by their analyses, assuming groundwater import is about the same (132 kgpd in 1984 compared to 140 kgpd in 2019). When groundwater levels increase, the FOS decreases, and vice versa. Although not a strictly linear relationship, for limited changes in groundwater levels, Figure 9.1 indicates that generally for approximately every 50-60 feet of groundwater increase or decrease, the FOS similarly changes by about 0.1. Based on this relationship, and comparison of water usage and groundwater levels presented by Yeh, the current FOS can be inferred to be around 1.2. Significant conclusions presented in the executive summary of the 1992 BYA report regarding FOS and movement are as follows[22]:

- "*The confidence level for factors of safety presented in the report is +/- 0.05*
- *Factors of safety of 1.2 or less are marginal. They do not provide a sufficient stability reserve against potential adverse conditions such as unknown adverse subsurface conditions and consecutive heavy rain years.*
- *Slow creep movement can and does occur in areas with a factor of safety of 1.2 or less. "*

The most significant summary conclusion presented in the BYA report are as follows and provides focus and direction for future actions to improve the stability of the BRM landslide. BYA concludes[23]:

> "*The low currently prevailing factors of safety in the BRM area, the above-described potential effects of rising groundwater levels and the potential accumulation of groundwater within existing cracks are a constant reminder to the citizens of the BRM area of the shared responsibility to minimize groundwater recharge by reducing effluent recharge, filling in cracks, improving surface drainage to reduce surface water infiltration and diligently maintaining the existing wells and hydraugers.*
>
> *Such precautionary measures are prudent in minimizing adverse factors that exacerbate instability. However, they are not sufficient to prevent future*

[21] It is important to keep in mind this is a gross generalization, as a detailed evaluation is beyond the scope of this report. The various regions of the BRM landslide complex have different factors of safety as summarized in Table 7.6 (BYA 1992) and the ability to lower the water using dewatering wells and gravity drains varies in each region due to varying hydrogeology, as discussed in the BYA report in Section 6.0 "Dewatering and Groundwater Response".

[22] BYA 1992, p. ES-7.

[23] BYA 1992, page 9-1

potential reactivation. Additional mitigation efforts will be needed if the citizens choose to increase the margin of safety against the potential reactivation of landsliding in the area[24]*…*

If the stability of the BRM area is to be maintained and improved, additional mitigation measures are required. Some of these mitigation measures can be area-wide. Others must be tailored to the specific characteristics of a given region. Because of the inter-dependency of the various regions, stability improvements in one region will benefit other regions. The extent to which the stability of the area should be improved is a collective decision for the CI (current LAD 98-1) property owners. It is one which involves a balancing of the risks the owners are willing to bear, versus the costs of the various potential mitigation measures."

Effect of Development

Conclusions of Previous Technical Studies

Previous technical studies of the Big Rock Mesa Landslide[25] have concluded that land development of Big Rock Mesa can have both beneficial and detrimental effects on the stability of the landslide, or factor of safety. Overall, current groundwater import indicates that water usage in 2019 is similar to 1984, despite the additional square footage of development permitted on BRM. The BYA report concludes that while it is important to reduce water infiltration from man-made sources on BRM as much as possible (as quoted in the previous section), the FOS will remain relatively low unless additional mitigation measures are undertaken, dewatering being identified as the most effective and necessary.

Slosson[26] summarizes the effects of development on landslides generally, and specifically performed a water budget analyses for Big Rock Mesa based on information from the period 1967 to 1983. Overall, he concludes that the basic cause of reactivation of the BRM landslide was the high groundwater table that formed after initial development in the 1960s (approximately 200 feet as reported by BYA 1992). With respect to sources of water infiltration into the BRM landslide, he concluded that the relative contributions were as follows: Rainfall (approximately 43.8%), Sewage Effluent (51.6%), Irrigation (4.4%) and water line leaks (0.2%). Slosson and Shuirman also conclude that development of BRM had the following effects:

- Relative to rainfall infiltration, the net effect of development was to slightly decrease surface water infiltration to groundwater.

[24] Underline emphasis added.

[25] BYA 1992 and Slosson and Shuirman 1992. The initial Slosson investigation summarized by this paper study was performed on behalf of the LACWWD29 as a defendant in the Hansch vs. County of Los Angeles, et al litigation.

[26] Slosson and Shuirman 1992, p.39

- The introduction of septic systems was a major cause of the rise in the groundwater table (already high due to cessation of pumping water wells)
- Irrigation constitutes a minor contribution to water infiltration.
- Infiltration from water line leaks is insignificant.

Cumulative effects of development since 1992

Both the Slosson and Shuirman forensic investigation and the BYA investigation indicate that a rise in groundwater is the most important influencing factor causally related to decrease in stability of the landslide. Other general effects of development can be summarized as follows:

- **Structure weight**: The weight of structures is infinitesimal compared to the mass of the landslide, even considering cumulative weight of all permitted structures. Oftentimes, more mass is being removed than added to the landslide.
- **Impermeable land coverage**: This is a form of passive dewatering by reducing permeable land area and is beneficial provided the change in effluent flow remains neutral or decreases.
- **Other Improvements required:** Most improvements result in other improvements (conveyance of roof drainage and area drainage to the storm drain system, for example). This has net beneficial effect on surface drainage by redirecting runoff into the street or storm drain system.
- **OWTS Effluent:** For systems that utilize seepage pits, effluent is disposed of into the ground and infiltrates into the landslide. For drip dispersal systems, effluent is dispersed near the ground surface and disperses via evapotranspiration and does not infiltrate into the landslide. Effluent from shallow leach lines (typically at a depth of 3.5 feet) most likely infiltrate the landslide but may also partly disperse via evapotranspiration.

Cumulative effects of development on the BRM landslide are evaluated and accounted for during project review, as discussed under Project Review, including both beneficial and adverse effects. This includes potential effects not only from proposed structures (including stabilization projects) but from any proposed changes to the OWTS (replacement or repair)[27] not only on the project itself, but from any changes in landslide movement or stress that may result from the stabilization project new structure. Evaluation of the effects of proposed projects includes evaluating change in effluent volume including but not limited to interior remodels, additions, or

[27] City Geotechnical Guidelines, Section 5.7 Mandatory Building Code Statements and Section 5.8 Onsite Wastewater Treatment Systems provide specific considerations in evaluation proposed project effect on landslides.

changes. An increase in volume of effluent discharge that will infiltrate the landslide mass down to the groundwater is not allowed[28].

City staff understands that some BRM homeowners are petitioning for a building moratorium, the implication being that preventing additional building prevents additional water import into BRM (increased water usage) and therefore prevents any additional infiltration of septic effluent to the groundwater table. This assumes there is a direct 1:1 correlation between permitted construction, rise in groundwater, and therefore destabilization of the landslide.

However, as discussed under Development Review[29], consideration of the effects of septic effluent on groundwater levels is already part of the Geotechnical and Environmental Health developments review criteria for Big Rock Mesa, and indeed for any proposed project on the already developed landslides within the City of Malibu. Proposed projects or changes must not increase the risk of destabilization locally or globally, and improvements must have a net zero effect or net beneficial increase on landslide stability. Additionally, decreased water usage has occurred since 2011.

Some factors that influence decrease in water usage likely includes decrease in water use by homeowners due to drought, installation of low flow fixtures, installations of drip irrigation systems versus sprinklered areas, and landscape improvements such as xeriscape which reduces or eliminates irrigation water use and thus reduces the amount of area requiring irrigation. This trend demonstrates that overall, there is room for improvement in decreasing water import, and therefore man-made water infiltration into the landslide just by individual homeowner actions. There is also likely room for improvement in water import reduction through actions the BRM HOA can take collectively, as well improvement in City policies, regulations, and review with respect to development on BRM landslide.

References

Bing Yen & Associates, Inc. (1992), A Geotechnical Engineering Evaluation, Big Rock Mesa, Malibu, California, February 26, 1992, 444p.

California Geological Survey (current), General Guidelines for Reviewing Geologic Reports—CGS Note 41.

City of Malibu (2013) Guidelines for the Preparation of Engineering Geology and Geotechnical Engineering Reports and Procedures for Report Submittal, prepared by Fugro Consultants, Inc. and the City of Malibu Environmental Sustainability Department. https://www.malibucity.org/DocumentCenter/View/215/Geotechnical-Guidelines?bidId=

[28] The two current CDP applications for properties requiring variances are special circumstances. Refer to City record on design and review of these projects.

[29] Section 3 Development Regulations and Review.

City of Malibu (current), Local Coastal Program including Local Costal Plan and Local Implementation Plan, https://www.malibucity.org/372/Local-Coastal-Program.

E.D. Michael (2018), Geologic Aspect of Redevelopment of Big Rock Landslide Area, November 2018, 85p.

Slosson, James and Gerard Shuirman (1992), “Malibu Landslide: Massive Litigation” in Forensic Engineering, Environmental Case Histories for Civil Engineers and Geologists, pp18 -86.

Yeh & Associates (2020) Project Update and Facility Status City of Malibu Landslide Assessment District 98-1 Big Rock Mesa, presentation October 6, 2020.

ATTACHMENTS:

1. Figure 1. Big Rock Mesa Area, September 23, 2002.
2. Figure 2. Historical Data Trends - Rainfall and BRM History.
3. Figure 3. Landslide Assessment District Map - with 1993 Fire Rebuilds.
4. Figure 4. Historical Data Trends Water Usage 1984-2020 BRM.
5. Figure 5. Historical Data Trends - Water Levels.
6. City of Malibu Geotechnical Consultant, Big Rock Mesa Geotechnical Review Standards Memo 10-22-2020.
7. City of Malibu Geotechnical Consultant, Response to Cunningham BRM questions_12-23-2020.
8. City of Malibu Geotechnical Consultant, Additional Response to Cunningham BRM questions_210107.
9. City of Malibu EH Dept, 10-21-20 Memo Big Rock Mesa developments, OWTS.
10. LA County Code Sections 110-111, adopted 2019.
11. ARR GEO Assumption of Risk and Release. standard with report.

Attachment 1- Figure 1. Big Rock Mesa Area, September 23, 2002 (Aerial photograph from CaliforniaCoastline.org, Image 4306).

Attachment 2 - Figure 2. Historical Data Trends - Rainfall and BRM History

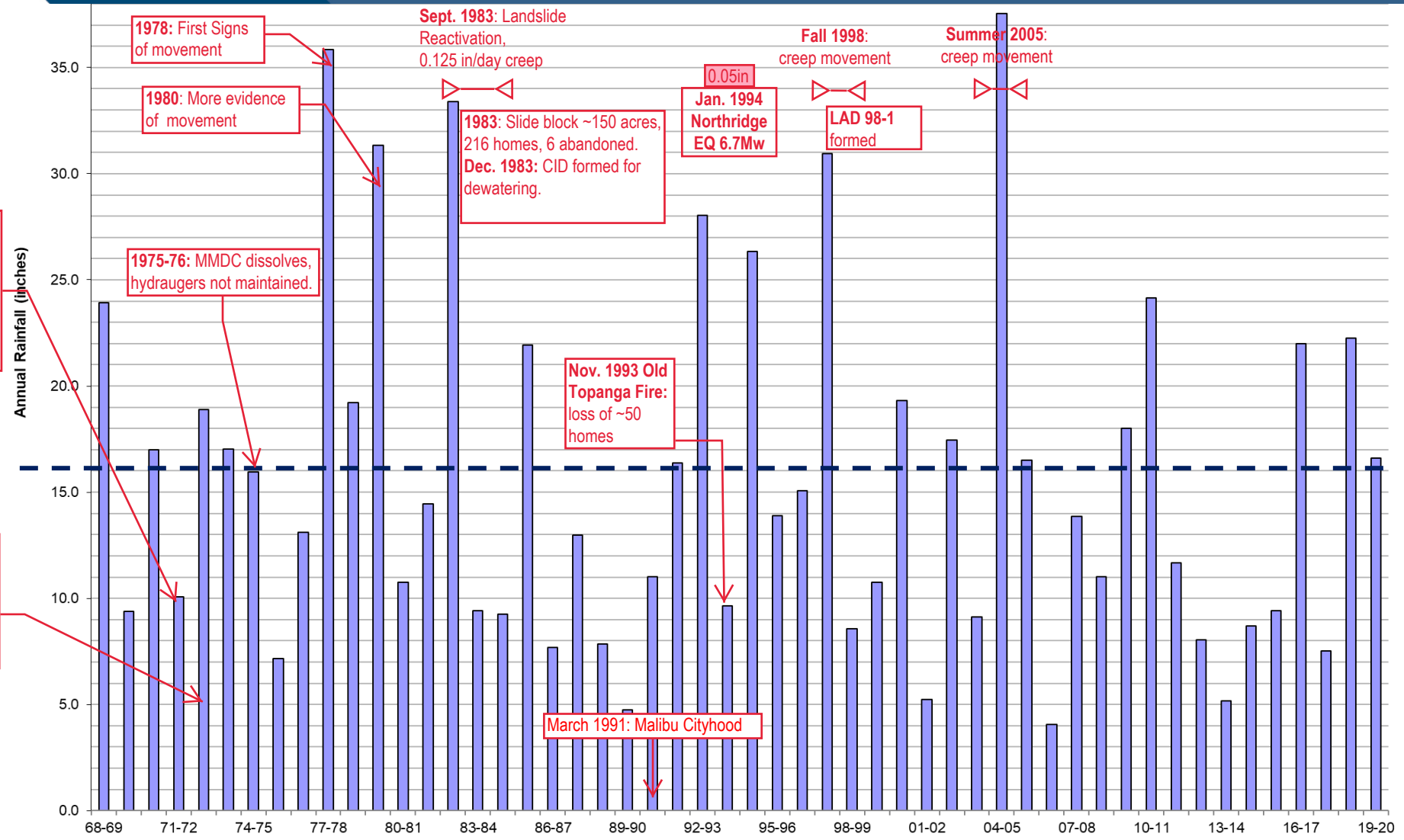
Historical Data Trends – Rainfall

1958-1961: Pumping begins to cease in existing water wells
1964: Residential Development begins on lower mesa tracts. Installation of 4 hydraugers (2800 linear ft.). Formation of Malibu Mutual Drainage Co. around same time.

1972: Groundwater issues become a concern for MMDC. Shallow groundwater problems noted, hydraugers not producing enough to lower water table (avg 4,800 gallons/day), added dewatering recommended by MMDC consultants

Ave: 15.4"
(1968-2020)

1973: Additional dewatering recommended, 3 dewatering wells brought online in addition to 4 hydraugers.
- Assessment District recommended.
- Homeowners reject new AD



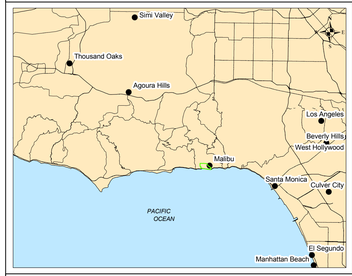
Attachment 3 - Figure 3. Landslide Assessment District Map - with 1993 Fire Rebuilds

BIG ROCK MESA LANDSLIDE ASSESSMENT DISTRICT MALIBU, CALIFORNIA

ASSESSMENT DISTRICT MAP

November 2004 — Plate 2

FUGRO WEST, INC.
4820 McGrath St., Suite 100, Ventura, California 93003
Tel: (805) 650-7000, Fax: (805) 650-7010



LEGEND

- Active Dewatering Well
- Slope Inclinometer Does not penetrate rupture surface.
- Slope Inclinometer Does penetrate rupture surface.
- Standpipe
- GPS Monument
- Producing Hydrauger
- Nonproducing Hydrauger
- Storm Drain Outfall
- Destroyed Hydrauger
- Storm Drain Catch Basin

Coordinate Grid: California State Plane, Zone 7, NAD 27, Feet

Big Rock Mesa Landslide District Boundary

Storm Drain

SCALE: 1:2,400

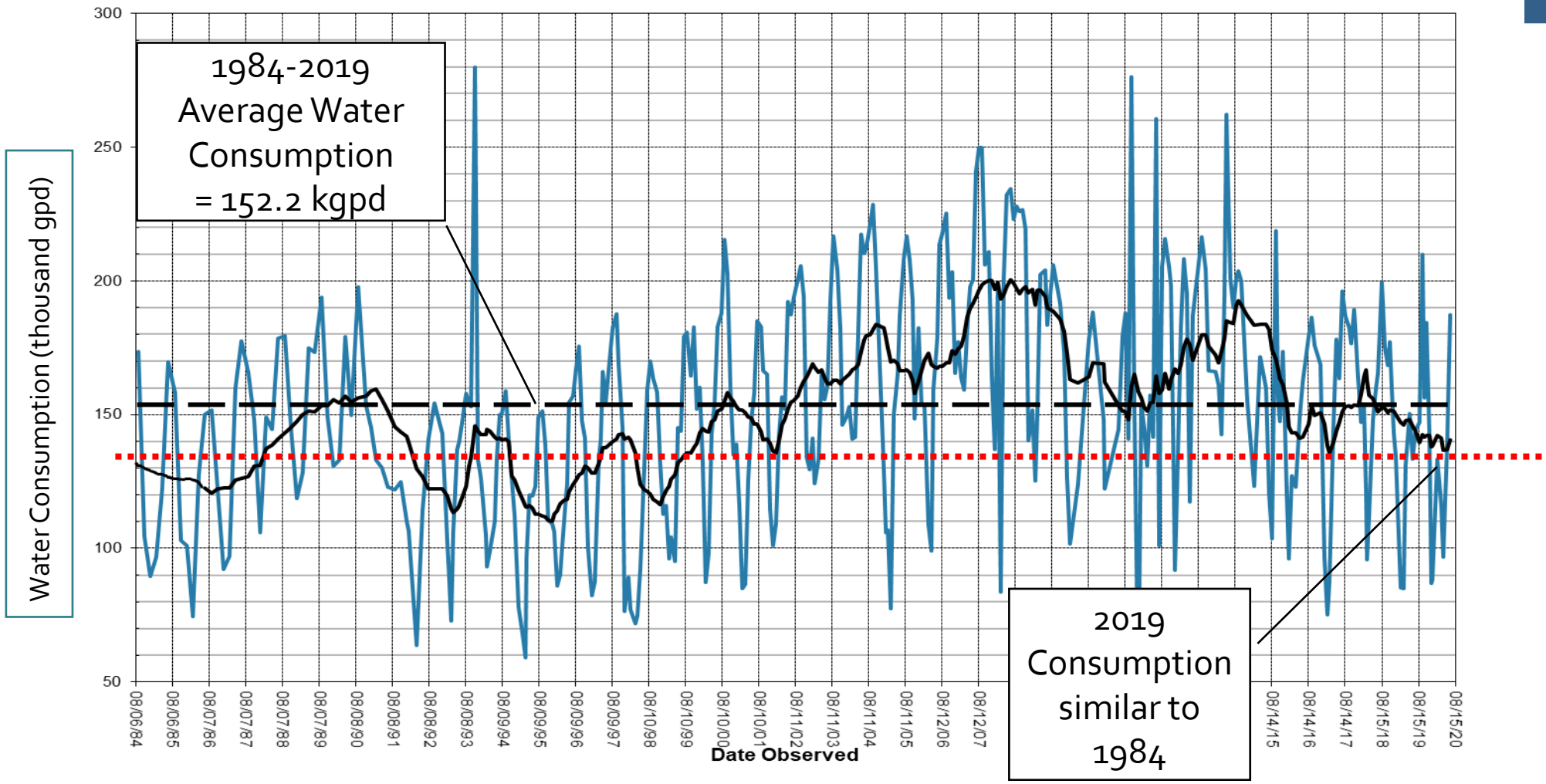
200 0 200 Feet

REVISIONS			
No.	DATE	DESCRIPTION	BY
1	08/11/04	GPS Field Results	KRS
2	08/18/04	GPS Field Results	KRS

DATE:	WORK ORDER:		PLATE NO.:
11/09/04	3399.006		2
DRAWN BY:	CHECKED BY:	APPROVED BY:	
CBD	AS	SM	

Attachment 4- Figure 4. Historical Data Trends Water Usage 1984-2020

Historical Data Trends – Water Usage



Attachment 5 - Figure 5. Historical Data Trends - Water Levels

Historical Data Trends – Water Levels

Facility Type	ID	Earliest Reading	Depth to Water (feet) (earliest)	Water Depth** October 2020 (feet)	Difference in Water Level
D. Well	W-1	1983	63.3	125.0	**-61.7 feet**
Standpipe	SP-33	1985	98.0	245.0	**-147.0 feet**
D. Well	W-3	1983	13.5	161.5	**-148.0 feet**
D. Well	W-8	1983	54.7	161.0	**-106.3 feet**
D. Well	W-16	1984	94.9	179.7	**-85.0 feet**
Standpipe	SP-16	1984	61.0	147.11	**-86.1 feet**
D. Well	BYA-4	1991	142.0	247.9	**-105.9 feet**
Standpipe	SP-10	1983	160.0	251.0	**-91.0 feet**

** Measurements taken after nearby pumps were turned off for 24 hours or more

Attachment 6.

City of Malibu

23825 Stuart Ranch Road ● Malibu, California ● 90265-4861
Phone (310) 456-2489 ● Fax (310) 456-3356 ●www.malibucity.org

MEMORANDUM

To: Yolanda Bundy, Building Official

From: Michael B. Phipps, PG, CEG, Christopher Dean, PG, CEG, Lauren J. Doyel, PE, GE, Geology Department, Building and Safety

Date: October 22, 2020

Re: Geology and Geotechnical Review for Development in the Big Rock Mesa Landslide Area

The Big Rock Mesa (BRM) area is a neighborhood of existing residential development located on a large historically active landslide that has been incorporated into an assessment district. The purpose of the assessment district is to dewater and monitor landslide activity, and maintain these facilities, with the purpose of maintaining low groundwater levels and therefore improving stability of the landslide mass. The dewatering and monitoring facilities are managed and monitored by the City on behalf of the property owners within the assessment district. Although the current factors of safety are unknown, according to the most comprehensive study specific to the BRM landslide performed (Bing Yen & Associates, Inc., 1991), the landslide mass does not have, nor could it easily attain, static (long-term) or pseudo-static (short term, seismic) factors of safety that meet the standard of care for new development. For this reason, development of vacant land within the BRM Landslide has generally not occurred since the landslide commenced movement in 1983 and continuing through Malibu cityhood in 1991 to today. Efforts have been pursued by applicants to develop new single-family residences in the BRM Landslide, as well as on other historically active landslides within the City on previously damaged properties (either by landslides or the 1993 fire). These development applications would require approval of a variance to the City's Local Coastal Program-Local Implementation Plan, with particular regard to slope stability (factor of safety) requirements for new development that are in Chapter 9.4.D of the LCP-LIP.

Development that *has* occurred within the Big Rock Mesa Landslide since incorporation of the City has consisted of additions, remodels, pools, and fire rebuilds from the 1993 Malibu-Old Topanga Fire. Proposed developments are evaluated by Geology Department consulting staff in accordance with the City of Malibu "Guidelines for the Preparation of Engineering Geology and Geotechnical Engineering Reports and Procedures for Report Submittal" (November 2013), including the requirement for engineering geology and geotechnical engineering reports to be submitted pursuant to Sections 110 and Section 111 of the Los Angeles County Code (as adopted and amended by the City in the Malibu Municipal Code). These code sections have been in place for more than four decades and were developed by Los Angeles County specifically for circumstances involving proposed development where potential geologic hazards exist, including landslides. Code section 111 requires the project geotechnical consultants to make specific findings, including: 1) a finding regarding the safety of the site of the proposed work against hazard from landslide, settlement or slippage; and 2) a finding regarding the effect that the proposed work will have on the geotechnical stability of the area outside of the proposed work. The underlying premise for these required findings is safety—that the project will not endanger the health or safety of the occupants, adjoining land, or the public. With the knowledge that proposed development

projects in the BRM Landslide area are located on or adjacent to a large historically active landslide (and are thus potentially subject to "landslide settlement or slippage", Section 110 of the Los Angeles County Code ("Prohibited Uses of Building Sites") has been applicable to proposed development submittals since before cityhood. Projects have been geotechnically approved provided that the project geotechnical consultants make the required findings pursuant to Section 111 of the code, including a finding of "*safe for the intended use*" per Section 110.2.3.2. Additions that do not increase the gross floor area of the existing residence by more than 25% are reviewed under the provisions of Section 110.2.3.4.

Part of the evaluation for development or remodel of existing structures (as described) includes coordination with the City Environmental Health Department and Public Works Department to determine impacts to local slope stability, slide mass stability, potential sources of water that could infiltrate into the unstable land mass, and location of Onsite Wastewater Treatment Systems (OWTS) with respect to dewatering facilities. Due to geologic conditions in the BRM Landslide area and factors discussed above, development is limited by type and location on the landslide mass. The important factor is to maintain or reduce infiltration of surface water (rainfall, septic effluent, and irrigation) to the groundwater table. This can be achieved through a variety of development practices including by control of surface drainage, impermeable surfaces that direct surface runoff to storm drains, OWTS utilizing drip dispersal methods (evapotranspiration), subdrainage collection under pools and shallow structures, landscaping that is water efficient and irrigation systems that have moisture monitoring and rainfall shutoff features.

Attachment 7.

City of Malibu

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Phone (310) 456-2489 ● Fax (310) 456-3356 ●www.malibucity.org

MEMORANDUM

To: Yolanda Bundy, Building Official

From: Michael B. Phipps, PG, CEG, Christopher Dean, PG, CEG, Lauren J. Doyel, PE, GE, Geology Department, Building and Safety

Date: December 23, 2020

Re: Geology Responses to questions posed by Christopher Cunningham, 12-4-2020

At the request of Building and Safety, the Geology Department has prepared responses to questions posed by the above referenced homeowner regarding the Big Rock Mesa Landslide and permitted construction. The responses are focused on answering the questions, but also include correction and/or clarification of statements in the preface to the questions. The question portions are highlighted.

When reading the responses, it is important to understand the following:

1. In the California and locally adopted building code, and LCP/LIP, there is a distinction between **constructed properties** (properties with existing or previously permitted structures) and **new property construction** (properties where no structures have ever been previously permitted).
2. Factors of safety are by nature transient. A landslide has on occasion, an overall factor of safety (FOS) of 1.0 or less than 1.0 when exhibiting ground movement. When not moving, the FOS is 1.0 or greater.
3. The term “waiver” is a misnomer. The City utilizes an “Assumption of Risk and Release” (ARR) form as a recorded document when development is permitted by the building code in areas with known geological hazards, including those potentially subject to hazard from landslide, settlement, or slippage. The underlying requirements of ARR’s and the building code are that the Applicant’s California state-licensed professionals, a Certified Engineering Geologist and licensed Civil (Soils) Engineer or Geotechnical Engineer, must provide findings that conclude that the proposed development is “safe for the intended use” and does not pose a risk to neighboring properties.
4. The factors of safety presented in the 1991 report “A Geotechnical Engineering Evaluation of the Big Rock Mesa Landslide, Malibu, California,” by Bing Yen & Associates (1991 BYA report) have been misstated in the recent correspondence received by the City. Table 7.1, Stability Analyses of the Main Mesa, presents results of stability analyses using three-dimensional analyses for the overall area, and two-dimensional analyses along

representative geologic cross-sections through the landslide, for both prevailing conditions (November 1991) and maximum attainable factor of safety by dewatering. The results presented are as follows:

a. Three dimensional analyses, Main Mesa: Prevailing factor of safety in November 1991 was about 1.25, and the maximum attainable factor of safety attainable by dewatering was 1.4.

b. Two-dimensional analyses, five cross-sections through Main Mesa Area: Prevailing factor of safety in November 1991 ranged from 1.23 to 1.30, and the maximum attainable factor of safety attainable by dewatering ranged from 1.3 to 1.50.

Question: *According to the Malibu Local Implementation Plan Chapter 9 Hazards Section 9.4 DEVELOPMENT STANDARDS and the Malibu Building Code Section 22.44.2180, the safety factor for slopes and landslide areas in Malibu is 1.5. Yet there was some reference in that October meeting last year that Big Rock has an allowable safety factor of 1.25. So…*

Where does it state in the Malibu Building Code the allowable safety factors below 1.25 for Big Rock, and what was the basis for lowering the safety factor for Big Rock to 1.25? By doing so, is the City encouraging development on an active landslide?

Response: The first part of the statement with respect to required Factor of Safety (FOS) is not entirely correct. The quoted development standard (LCP/LIP Section 9.4.D) is applicable to the stability of slopes for new property construction (aka, new development). The quoted Section 22.44.2180 is part of the Planning Code of the County of Los Angeles and is not applicable to the City of Malibu. The slope stability development standard outlined in LCP/LIP Section 9.4.D for new development is two-fold: a minimum FOS of 1.5 is required for long term static stability, and a minimum FOS of 1.0 (formerly 1.1 under seismic stability analysis procedures that have now been superceded) is required for short-term pseudo-static (seismic) stability.

Nowhere in the Malibu Building Code, the City's Local Implementation Plan (LIP), or in the City's 2013 Geotechnical Guidelines is a 1.25 Factor of Safety (FOS) allowed for proposed new property construction (new development) anywhere in the City, including the Big Rock Mesa area. The only situations in which a 1.25 FOS is applicable is for temporary excavations during construction and for slopes associated with access roads (if the slope does not affect the stability of the building pad) per Section 6.4.5 of the 2013 Guidelines for Geotechnical Reports (adopted as part of the municipal code). A FOS of 1.25 is not a standard for development, and thus any suggestion to that end is based on misinformation.

The City is not encouraging development on a historically active landslide. The City reviews development applications for legal use of the property under existing codes and standards, with significant restrictions. We also note that many properties (approximately 25 single-family residences) on the BRM landslide were destroyed and were permitted to be reconstructed following the 1993 Malibu-Old Topanga Fire, consistent with Section 110.2 of the Building Code.

Question: *Secondly, the mesa lots are in an active landslide hazard zone, and there has been no slope stability study that shows a safety factor for these lots at or above 1.5 or even above 1.25 for that matter. In fact, the only slope stability study conducted for Big Rock in the last 28 years by Bing Yen (that Don Kowalewsky mentioned in the October 21, 2019 Planning*

Commission meeting) shows that 5 of the 6 zones in the Big Rock Mesa landslide area have safety factors of 1.2 or less. In the Planning Commission meeting on October 21, 2019, Kowalewsky questioned Bing Yen on its safety factor and he states "beats me" on why Bing Yen did not conclude that the slope's safety factor was 1.0 or less when inclinometers show movement. The Drummonds provided this information to both the City Council and Planning Commission in a letter dated November 1, 2019. So, now having been aware of this information for some time, what is the basis for why the City would continue to allow a variance from the City's geotechnical standards and codes on slope stability with respect to development in Big Rock?

Response: "*Kowalewsky questioned Bing Yen on its safety factor and he states "beats me" on why Bing Yen did not conclude that the slope's safety factor was 1.0 or less when inclinometers show movement."* The statement related by Don Kowalewsky was made by a staff member (personal communication, D. Kowalewsky to L. Doyel), was taken out of context, and is incorrect. Nowhere does the 1991 BYA report conclude that, while moving, the FOS was greater than 1.0. The Factors of Safety presented in the report represent landslide conditions in mid-1983 and November 1991, based on evaluation of complex geology, groundwater levels, analysis of past recorded movement and observations, and results of stability modeling.

The Bing Yen & Associates study of the Big Rock Mesa Landslide (1991) concluded that, on average, the calculated FOS for most of the regions on the active landslide is 1.25 or less in November 1991, and "are likely to be the maximum attainable by the existing dewatering system… (p9-1, BYA 1991)". Furthermore, the report states that "Factors of safety are transient in nature." Following significantly above-average rainfall years, such as in 1995, 1998, and 2005, minor creep movement of certain portions of the Big Rock Mesa landslide were documented and reported in the annual monitoring reports published by the City's consulting geotechnical firm managing the Assessment Districts. During creep movement of a portion of the landslide, the Factor of Safety against slope instability is, by definition, temporarily at or slightly below 1.0 until the dewatering facilities lower the water levels such that the slide creep movement slows and then ceases.

The City has allowed applicants representing two properties in the historically active Big Rock Mesa Landslide to apply for a variance to the Factor of Safety requirement in LCP/LIP Chapter 9 (Section 9.4.D) in accordance with Section 13.26.5(B) of the City of Malibu's LCP-LIP (Page 243). Both properties were previously occupied by single-family residences. One of these pre-existing residential developments was destroyed in the 1993 Malibu-Old Topanga firestorm that destroyed dozens of properties on the mesa, and the other was damaged, reg-tagged, and ultimately ordered demolished due to local bluff instability (not movement of the Big Rock Mesa landslide mass) by the County of Los Angeles. This above-referenced section of the LCP-LIP requires the City to make several findings before a variance can be granted. Each finding must be supported by substantial evidence. The second of these required findings reads as follows: "*The granting of such variance will not be detrimental to the public interest, safety, health, or welfare, and will not be detrimental or injurious to the property or improvements in the same vicinity and zone(s) in which the property is located."*

The applicant must retain an appropriately licensed geotechnical consultant to perform an investigation of the property that conforms to the City's 2013 Guidelines, with the knowledge

that the proposed development cannot meet the required 1.5 FOS; thus, the variance. The applicant and their consultants must ultimately provide the City with reports that adequately support the required findings for the variance. The City's geotechnical reviewers (presently Cotton Shires and Associates, Inc./GeoDynamics, Inc.) review the Project Geotechnical Consultant's discussions regarding the Big Rock Mesa Landslide Assessment District reports, dewatering, the variance, and the submittal of their quality control maintenance manual (QCMM). Approval of the project from a geotechnical perspective cannot be granted until all the findings and conditions of the variance have been adequately addressed and implemented in the plans. An "Assumption of Risk and Release" for geotechnical hazards must be signed by the property owners and recorded with the County Recorder, prior to permit issuance, because it is required by Section 110.2 of the Building Code, as originally developed by the County of Los Angeles.

Technical Note: Conclusions presented in the 1991 BYA report are the result of an in-depth evaluation of the complex geology, groundwater conditions, movement analysis, changes in material strength and stability modeling. The key conclusions regarding the condition of the BRM landslide in 1983 and November 1991 (under then current dewatering conditions) are as follows (per Sections 7 and 9, BYA report 1991):

- The stability evaluation was "aimed at assessing the gross stability of the main mass and it's subregions, and represents an average…" and represent "estimates the prevailing (November 1991) factors of safety as well as the maximum factors of safety attainable by additional dewatering for the BRM Main Mesa…"
- "The factor of safety was between 1.0 and1.05 during the period of late 1983 to mid-1984 when the emergency dewatering program was being implemented. In other words, the average groundwater level measured after this period represented a condition under which the main mass movement had slowed down significantly but still, locally, exhibited creep-like movement."
- "The prevailing FOS for the main landslide areas is no greater than 1.25. This factor of safety seems to be the maximum attainable with the existing dewatering system (in 1991)."
- "…factors of safety of about 1.4 to 1.5 were determined for both the deeper and the 1983 sliding surfaces when the groundwater is lowered near or below the 1983 basal rupture surface. Thus, for the BRM landslide area, this factor of safety of 1.4 to 1.5 is the maximum factor of safety attainable."

Question: *The City's apparent circumvention of the existing code through its continual issuance of waivers undermines the code's purpose to protect property owners. This is because the City simply has the developer sign a waiver to take on the liability and indemnify the City and does not consider the risk born by nearby property owners who waive nothing. It also looks at each applicant in isolation without considering the cumulative effects of multiple new developments on the mesa. Does the City know what the current, actual safety factors are for these lots when they issue these waivers? Why doesn't the City Geologist require a slope stability study from developers in the active BRM landslide area to get a current, accurate safety factor?*

Response: The City has not circumvented the existing code, and all reviews are performed in accordance with existing development standards. Please refer to the four key points at beginning of this response and the October 22, 2020 memorandum describing the conditions

under which limited improvements on existing constructed properties have been permitted within the Big Rock Mesa area (Attachment 1).

The current FOS of the Big Rock Mesa landslide complex has not been analyzed as it was in the 1991 BYA report, however, it can be reasonably concluded, based upon the analyses presented in the 1991 BYA report and the similarity in current groundwater levels compared to 1991, that the FOS are likely similar. The landslide encompasses 160 acres and several hundred properties and does not meet the factors of safety required for NEW land development. Requiring individual property owners to perform slope stability analyses of the entire BRM landslide would not provide any new information regarding the FOS of the landslide from what is known already. However, geotechnical consultants are required to review the 1991 BYA report and current Assessment District monitoring and groundwater data. It must be noted that only the two variance projects mentioned above are residential developments. All other projects processed by the City in the landslide area have conformed/must conform to Section 110.2 of the Building Code (repairs, remodels, and additions increasing the permitted square footage of the structure <= 25%). Section 110.2 of the Building Code is part of the Los Angeles County Code (Title 26-Building Code) as adopted triennially by the City. The City has enforced this section of the Code since incorporation.

Question: *Finally, I'd like to revisit Kraig Hill's questions from the City Planning Commission's meeting on October 21, 2019 since I did not hear a response then and would very much appreciate a response now--How low below the 1.5 safety factor is the City willing to go with these waivers or in other words what is the minimum safety factor at which the City will not issue a waiver (when we have 2 geologists-Kowalewsky & Michaels, both indicate that the safety factor in Big Rock Mesa is not only below 1.5, not only below 1.25 but closer to or even below 1.0)?*

Response: There is no minimum FOS standard for the projects approved under the LCP/LIP Variance and Building Code Section 110 projects described in our responses above; however, findings must be provided as noted in bullet point #3 (see page 1 of this memorandum). An **"**Assumption of Risk and Release" for geotechnical hazards is signed by the property owner(s) and recorded at the City prior to permit issuance. This document is an acknowledgment by the property owner that the property is potentially subject to hazard from landslide, settlement or slippage, but has been determined by the project geotechnical consultant to be safe for the intended use. The document runs with the land (deed) and is therefore binding on all successors in interest of the property and will appear on any title report for a property on which it has been recorded. This requirement is applicable city-wide and is not unique to the BRM landslide area.

All other new development applications must submit reports and make specific findings in accordance with Section 111 of the Building Code and must meet the 1.5 FOS for long term (static) and 1.0 FOS for short term (seismic) requirements in the City's LCP/LIP and 2013 Geotechnical Guidelines. Please refer to the above responses for accurate representations of FOS presented by the 1991 BYA report.

Attachment 1: *Geology and Geotechnical Review for Development in the Big Rock Mesa Landslide Area, Building and Safety Department Memorandum, October 22, 2020.*

City of Malibu

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MEMORANDUM

To: Yolanda Bundy, Building Official

From: Michael B. Phipps, PG, CEG, Christopher Dean, PG, CEG, Lauren J. Doyel, PE, GE, Geology Department, Building and Safety

Date: October 22, 2020

Re: Geology and Geotechnical Review for Development in the Big Rock Mesa Landslide Area

The Big Rock Mesa (BRM) area is a neighborhood of existing residential development located on a large historically active landslide that has been incorporated into an assessment district. The purpose of the assessment district is to dewater and monitor landslide activity, and maintain these facilities, with the purpose of maintaining low groundwater levels and therefore improving stability of the landslide mass. The dewatering and monitoring facilities are managed and monitored by the City on behalf of the property owners within the assessment district. Although the current factors of safety are unknown, according to the most comprehensive study specific to the BRM landslide performed (Bing Yen & Associates, Inc., 1991), the landslide mass does not have, nor could it easily attain, static (long-term) or pseudo-static (short term, seismic) factors of safety that meet the standard of care for new development. For this reason, development of vacant land within the BRM Landslide has generally not occurred since the landslide commenced movement in 1983 and continuing through Malibu cityhood in 1991 to today. Efforts have been pursued by applicants to develop new single-family residences in the BRM Landslide, as well as on other historically active landslides within the City on previously damaged properties (either by landslides or the 1993 fire). These development applications would require approval of a variance to the City's Local Coastal Program-Local Implementation Plan, with particular regard to slope stability (factor of safety) requirements for new development that are in Chapter 9.4.D of the LCP-LIP.

Development that *has* occurred within the Big Rock Mesa Landslide since incorporation of the City has consisted of additions, remodels, pools, and fire rebuilds from the 1993 Malibu-Old Topanga Fire. Proposed developments are evaluated by Geology Department consulting staff in accordance with the City of Malibu "Guidelines for the Preparation of Engineering Geology and Geotechnical Engineering Reports and Procedures for Report Submittal" (November 2013), including the requirement for engineering geology and geotechnical engineering reports to be submitted pursuant to Sections 110 and Section 111 of the Los Angeles County Code (as adopted and amended by the City in the Malibu Municipal Code). These code sections have been in place for more than four decades and were developed by Los Angeles County specifically for circumstances involving proposed development where potential geologic hazards exist, including landslides. Code section 111 requires the project geotechnical consultants to make specific findings, including: 1) a finding regarding the safety of the site of the proposed work against hazard from landslide, settlement or slippage; and 2) a finding regarding the effect that the proposed work will have on the geotechnical stability of the area outside of the proposed work. The underlying premise for these required findings is safety — that the project will not endanger the health or safety of the occupants, adjoining land, or the public. With the knowledge that proposed development

projects in the BRM Landslide area are located on or adjacent to a large historically active landslide (and are thus potentially subject to "landslide settlement or slippage"), Section 110 of the Los Angeles County Code ("Prohibited Uses of Building Sites") has been applicable to proposed development submittals since before cityhood. Projects have been geotechnically approved provided that the project geotechnical consultants make the required findings pursuant to Section 111 of the code, including a finding of "*safe for the intended use*" per Section 110.2.3.2. Additions that do not increase the gross floor area of the existing residence by more than 25% are reviewed under the provisions of Section 110.2.3.4.

Part of the evaluation for development or remodel of existing structures (as described) includes coordination with the City Environmental Health Department and Public Works Department to determine impacts to local slope stability, slide mass stability, potential sources of water that could infiltrate into the unstable land mass, and location of Onsite Wastewater Treatment Systems (OWTS) with respect to dewatering facilities. Due to geologic conditions in the BRM Landslide area and factors discussed above, development is limited by type and location on the landslide mass. The important factor is to maintain or reduce infiltration of surface water (rainfall, septic effluent, and irrigation) to the groundwater table. This can be achieved through a variety of development practices including by control of surface drainage, impermeable surfaces that direct surface runoff to storm drains, OWTS utilizing drip dispersal methods (evapotranspiration), subdrainage collection under pools and shallow structures, landscaping that is water efficient and irrigation systems that have moisture monitoring and rainfall shutoff features.

See February 20, 2021 Supplemental Report for Attachment No. 8

Attachment 9.

City of Malibu

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MEMORANDUM

To: Yolanda Bundy, Building Official

From: Melinda Talent, R.E.H.S., Environmental Health Administrator

Date: October 21, 2020

Re: Onsite Wastewater Treatment Systems (OWTS) for Developments in the Big Rock Mesa Landslide Area

Developments in the Big Rock Mesa Landslide area are evaluated by Environmental Health staff for the siting, design and operation of OWTS. Part of the evaluation for new developments or remodel of existing structures includes coordination with the City Geologist to determine impacts to the slide area and loading rates of wastewater into the unstable land mass.

Proposed new OWTS and remodel to existing developments are evaluated for conformance with the Statewide OWTS Policy; Local Agency Management Program (LAMP); Malibu Municipal Code (MMC) Chapter 15.40 and 15.42, Regulation of OWTS and Technical Standards; and OWTS Manual. MMC contains general requirements for OWTS under Chapter 15.40.040, which requires that the property must support OWTS design capacity and soil absorption conditions to properly absorb the wastewater from proposed improvements. This section of MMC also requires that the OWTS be sited, designed, installed and maintained to insure health and safety for the public and environment such that sewage will not discharge onto the ground, be dangerous to health or drain to any stream within City of Malibu. This also includes any discharge or potential discharge to groundwater. The Big Rock Mesa Area contains several groundwater wells for monitoring and extraction. Setbacks from OWTS components to these facilities must be addressed by the project geologist and OWTS designer.

MMC also contains specific criteria for design of OWTS. Chapter 15.42.030 includes setback distances to water wells, streams, groundwater and unstable land masses. Technical standards under Chapter 15.42 also address site evaluation, geological reports and OWTS design reports which must include discussion on soils conditions and absorptive capabilities of the property. Sites that do not meet standard design criteria may be evaluated for alternative sewage disposal options as determined by the Administrative Authority on a case-by-case basis.

Due to soils conditions in the Big Rock Mesa Landslide Area and factors discussed above, standard OWTS dispersal components such as seepage pits and leach lines may not be appropriate for OWTS sited in this area. Systems utilizing drip dispersal methods are best suited for these properties where groundwater levels, water well locations, slope or soil absorption rates are a concern.

SECTION 110 - PROHIBITED USES OF BUILDING SITES

110.1 - Flood Hazard.

110.1.1

Buildings are not permitted in an area determined by the Building Official to be subject to flood hazard by reason of inundation, overflow or erosion.

The placement of the building and other structures (including walls and fences) on the building site shall be such that water or mud flow will not be a hazard to the building or adjacent property. Subject to the conditions of Section 110.1.2, this prohibition shall not apply when provision is made to eliminate such hazard to the satisfaction of the Building Official by providing adequate drainage facilities by protective walls, suitable fill, raising the floor level of the building, a combination of these methods, or by other means. The Building Official, in the application of this Section for buildings, structures, and grading located in whole or in part in flood hazard areas, shall enforce, as a minimum, the current Federal Flood Plain Management Regulations defined in Title 44, Code of Federal Regulations, Section 60.3, and may require the applicant or property owner to provide the following information and/or comply with the following provisions:

1. Delineation of flood hazard areas, floodway boundaries and flood zones, and the design flood elevation, as appropriate;
2. The elevation of the proposed lowest floor, including basement, in flood hazard areas (A Zones), and the height of the proposed lowest floor, including basement, above the highest adjacent grade;
3. The elevation of the bottom of the lowest horizontal structural member in coastal high hazard areas (V Zone);
4. If the design flood elevations are not included on the community's Flood Insurance Rate Map (FIRM), then the applicant shall obtain and reasonably utilize any design flood elevation and floodway data available from other sources, as approved by the Building Official; and
5. During construction, upon placement of the lowest floor, including basement, and prior to further vertical construction, the permittee shall provide to the Building Official documentation, prepared and sealed by a registered design professional, certifying the elevation of the lowest floor, including basement.

(Ord. 2013-0048 § 2, 2013; Ord. 2010-0053 § 2, 2010; Ord. 95-0065 § 3 (part), 1995.)

* **Editor's note:** Volume 5 of the Los Angeles County Code contains the Flood Control District Code.

110.1.2

Portions of the unincorporated territory of the County of Los Angeles subject to severe flood hazard by reason of inundation, overflow, erosion or deposition of debris are established as floodways by Chapter 11.60 of Title 11 of the Los Angeles County Code. Whenever, in such ordinance establishing floodways, reference is made to any floodway, it shall be construed to mean a floodway referred to in this Section. A person shall not perform work for which a building or grading permit is required within the boundaries of an established floodway if such work increases the flood hazard to adjacent properties by either increasing the capital flood water surface elevation, deflecting flows or increasing bank erosion. Such work may be performed within an established floodway, and a building or grading permit therefor may be issued, where provisions are made to the satisfaction of the Building Official to avoid such an increase in the flood hazard.

(Ord. 95-0065 § 3 (part), 1995.)

110.2 - Geotechnical Hazards.

110.2.1

No building or grading permit shall be issued under the provisions of this section when the Building Official finds that property outside the site of the proposed work could be damaged by activation or acceleration of a geotechnically hazardous condition and such activation or acceleration could be attributed to the proposed work on, or change in use of, the site for which the permit is requested. For the purpose of this section, a geotechnically hazardous condition does not include surface displacement due to earthquake faults.

(Ord. 2016-0053 § 2, 2016: Ord. 2002-0076 § 47, 2002: Ord. 95-0065 § 3 (part), 1995.)

110.2.2

Except as provided in Section 110.2.3, work requiring a building or grading permit by this Code is not permitted in an area determined by the Building Official to be subject to hazard from landslide, settlement, or slippage. For the purpose of this Section, landslide, settlement, or slippage does not include surface displacement due to earthquake faults.

(Ord. 2016-0053 § 2, 2016: Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 98-0020 § 12, 1998: Ord. 95-0065 § 3 (part), 1995.)

110.2.3

Subject to the conditions of Subsection 110.2.1, permits may be issued in the following cases.

(Ord. 2007-0108 § 2 (part), 2007: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.1

When the applicant has submitted an engineering geology and/or soils engineering report or reports complying with the provisions of Section 111 such that said reports show to the satisfaction of the Building Official that the hazard will be eliminated prior to the use or occupancy of the land or structures.

(Ord. 2010-0053 § 2, 2010; Ord. 2002-0076 § 48, 2002: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.2

When the applicant has submitted an engineering geology and/or soils engineering report or reports that comply with the provisions of Section 111, and that demonstrate, to the satisfaction of the Building Official, that the site is safe for the intended use. = hazard not necessarily eliminated

(Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.3

When the proposed work involves the alteration or repair of existing structures and the cost of such alteration or repair does not exceed 25 percent of the current market value of the existing structure, such value to be based on assumed continuation of the established legal use. Before a permit may be issued pursuant to this section, the owner shall do all of the following:

1. If required by the Building Official, submit an engineering geology and/or soils engineering report or reports that contain(s), at a minimum, a qualitative and/or conditional finding that the proposed work complies with the provisions of Section 110.2.1.
2. Record in the office of the Department of Registrar-Recorder, a statement that the owner is aware that the records of the Building Official indicate that the property is potentially subject to hazard from landslide, settlement, or slippage.
3. Record in the office of the Department of Registrar-Recorder, an agreement relieving the County and all officers and employees thereof of any liability for any damage or loss which may result from issuance of such a permit. This agreement shall provide that it is binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the Department of Registrar-Recorder a statement that the Building Official has determined that such hazard from landslide, settlement or slippage no longer exists. The repair work shall consist of restoring the original construction. The Building Official may require that provisions be made in anticipation of future settlement. For the purposes of this Section 110.2.3.3, "alteration" does not include an addition or additions.

(Ord. 2016-0053 § 2, 2016; Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 2002-0076 § 49, 2002: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.4

When the proposed work involves an addition or additions to an existing structure but is not a change in use or occupancy and such work does not increase the gross floor area of the structure by more than 25 percent of the area of the structure as it existed on July 6, 1968, and the Building Official determines that the proposed work will not impact a historically active landslide. Before a permit may be issued pursuant to this Section, the owner shall do all of the following:

1. Submit an engineering geology and/or soils engineering report or reports that contain(s), at a minimum, a qualitative and/or a conditional finding that the proposed work complies with the provisions of Section 110.2.1.
2. Record in the office of the Department of Registrar-Recorder the finding of such report or reports.
3. Record in the office of the Department of Registrar-Recorder an agreement relieving the County and all officers and employees thereof of any liability for any damage or loss which may result from the issuance of such a permit. This agreement shall provide that it is binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the Department of Registrar-Recorder a statement that the Building Official has determined that a hazard from landslide, settlement, or slippage no longer exists.

This Section shall not apply to structures constructed after July 6, 1968. ? what is the significance of this date

(Ord. 2016-0053 § 2, 2016; Ord. 2013-0048 § 2, 2013; Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 2002-0076 § 50, 2002: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.5

When the proposed work involves the repair of a single-family residence or accessory structures where the cost of such repair exceeds 25 percent of the current market value of the existing building.

The scope of the repair work shall be subject to the approval of the Building Official. Before a permit may be issued pursuant to this Section, the owner shall do all of the following:

1. Submit an engineering geology and/or soils engineering report or reports that contain(s), at a minimum, a qualitative and/or conditional finding that the proposed work complies with the provisions of Section 110.2.1 of this Code.
2. Record in the office of the Department of Registrar-Recorder a statement by the owner acknowledging that the records of the Building Official indicate that the property is potentially subject to hazard from landslide, settlement, or slippage.
3. Record in the office of the Department of Registrar-Recorder an agreement relieving the County and all officers and employees thereof of any liability for any damage or loss

which may result from issuance of such a permit. This agreement shall provide that it is binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the Department of Registrar-Recorder a statement that the Building Official has determined that such hazard from landslide, settlement, or slippage no longer exists.

(Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.6

When the proposed work involves the replacement of structures destroyed by causes other than landslide, settlement, or slippage, and the permit applicant was the owner of the property at the time of the loss, their immediate heir(s), or their authorized representative, and the application for a permit under this Section is filed no later than ten (10) years following the date of the loss.

The replacement structure(s) shall not exceed the area, number of stories, load, or number of fixtures and bedrooms of the structure that was destroyed. No change in occupancy type shall be permitted. Before a permit may be issued pursuant to this Section, the owner shall do all of the following:

1. Demonstrate, to the satisfaction of the Building Official, that the replacement structure and/or the associated private sewage disposal system (if any) and/or the replacement landscaping (if any) will not result in a greater amount of groundwater infiltration than occurred under the original condition.
2. Submit an engineering geology and/or soils engineering report or reports that contain, at a minimum, a qualitative and/or conditional finding that the proposed work complies with the provisions of Section 110.2.1 of this Code and that contain recommendations for enhancing the stability of the site.
3. Record in the office of the Department of Registrar-Recorder a statement by the owner acknowledging that the owner is aware that the records of the Building Official indicate that the property is potentially subject to a hazard from landslide, settlement, or slippage.
4. Record in the office of the Department of Registrar-Recorder an agreement relieving the County and all officers and employees thereof of any liability for any damage or loss which may result from issuance of such a permit. This agreement shall provide that it is binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the Department of Registrar-Recorder a statement that the Building Official has determined that such hazard from landslide, settlement, or slippage no longer exists.

(Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 2002-0076 § 51, 2002: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.7

When the proposed work involves a one-story, detached, light-framed structure not intended or used for human occupancy, such as a garage, carport, patio cover, deck or storage shed, accessory to a single-family residence not exceeding 400 square feet in gross floor area nor 12 feet in height. Before a permit may be issued pursuant to this Section, the owner shall do all of the following:

1. If required by the Building Official, submit an engineering geology and/or soils engineering report or reports that contain(s), at a minimum, a qualitative and/or conditional finding that the proposed work complies with the provisions of Section 110.2.1.
2. Record in the office of the Department of Registrar-Recorder a statement by the owner acknowledging that the owner is aware that the records of the Building Official indicate that the property is potentially subject to hazard from landslide, settlement, or slippage.
3. Record in the office of the Department of Registrar-Recorder an agreement relieving the County and all officers and employees thereof of any liability for any damage or loss which may result from issuance of such a permit. This agreement shall provide that it is binding on all successors in interest of the owner and shall continue in effect until the Building Official records in the office of the Department of Registrar-Recorder a statement that the Building Official has determined that such hazard from landslide, settlement, or slippage no longer exists.

(Ord. 2016-0053 § 2, 2016; Ord. 2013-0048 § 2, 2013: Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 98-0020 § 13 (part), 1998.)

110.2.3.8

When the Building Official determines that the hazard from landslide, settlement, or slippage is based solely on the fact that the area has been identified as a potentially liquefiable area in a seismic hazard zone (pursuant to Public Resources Code section 2690 et seq.) and a foundation investigation is performed in connection with the work in accordance with Section 1803 of this Code.

(Ord. 2013-0048 § 2, 2013: Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007: Ord. 2002-0076 § 52, 2002: Ord. 98-0020 § 13 (part), 1998: Ord. 95-0065 § 3 (part), 1995.)

110.2.3.9

Notwithstanding any other provisions of this Section, the Building Official may, at his or her discretion, deny a permit for any building, structure, or grading subject to hazard from landslide, settlement, or slippage, which cannot be mitigated and may endanger the health or safety of the occupants, adjoining property, or the public.

(Ord. 2010-0053 § 2, 2010; Ord. 2007-0108 § 2 (part), 2007.)

110.2.3.10

When the proposed work involves the repair and restoration of a slope. Before a permit may be issued pursuant to this Section, the owner shall submit an engineering geology and/or soils engineering report or reports that contain(s) the following:

1. A description and analysis of the existing conditions, including the cause or causes of the failed slope.
2. Recommendations for the repair of the failed slope.
3. A qualitative and/or conditional finding that the proposed work complies with the provisions of Section 110.2.1 of this Code.
4. An analysis demonstrating that future failures originating from the repaired portion of the slope will not impact previously permitted structures.
5. An analysis demonstrating that the proposed work will improve existing slope stability.

(Ord. 2013-0048 § 2, 2013: Ord. 2007-0108 § 2 (part), 2007.)

110.2.3.11

When the proposed work involves a minor alteration or repair to an existing Group R-3 Occupancy building and/or its accessory structures. Minor alterations and repairs shall include the following:

1. Roof mount photovoltaic solar systems that impose no more than 5 percent gravity load increase to the existing building.
2. Ground mount photovoltaic solar systems.
3. Recovering and reroofings.
4. New and replacement mechanical and plumbing equipment.
5. Window change-outs.
6. Similar work as determined by the Building Official.

(Ord. 2016-0053 § 2, 2016.)

110.3 - Fills Containing Decomposable Material.

Permits shall not be issued for buildings or structures regulated by this Code within (1,000) feet (304.8 m) of fills containing rubbish or other decomposable material unless the fill is isolated by approved natural or artificial protective systems or unless designed according to the recommendation contained in a report prepared by a licensed civil engineer. Such report shall contain a description of the investigation, study and recommendation to minimize the possible intrusion, and to prevent the accumulation of explosive concentrations of decomposition gases within or under enclosed portions of such building or structure. At the

time of the final inspection, the civil engineer shall furnish a signed statement attesting that the building or structure has been constructed in accordance with the civil engineer's recommendations as to decomposition gases required herein.

EXCEPTION: When approved by the Building Official, mitigation of decomposition gases shall not be required for additions to single family dwellings not exceeding 400 square feet in gross floor area and/or alterations to single family dwellings.

(Ord. 2013-0048 § 2, 2013: Ord. 2007-0108 § 2 (part), 2007; Ord. 95-0065 § 3 (part), 1995.)

110.4 - Methane Gas Hazards.

Permits shall not be issued for new buildings or enclosed structures regulated by this Code on, adjacent to, or within 300 feet (91.44 m) of active, abandoned or idle oil or gas well(s) unless designed according to recommendations contained in a report prepared by a registered design professional, such as a licensed civil engineer and/or a licensed petroleum engineer, to evaluate whether such wells are being properly operated or maintained, or are abandoned. No permits shall be issued until documentation of proper operation, maintenance, or abandonment or reabandonment is submitted to and approved by the Building Official.

Exceptions:

1. When approved by the Building Official, mitigation of methane gas hazards shall not be required for additions or alterations to existing buildings or structures located no closer than 200 feet (60.96 m) to active, abandoned or idle oil or gas well(s).
2. Grading permits may be issued when the proposed work is necessary to mitigate the methane gas hazard.

As used in this Section, "well" shall mean any well as defined by Section 3008, Subdivisions (a), (b), and (c) of the California Public Resources Code.

(Ord. 2016-0053 § 2, 2016; Ord. 2013-0048 § 2, 2013: Ord. 2007-0108 § 2 (part), 2007: Ord. 95-0065 § 3 (part), 1995.)

110.5 - Conditional Use.

Work required by this Section as a condition for the use of the site shall be performed prior to the connection of the utilities or occupancy of the building.

(Ord. 95-0065 § 3 (part), 1995.)

SECTION 111 - ENGINEERING GEOLOGY AND SOILS ENGINEERING REPORTS

The Building Official may require an engineering geology or soils engineering report, or both, where in the Building Official's opinion, such reports are essential for the evaluation of the safety of the site. The engineering geology or soils engineering report or both shall contain a finding regarding the safety of the site of the proposed work against hazard from landslide, settlement or slippage and a finding regarding the effect that the proposed work will have on the geotechnical stability of the area outside of the proposed work. Any engineering geology report shall be prepared by a certified engineering geologist licensed in the State of California. Any soils engineering report shall be prepared by a civil engineer licensed in the State of California, experienced in the field of soil mechanics, or a geotechnical engineer licensed in the State of California. When both an engineering geology and soils engineering report are required for the evaluation of the safety of a building site, the two reports shall be coordinated before submission to the Building Official.

(Ord. 2007-0108 § 2 (part), 2007: Ord. 2002-0076 § 53, 2002: Ord. 95-0065 § 3 (part), 1995.)

Attachment 11.

RECORDING REQUESTED BY AND
WHEN RECORDED, RETURN TO:

City of Malibu
Attention: City Clerk
23825 Stuart Ranch Road
Malibu, California 90265

SPACE ABOVE THIS LINE RESERVED FOR RECORDER'S USE

ASSUMPTION OF RISK AND RELEASE STANDARD HAZARDS WITH GEOTECHNICAL REPORTS

THIS ASSUMPTION OF RISK AND RELEASE is made this _____ day of _____, 20___, by _____ and _____ (hereinafter referred to as "Property Owner") in favor of the City of Malibu ("City"), a municipal corporation.

RECITALS:

A. Property Owner's property consists of Lot _____ of Tract _____, or Assessor's parcel: Book _____, Page_____, Parcel _____, together with all improvements household furnishings and effects, and personal property located therein and thereon, more commonly known as _____, Malibu, California ("the property").

B. Property Owner's property is located within an area where geologic and/or geotechnical hazards and/or damages have occurred in the past and where further hazards and/or damages may occur in the future. Property Owner recognizes and understands that the records of the County of Los Angeles, Department of Public Works, and for the City of Malibu, indicate that the above property is located within an area that is subject to physical hazards of a geologic and/or geotechnical nature. Further, the Property Owner has read and understands the Geologic/Geotechnical Report(s) prepared by _____ and dated _____ which (indicate)s that the property is subject to physical hazards of a geologic and/or geotechnical nature. A copy(ies) of that/these report(s) is on file with the City. The City has available to Property Owner all public files in its custody relative to the geologic stability of the property and the area surrounding the property, and Property Owner acknowledges that he/she has had the opportunity to undertake any and all further geologic investigation Property Owner deems necessary precedent to constructing any improvements on the property.

C. Property Owner desires to take certain actions in order to add to, repair, rehabilitate, or remodel the existing home or identified structures on the property; and acknowledges this work shall require a building permit.

D. Property Owner desires to assume all risk relating to and arising from the issuance of a building permit for said addition, repair, rehabilitation, or remodel work, including risks relating to the City's negligent issuance of such a building permit.

E. As an accommodation to the Property Owner so as to alleviate the hardship associated with relocating from Property Owner's home, City is willing to allow additions, repair, rehabilitation, and remodeling work necessary or desired to maintain the home in a habitable and convenient condition, and arising from any claim that the City acted negligently or improperly in issuing a building permit to Property Owner under the

above-described circumstances.

F. Both Property Owner and City agree that this Assumption of Risk and Release does not exculpate the City from any future acts of negligence on the City's part, but applies solely to the issuance of a building permit for construction of specified improvements.

NOW, THEREFORE, as inducement for City to grant a building permit, Property Owner agrees as follows:

1. Assumption of Risk.

Property Owner hereby assume all risk of damages to the property, and loss or impairment of the use and enjoyment thereof, and loss of any and all expenditures in any manner arising out of or attributable to the City issuing the building permit for the proposed work, notwithstanding that the property is located within an area subject to physical hazards of a geologic and/or geotechnical nature.

2. Release.

Property Owner hereby releases and discharges City, its officers, employees and agents from any and all claims for losses, damages or liabilities of or to the property of undersigned Property Owner (whether for damages to the property, personal injury, expenses, attorney's fees or otherwise) arising out of or attributable to the City issuing the building permits for the proposed addition, repair, rehabilitation, or remodeling work, notwithstanding that the property is located within an area subject to physical hazards of a geologic and/or geotechnical nature. This release includes, but is not limited to, any claims arising from the City's negligence in issuing the permit. Property Owner hereby expressly agrees to forego the right to assert any claim or bring any action of any nature whatever against the City, its officers, agents and employees for any damages or losses of any kind attributable to the issuance of a building permit and the work performed pursuant thereto.

3. Voluntary Agreement.

Property Owner has obtained the advice of legal counsel and has been advised of the nature and legal effect of the execution of this instrument or expressly declines to secure the advice of legal counsel, and understands the contents hereof and knowingly forgoes the opportunity to seek legal counsel. Property Owner executes this instrument voluntarily with knowledge of its significance in consideration for issuance of a building permit to perform certain work on Property Owner's home that would otherwise not be issuable due to the location of the home adjacent to an area that is subject to physical hazards of a geologic or geotechnical nature.

4. Binding Effect.

Property Owner agrees and acknowledges that this instrument shall be recorded against the title of the subject property in the official records of the Los Angeles County Recorder.

This instrument shall run with the land and shall be binding on all parties having or acquiring any right, title or interest in or to the subject property or any portion thereof, and shall constitute notice of the physical hazards of a geologic or geotechnical nature that affect the property. This instrument shall be terminated or modified only upon the express written consent of the city. In the event Property Owner sells, transfers, leases or otherwise conveys any interest or right of possession in the property, Property Owner shall provide

any such purchaser, lessee or transferee with a copy of this instrument.

_____(Property Owner's initials) I UNDERSTAND THAT THIS IS AN AGREEMENT TO FOREGO MY LEGAL RIGHTS. I UNDERSTAND THAT MY PROPERTY IS LOCATED WITHIN OR ADJACENT TO AN AREA SUBJECT TO PHYSICAL HAZARDS OF A GEOLOGIC and/OR GEOTECHNICAL NATURE AND THAT ORDINARILIY THE CITY WOULD NOT ISSUE A BUILDING PERMIT FOR THE CONSTRUCTION I WANT TO DO ON MY PROPERTY. I UNDERSTAND THA THE CITY HAS AGREED TO ISSUE THE PERMIT BECAUSE I HAVE RELEASED THE CITY FROM ANY LIABIITY FOR PERSONAL INJURY OR PROPERTY DAMAGE, INCLUDING LIABILITY ARISING FROM ITS OWN NEGLIGENCE IN ISSUING THE PERMIT. I UNDERSTAND THAT AS A RESULT OF SIGNING THIS INSTRUMENT I DO NOT HAVE THE RIGHT TO SUE THE CITY IN CONNECTION WITH THE BUILDING PERMIT OF ANY OF THE CONSTRUCTION IT AUTHORIZES.

IN WITNESS WHEREOF, Property Owner has executed this assumption of risk, release and indemnity on the date first written above.

_____
(Property Owner)

_____
(Property Owner)

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
County of _____

On _____, before me, _____, Notary Public,
(insert name and title of officer)
personally appeared _____
who provided to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, execute the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

CITY OF MALIBU

_____ _____
By: _____ Date
_____

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
County of Los Angeles

On _____, before me, Heather Glaser, City Clerk for the City of Malibu, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her authorized capacity, and that by his/her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____
HEATHER GLASER, City Clerk
(seal)