A Perspective on Revolutions, Revisions, Rights, and Responsibilities in the Geosciences

https://CroninProjects.org/October2024/

Kimberly, Australia, from Planet Snapshots, www.planet.com

Geoethics is a core competency in the Geosciences

https://CroninProjects.org/Oct2024/Geoethics/

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Carbon Dioxide and Climate: A Scientific Assessment

Report of an Ad Hoc Study Group on Carbon Dioxide and Climate
Woods Hole, Massachusetts
July 23–27, 1979
to the
Climate Research Board
Assembly of Mathematical and Physical Sciences
National Research Council

Charney et al., 1979

NATIONAL ACADEMY OF SCIENCES
Washington, D.C. 1979

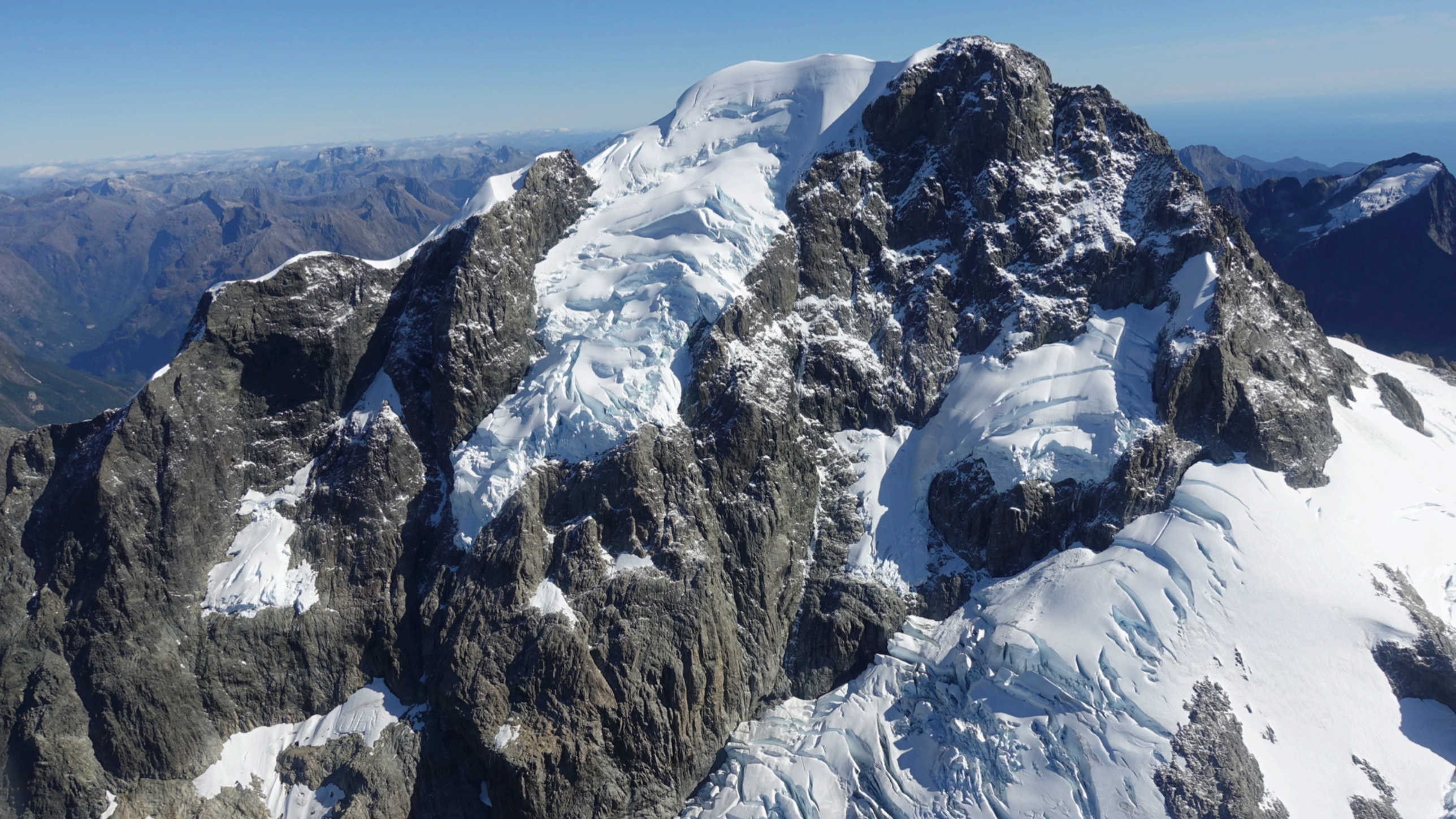
Changing Climate

Report of the Carbon Dioxide Assessment Committee

Board on Atmospheric Sciences and Climate
Commission on Physical Sciences, Mathematics, and Resources
National Research Council

Nierenberg et al., 1983

NATIONAL ACADEMY PRESS
Washington, D.C. 1983



Geoscientists are the essential intellectual bridge between humanity and Earth's ecosystems, resources and hazards

Geoscientists have a unique responsibility for the stewardship of our home: Earth and its ecosystems.

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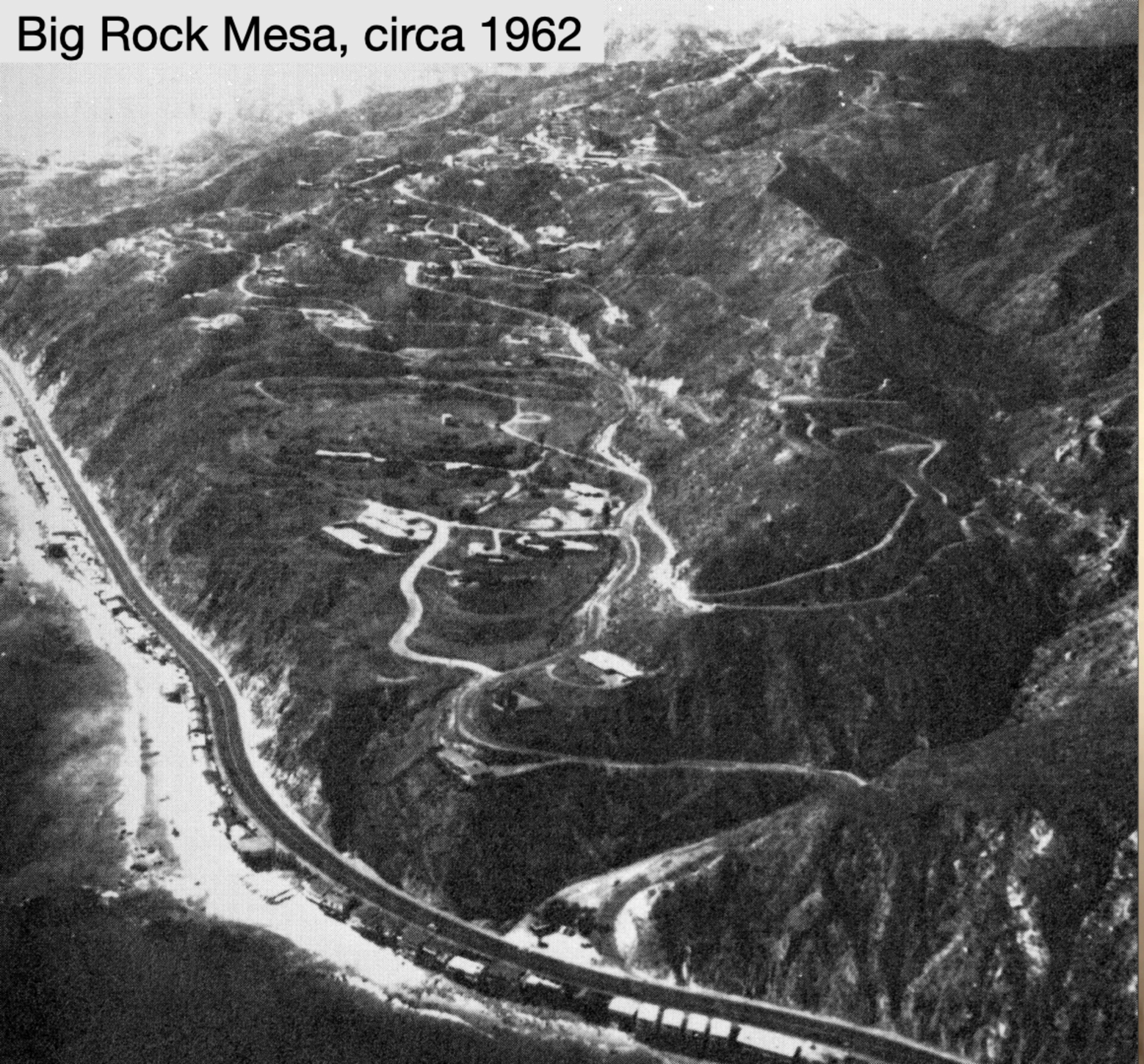
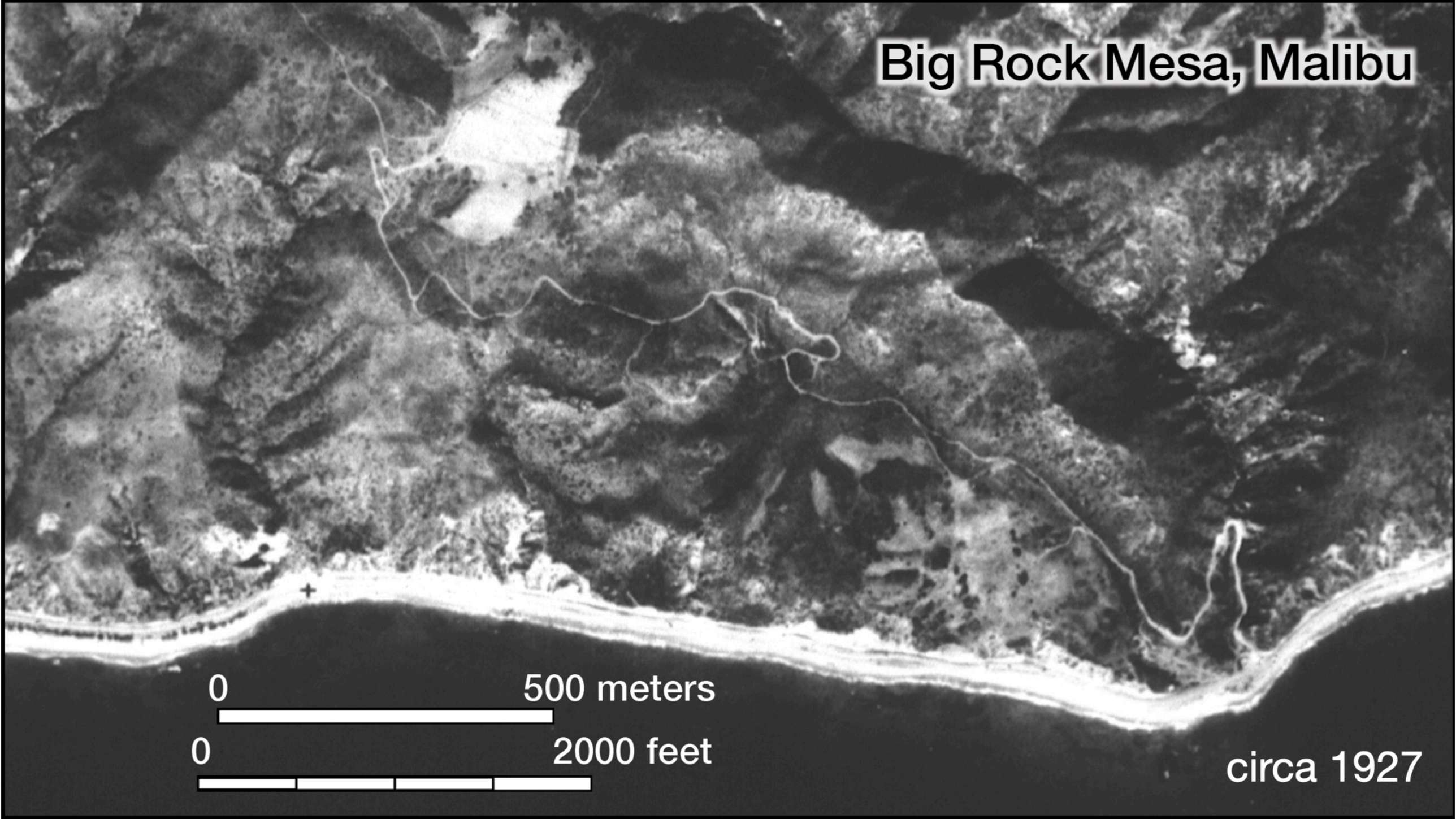
We bear our special knowledge in trust for all humankind.

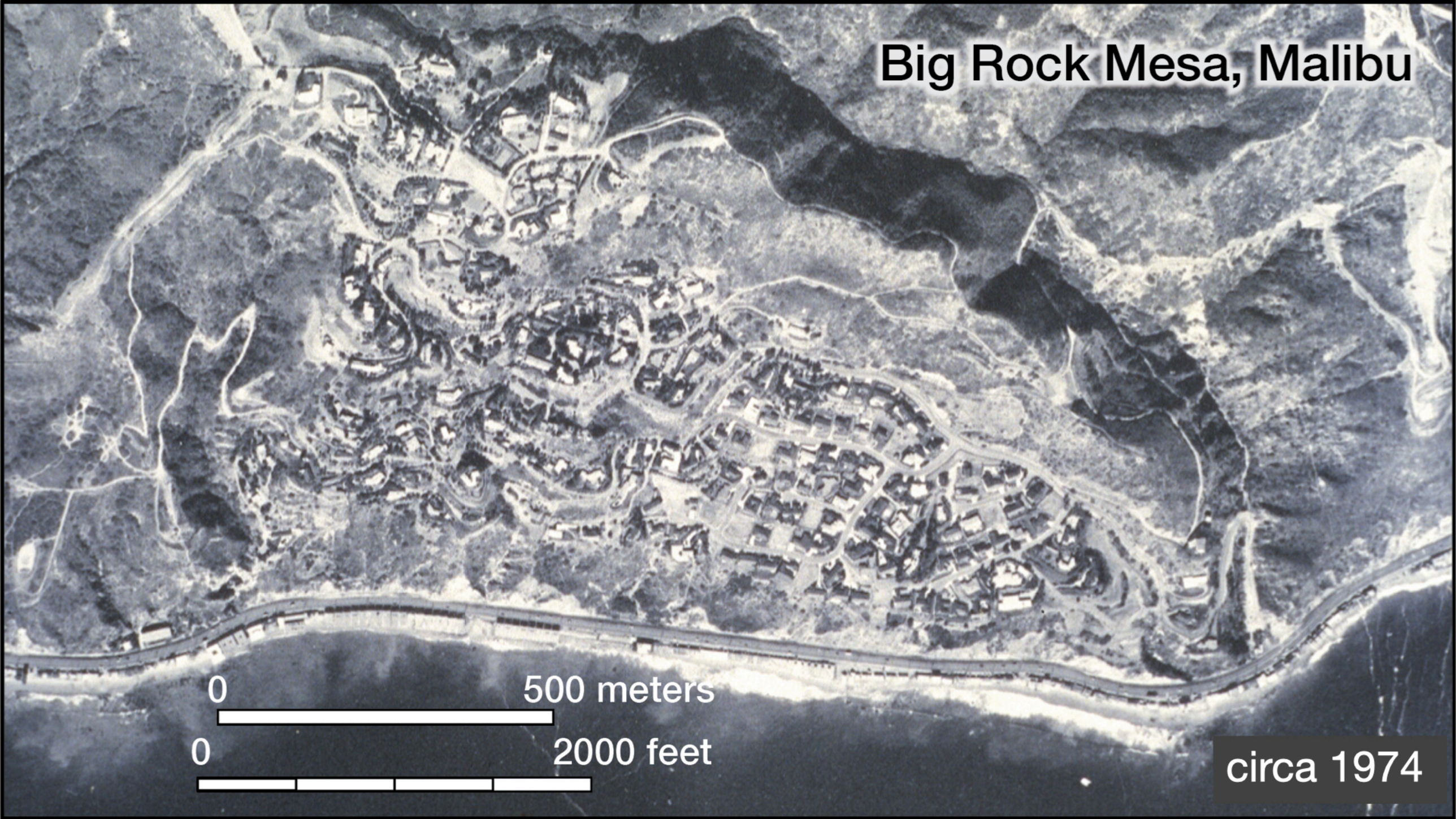
A small case history…

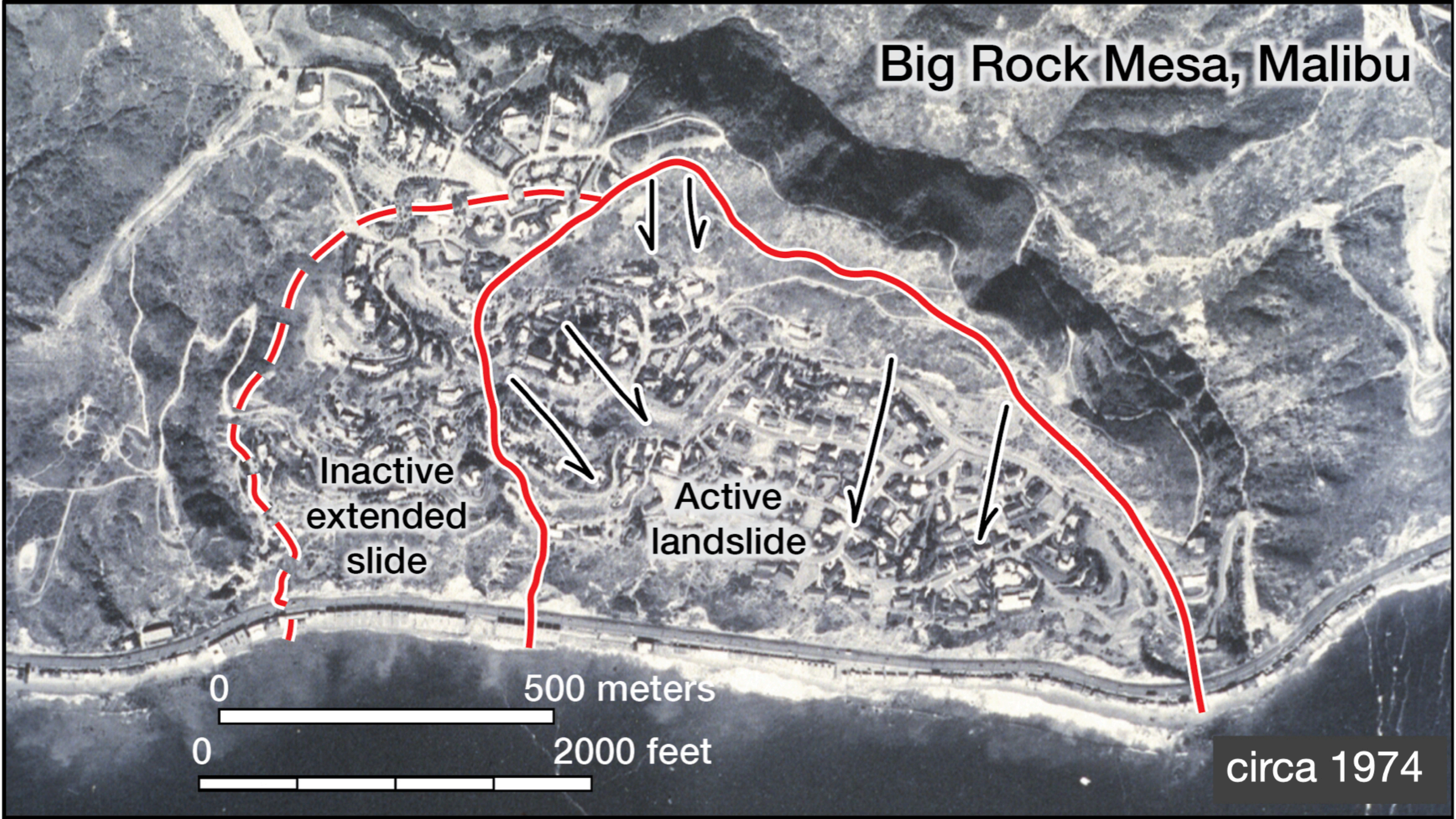
Big Rock Mesa, Malibu, circa 1927

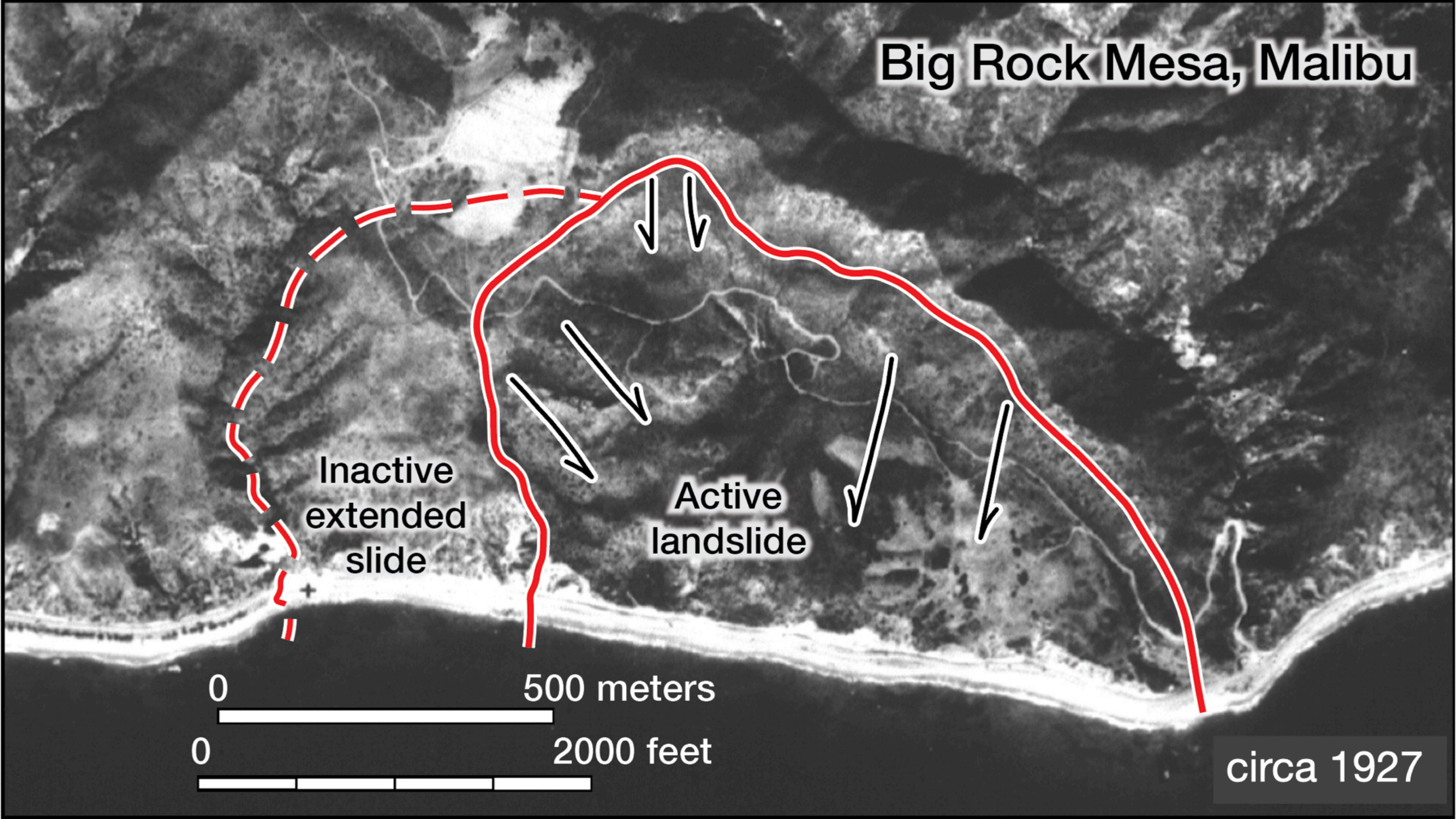
Big Rock Mesa, circa 1962




Big Rock Mesa, Malibu
0
500 meters
0
2000 feet
circa 1927


Big Rock Mesa, Malibu
0
500 meters
0
2000 feet
circa 1974


Big Rock Mesa, Malibu
Inactive
extended
slide
Active
landslide
0
500 meters
0
2000 feet
circa 1974


Big Rock Mesa, Malibu
Inactive
extended
slide
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landslide
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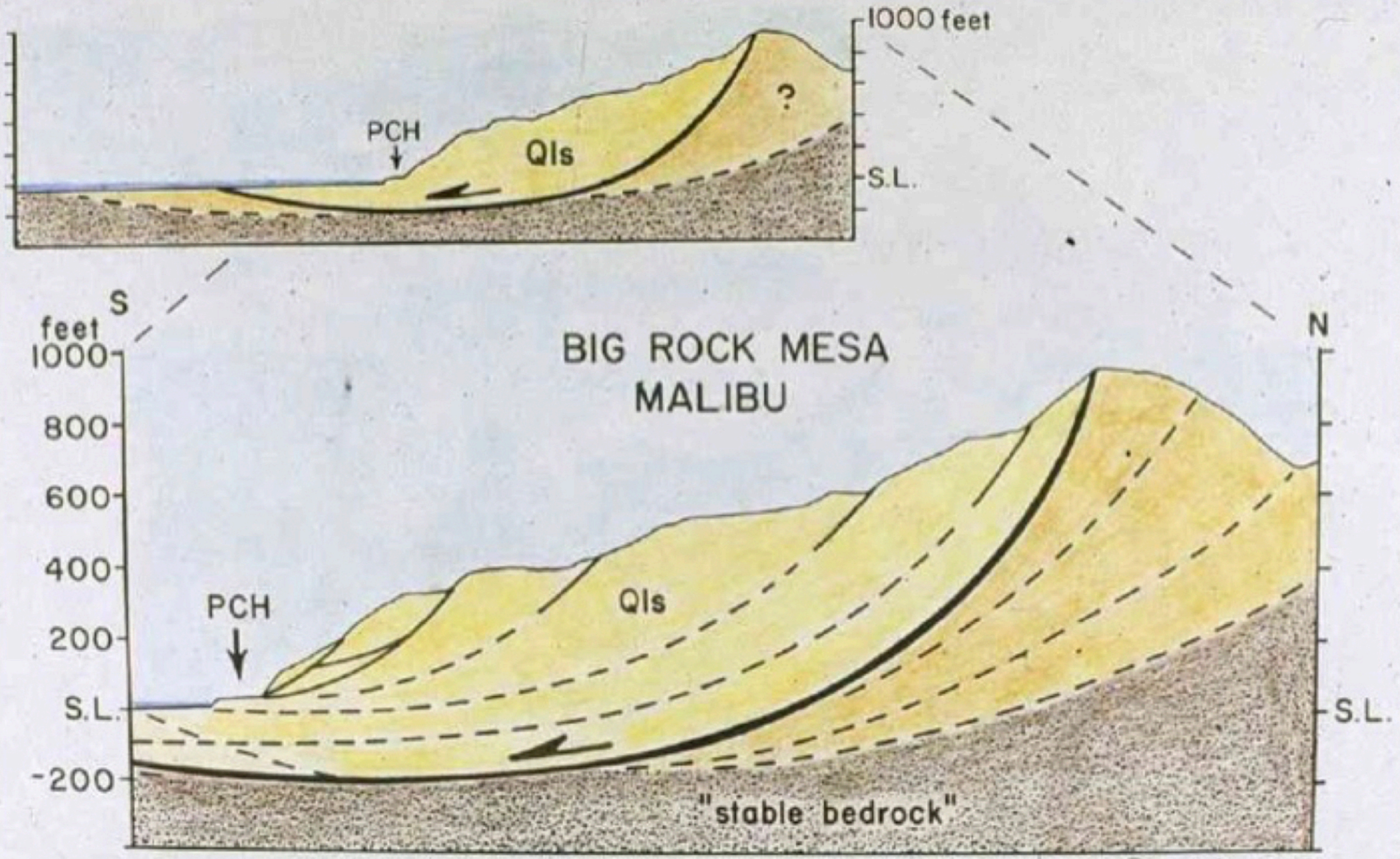
500 meters
0
2000 feet
circa 1927

Aerial photo by Woody Higdon;
supplied by Jim Slosson


1000 feet
PCH
Qls
?
S.L.
S
N
feet
1000
800
600
400
200
S.L.
-200
BIG ROCK MESA
MALIBU
PCH
Qls
S.L.
"stable bedrock"

Pacific Coast Hwy uplifted across the front of the Big Rock Mesa landslide

Unstable cliff above
Pacific Coast Hwy


UNSAFE

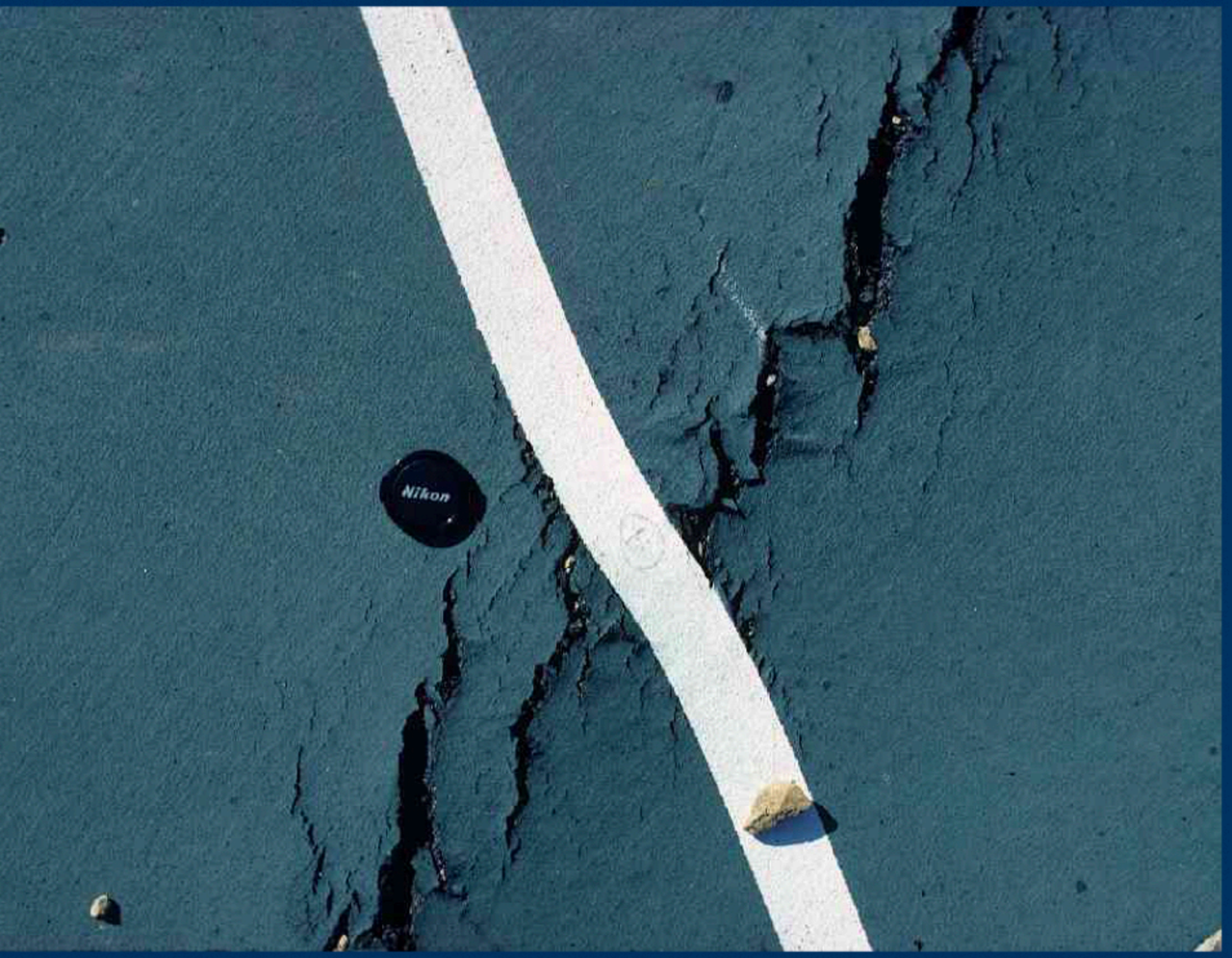
Extension cracks in the surface of the landslide, covered in plastic held in place with sandbags

Exposed water supply pipes along a road on Big Rock Mesa landslide

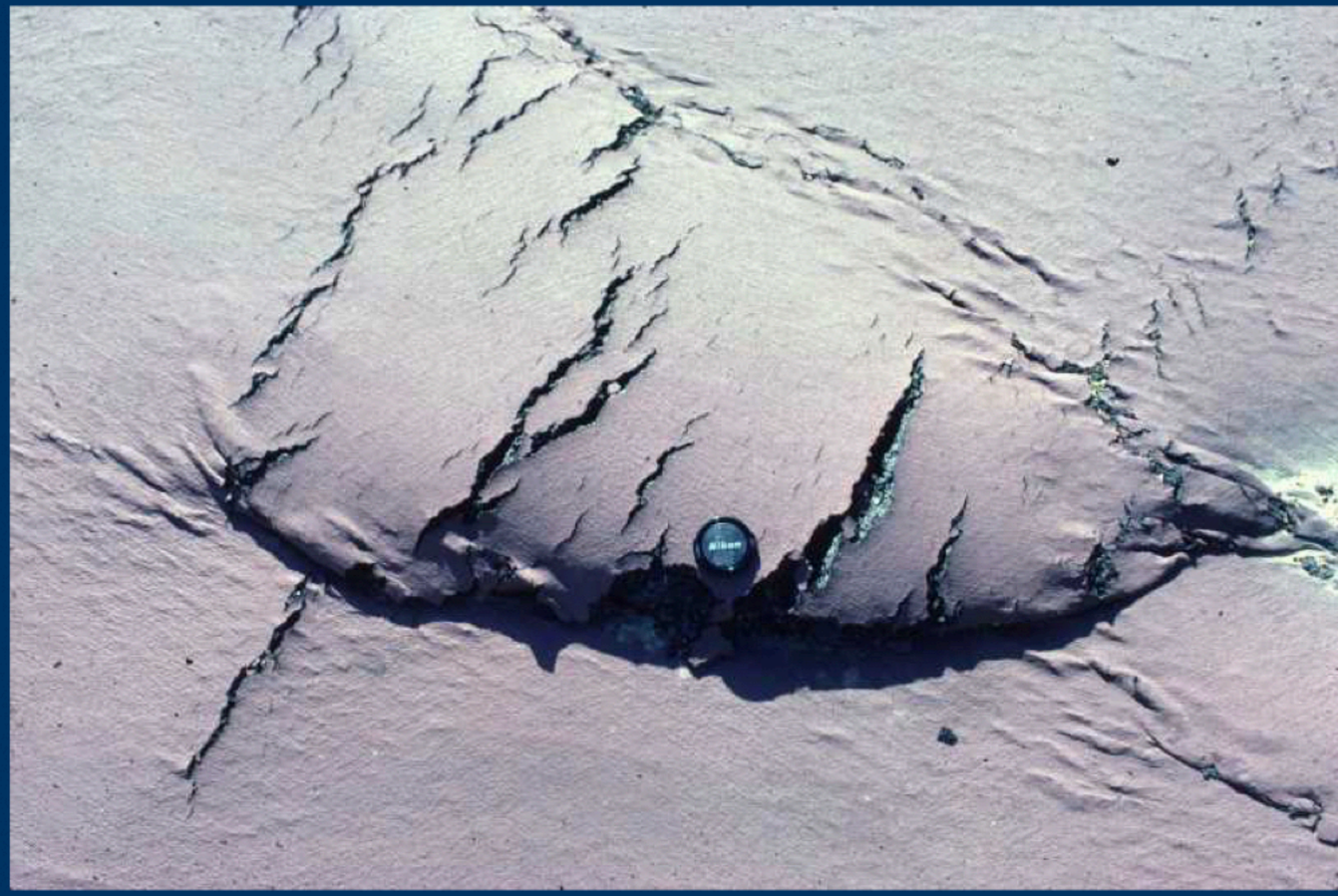
Exposed water supply pipe with strain release loop along a road on Big Rock Mesa landslide

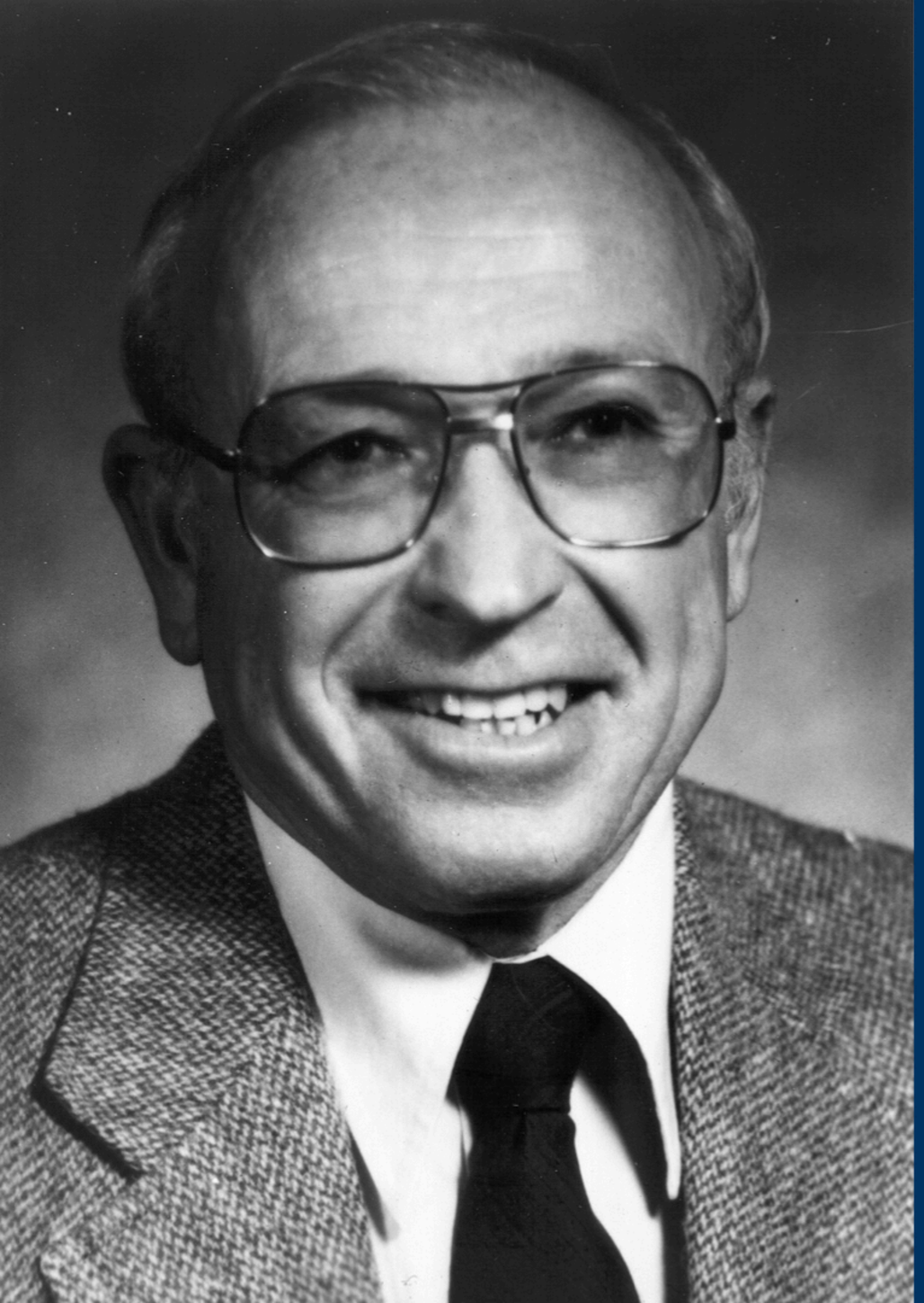
Dewatering well along a road on Big Rock Mesa landslide, discharging into a storm sewer

Headscarp above Hansch property, Big Rock Mesa landslide


Nikon


Nikon



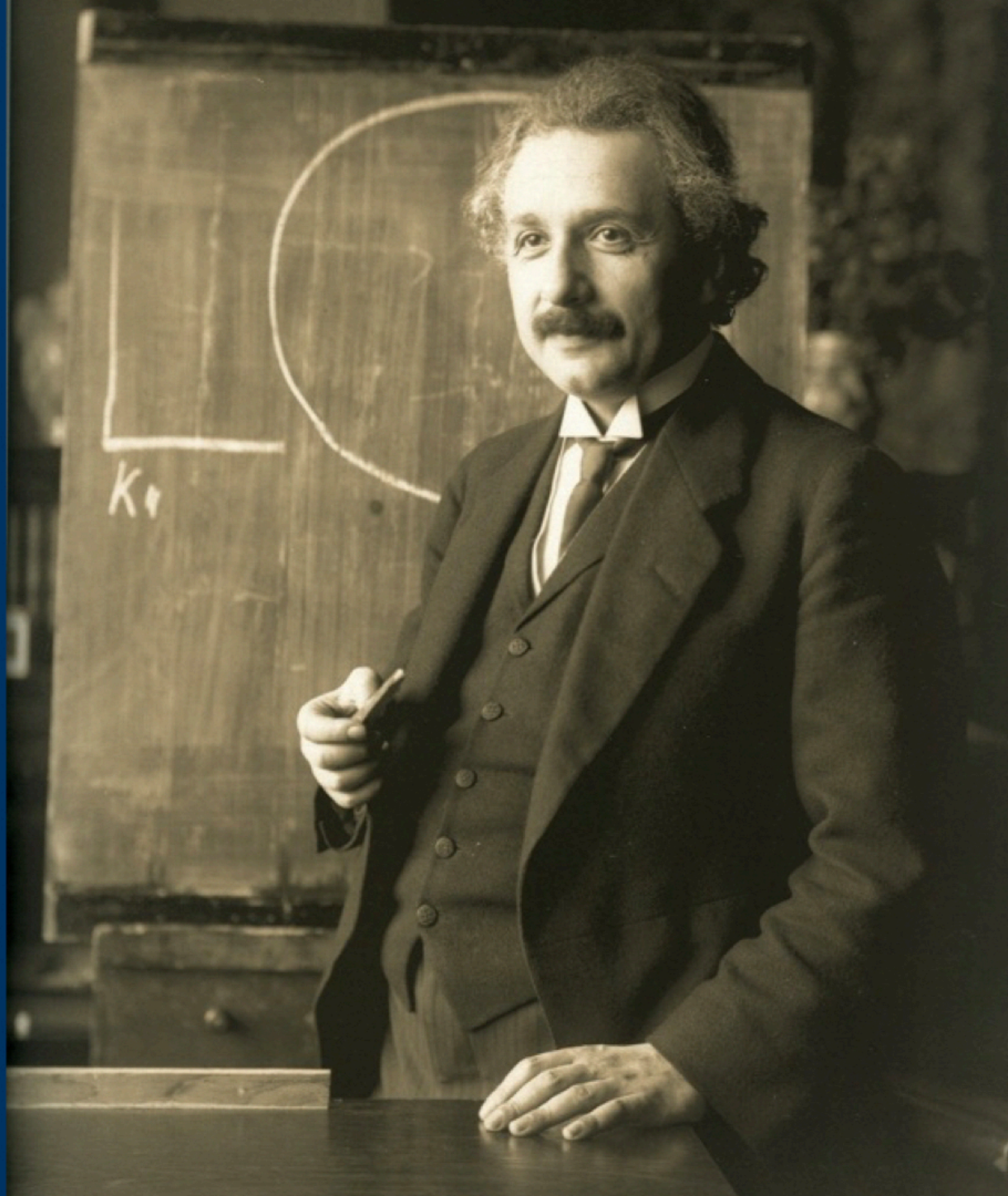


Dr. Jim Slosson

California State Geologist
1973-75

The right to search
for truth implies also
a duty;
one must not conceal
any part of what one
has recognized
to be true.

Einstein



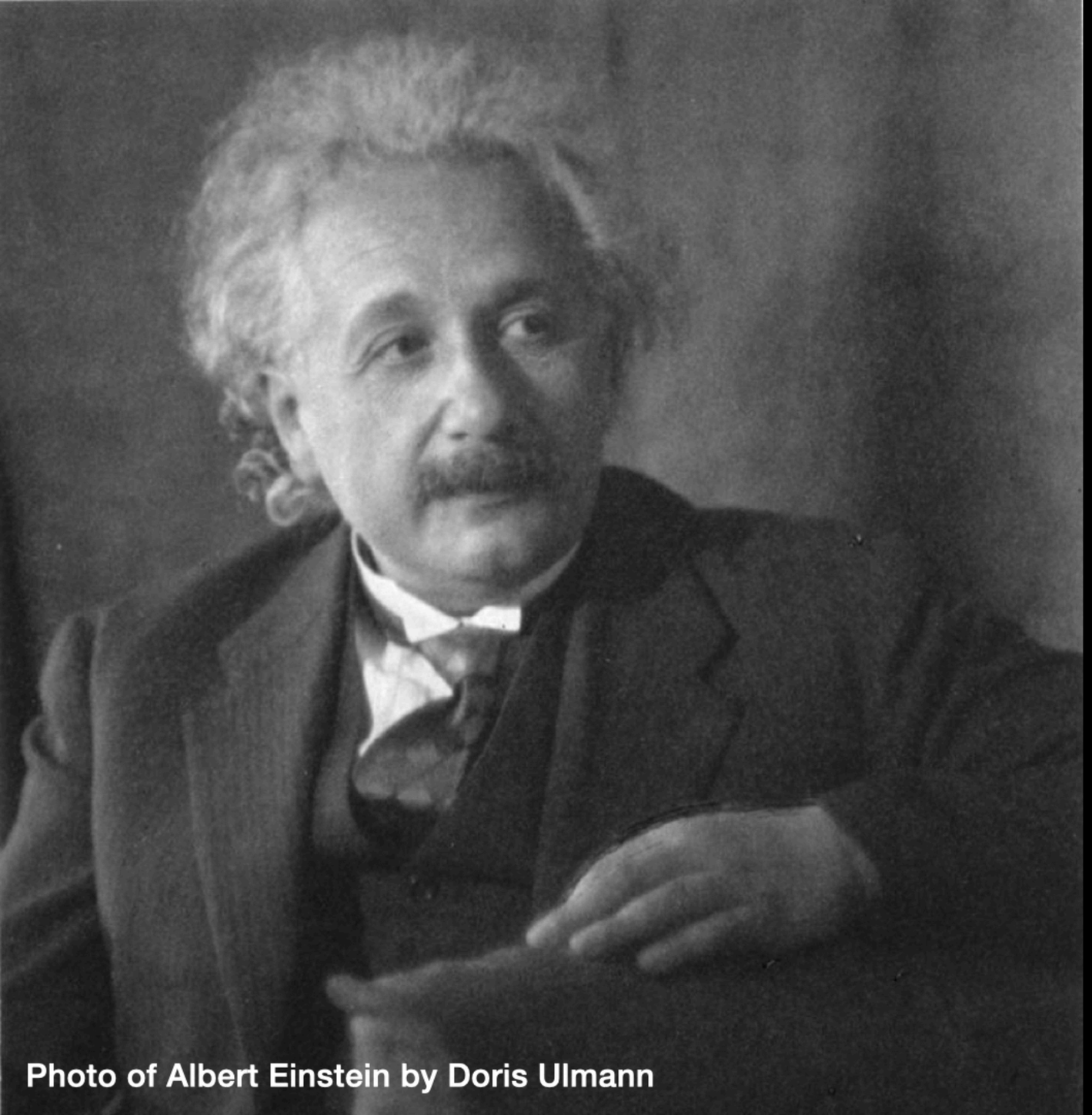


Photo of Albert Einstein by Doris Ulmann

Truth is what stands the test of experience

Einstein, 1950, The laws of science and the laws of ethics

The reasons society employs professional geoscientists include [1] resource exploration and production and [2] recognition and useful characterization of potential geologic hazards to mitigate or avoid them.

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We are not hired guns who generate reports whose conclusions are pre-determined by clients.

We are scientists, not client advocates.

The ultimate client of
any engineering geologist
is society

Business decisions do not outweigh our professional obligation to protect the public.

Science is a human endeavor in which we use **reproducible observations** and **testable hypotheses** to develop **reliable knowledge** of our world.

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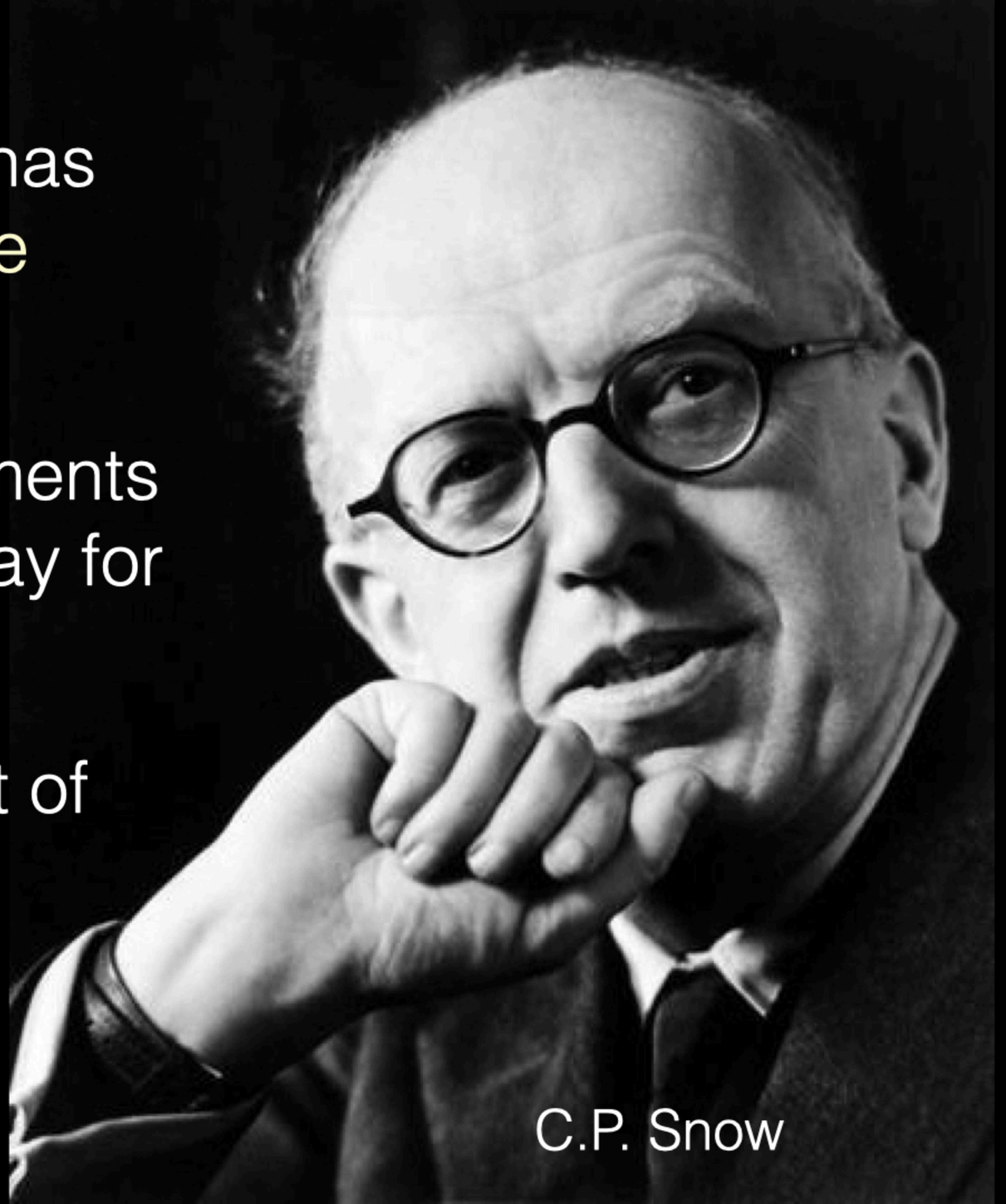
The only ethical principle which has made science possible is that the truth shall be told all the time.

If we do not penalize false statements made in error, we open up the way for false statements by intention.

And, of course, a false statement of fact made deliberately is the most serious crime a scientist can commit.



C.P. Snow

Licensure laws are based on the same fundamental principle as are professional codes of ethics: the professional must hold the protection of the public health, safety, and welfare to be more important than his or her interest or even the interest of the client or employer.

Robert Tepel
AEG Spec. Pub. 7
1995

“…hold paramount the safety, health, and welfare of the public and strive to comply with the principles of sustainable development.”

American Society of Civil Engineers (2017)


Primacy Principles

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For example, the Hippocratic Oath is an ancient expression of primacy principles under which a medical healer must work.

Primacy Principles for Professional Geoscientists

**In our professional work,
the health, safety, and wellbeing
of the public are paramount**

Robert Tepel

Primacy Principles for Professional Geoscientists

The ethical imperatives, standards, and norms that apply to any scientist also apply to professional geoscientists

Primacy Principles for Professional Geoscientists

Professional geoscientists have a responsibility to act in ways that promote, protect, and sustain the health of the Earth environment.

Primacy Principles for Professional Geoscientists

1. Public safety and welfare
2. Scientific standards & norms
3. Environmental health & sustainability

Another case history…

Velez Family, Christmas 1981

Bill Velez, father

Barbara Velez, mother

Michelle, age 14

Billy, age 7

Melissa, age 4

We have completed an investigation of the soil/*geologic conditions* of the subject site…

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The investigation consisted of a soils and foundation study *and a geologic reconnaissance of the local area*…

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The investigation consisted of a soils and foundation study *and a geologic reconnaissance of the local area*…

Our findings indicate that the site is suitable for the proposed residential use…”

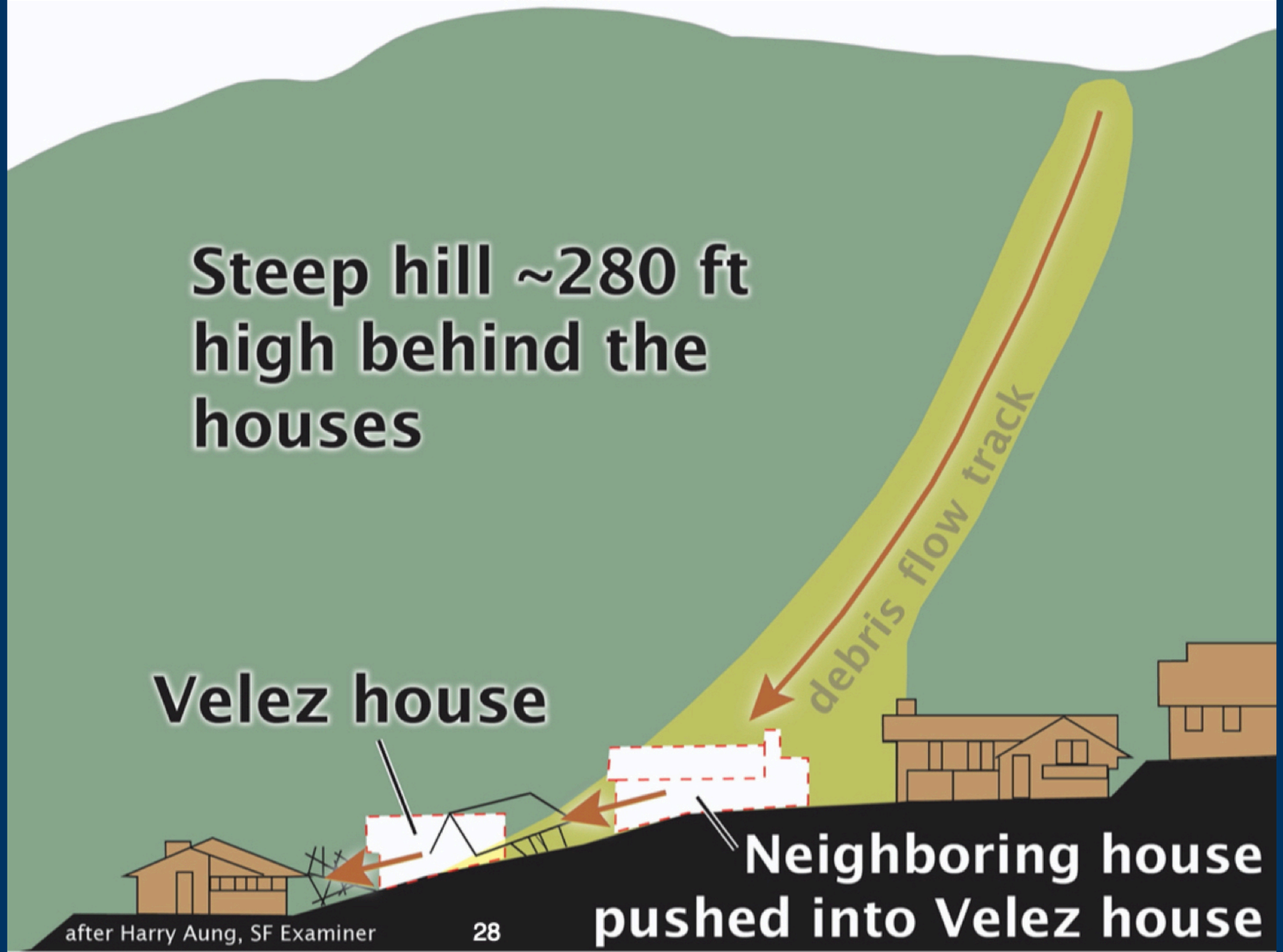
Steep hill ~280 ft high behind the houses
debris flow track
Velez house
Neighboring house pushed into Velez house
after Harry Aung, SF Examiner
28

photo from Jim Slosson

photo from Jim Slosson

Reasons given to explain why the hazard potential was not recognized

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The source of the debris was on the other side of the property line.

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Colluvium-filled swales were not commonly recognized as potential hazards. It was beyond standard practice

This project was driven by the developer and engineers. Site geology was a minor consideration.

photo from Jim Slosson

Our goal as professional geoscientists is to participate in the responsible development of assets that are of sustainable benefit to society, while avoiding or effectively mitigating any hazardous consequences of that development.

Professional geoscientists are an international professional community dedicated to geoscience in the public interest

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Community is formed through professional organizations such as AEG, IAEG, AIPG, GSA-EEGD, SIPES, etc.

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Those professional organizations have codes, standards, norms, or guidelines that their members are expected (or required) to follow

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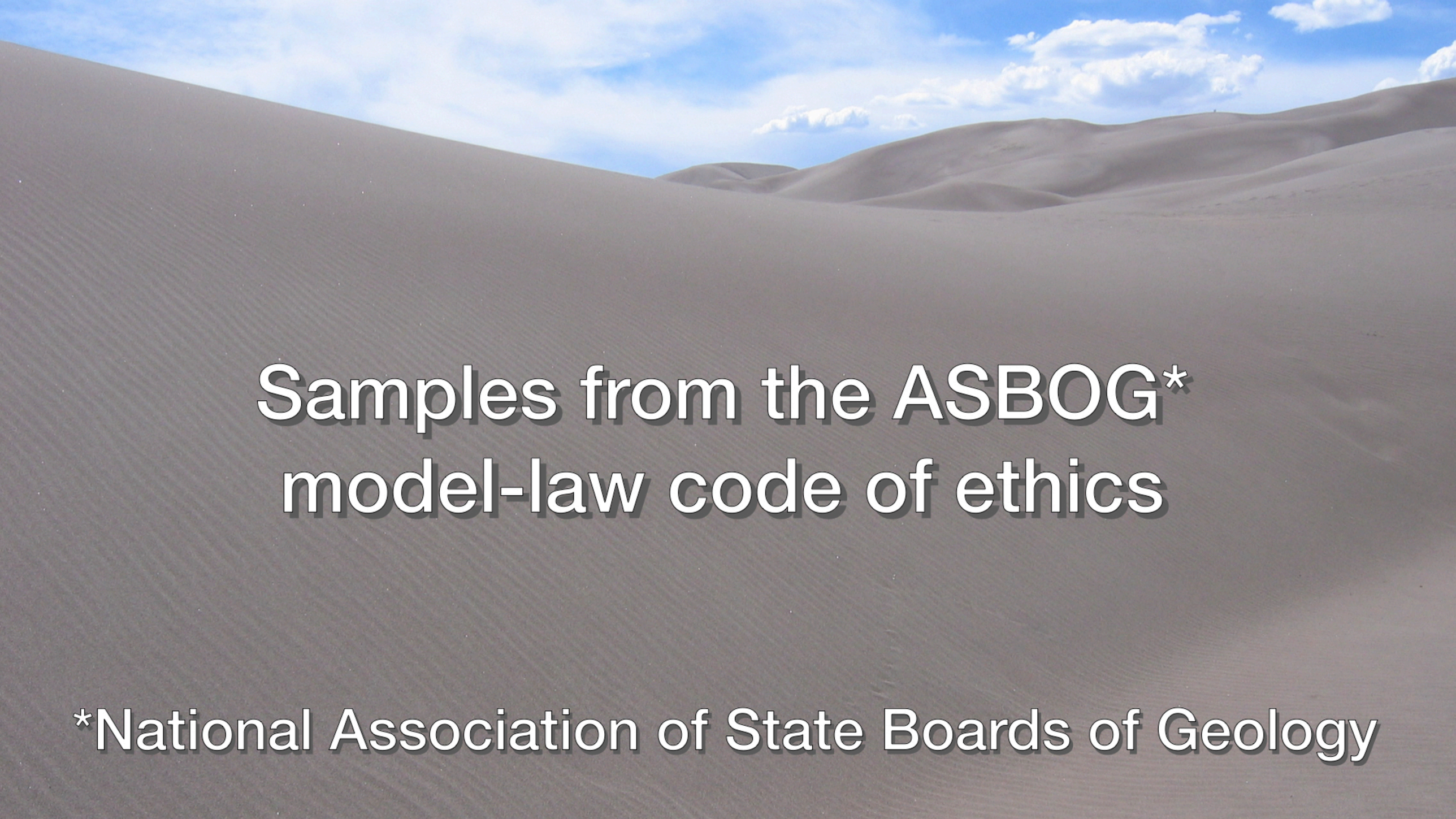
Links to published codes: https://croninprojects.org/Oct2024/Geoethics/


Samples from the ASBOG*
model-law code of ethics
*National Association of State Boards of Geology

Main titles in ASBOG's model ethics code

Professional Conduct

Public Interest

Legal Compliance

Integrity

Conflicts of Interest

Obligations of Employers and Clients

Professional and Ethical Obligations

Professional Courtesy

https://asbog.org/documents/ASBOG Rules-Regs 2019.pdf

From ASBOG's Task Analysis Survey, Ethical Issues

Conflict of interest

Failure to disclose regulatory violations

Failure to maintain confidentiality

Gifts: accepting and giving

Inappropriate advocacy for client

Insufficient "scope of work"

Invoicing

From ASBOG's Task Analysis Survey, Ethical Issues

Misrepresentation of professional qualifications

Plagiarism

Practicing outside area of competence

Practicing without a license

Selective data analysis, analysis, or disclosure

Retaliation against "whistle blowers"

https://asbog.org/documents/ASBOG TAS 2015 - Summary Report (July 2021).pdf

One final case history…

after William A. Bryant

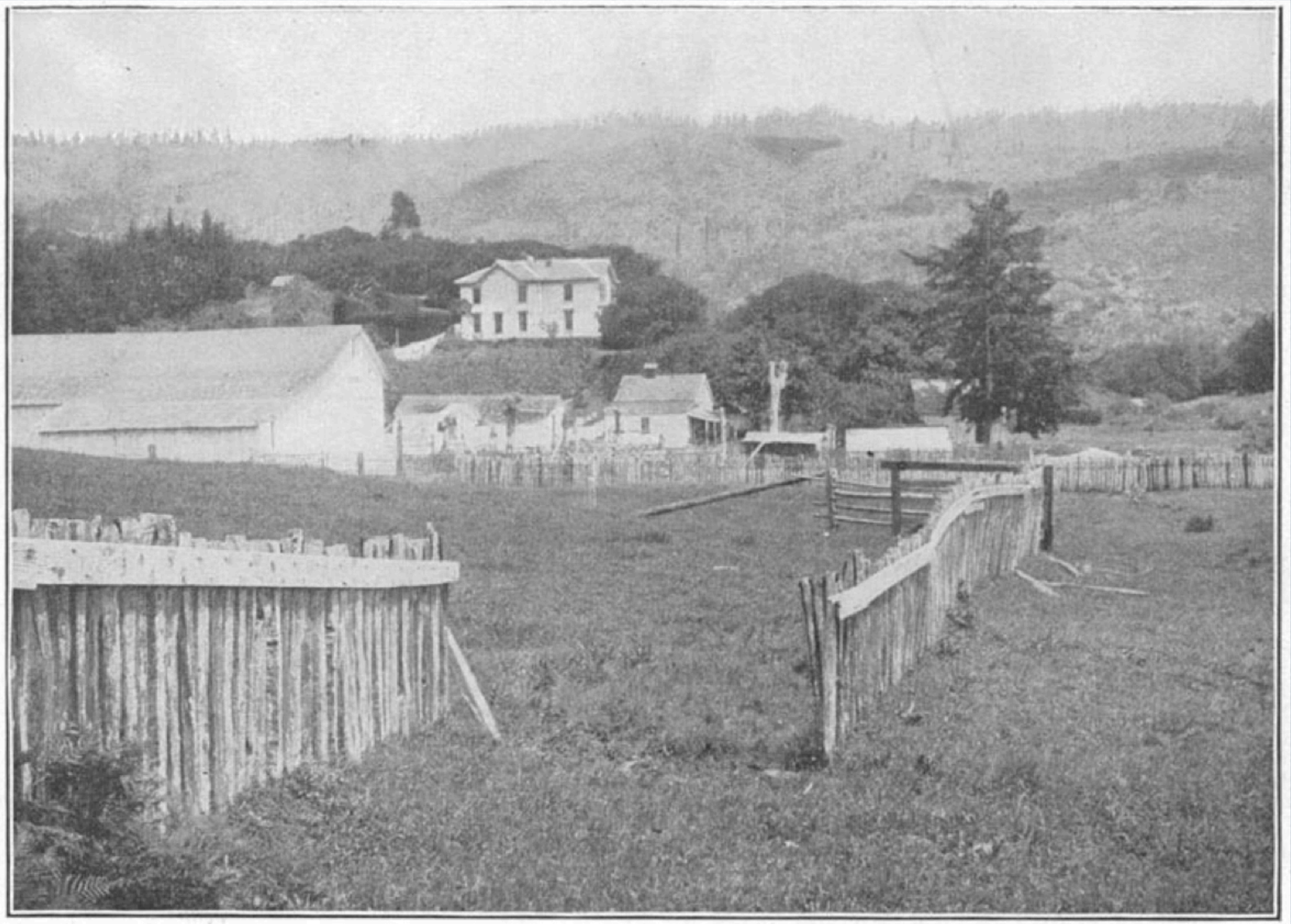
“I consider all faults to be inactive unless the State officially designates the fault as being active.”

Anonymous

New Construction Within the San Andreas Fault Zone, Pacifica, California

Google Earth image


Google Earth image
July, 1993



B. FENCE PARTED BY EARTHQUAKE FAULT.

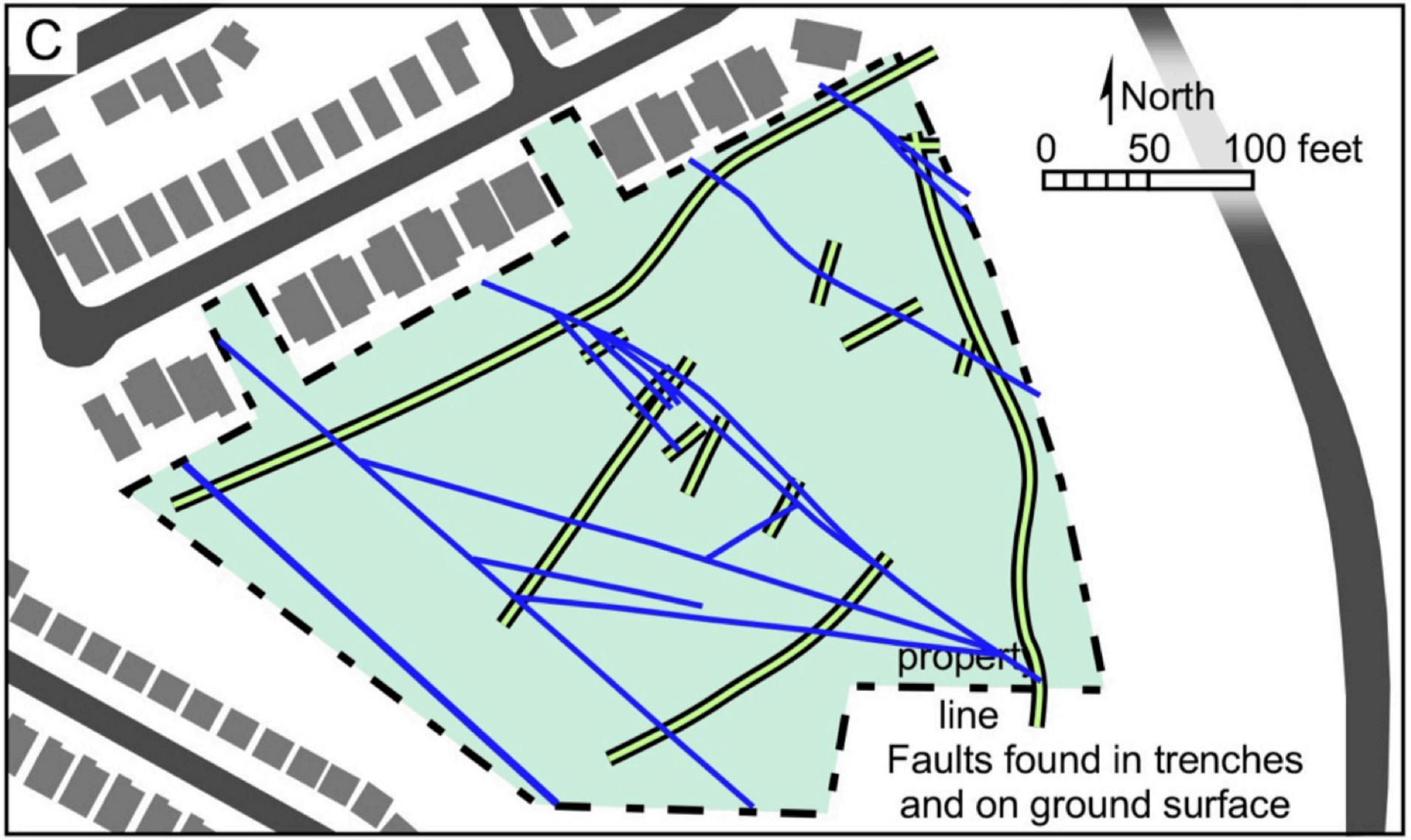
The fault trace or fracture accompanying the earthquake is inconspicuous, although the horizontal displacement is considerable. Photograph by G. K. Gilbert.

1906 San Francisco earthquake

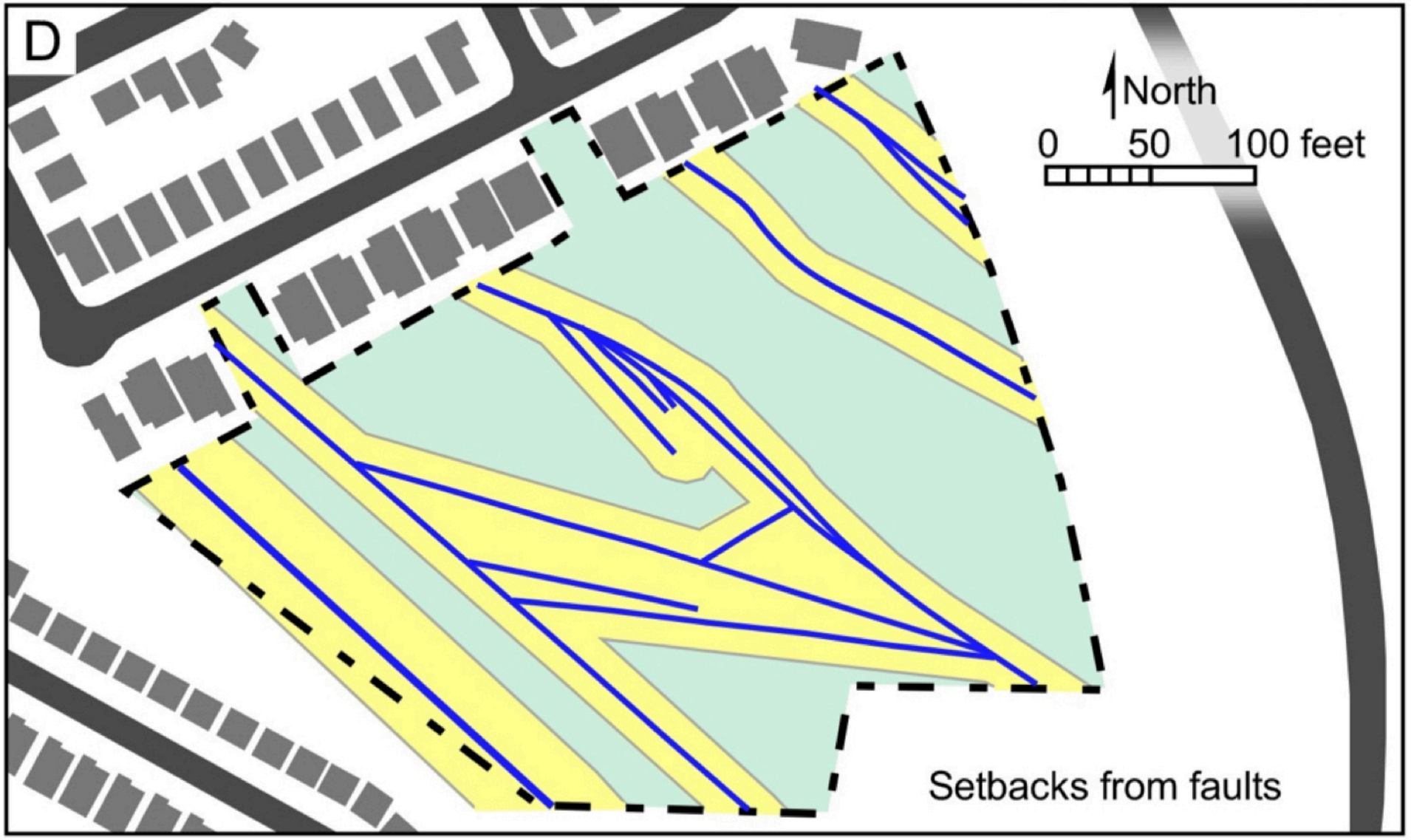
M 7.8, ~3,000 deaths

~$10.5 billion estimated damage (2015 $)

~12 feet of right-lateral offset near the development site



after W.A. Bryant



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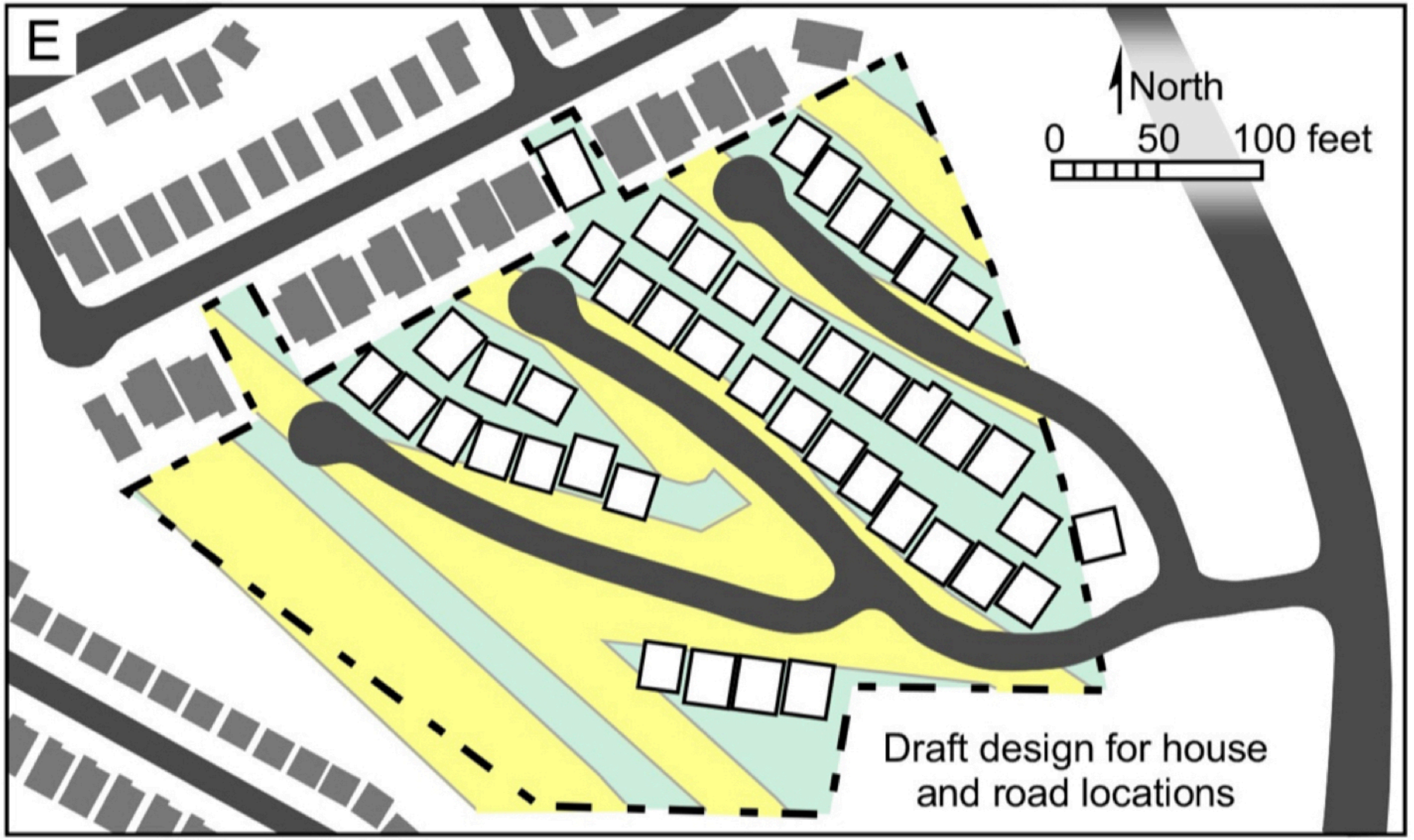


after W.A. Bryant

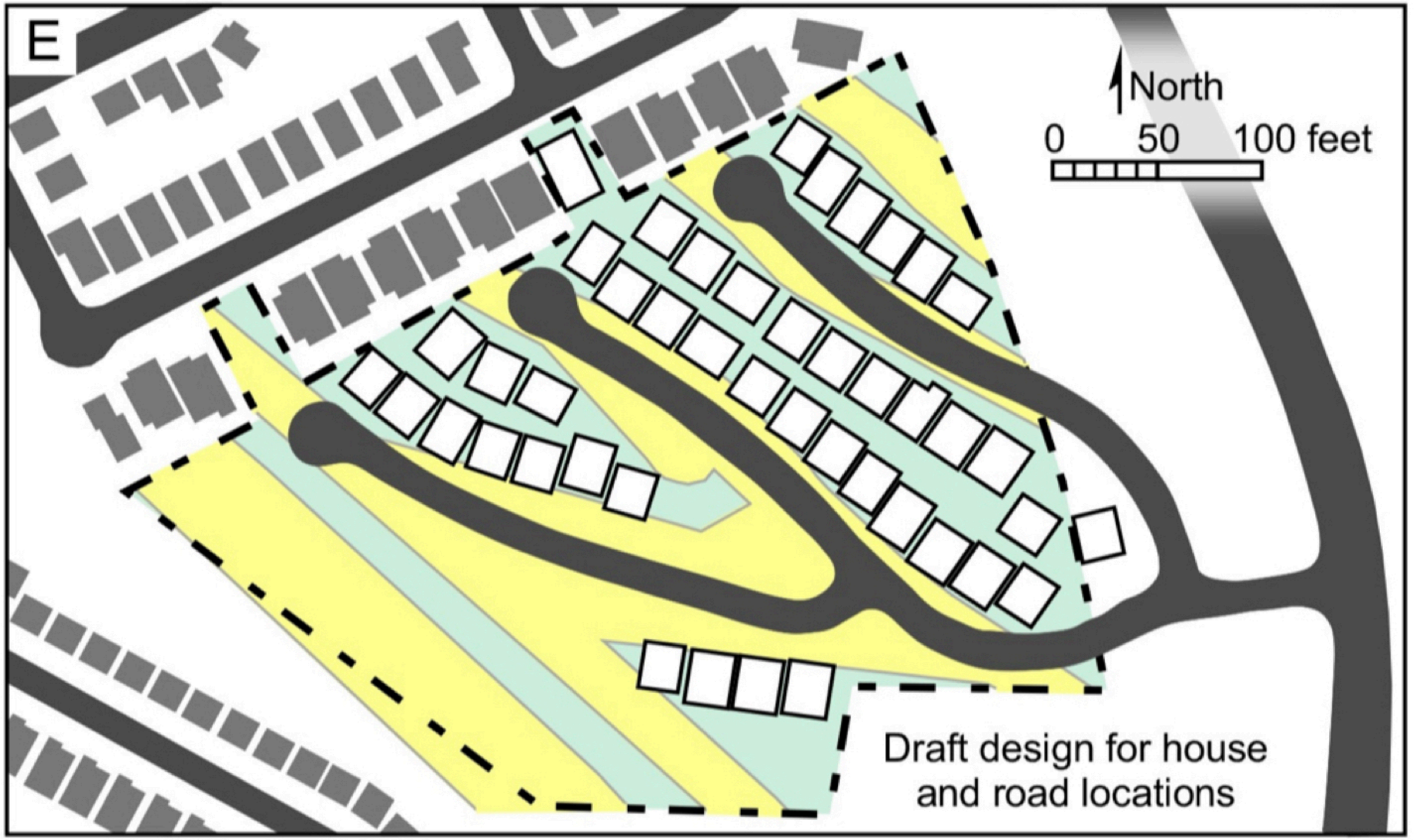
Recent analogs for the 1906 San Francisco earthquake

2023 Turkey-Syria earthquake
M 7.8, >50,325 confirmed deaths as of February 28, 2023
many tens of thousands of injuries,
~$84.1 billion in damage

Recent analogs for the 1906 San Francisco earthquake

2015 Nepal (Gorkha) earthquake
M 7.8, >8,964 deaths,
tens of thousands of injuries,
~$10 billion in damage

Bhaktapur, Nepal, 2015



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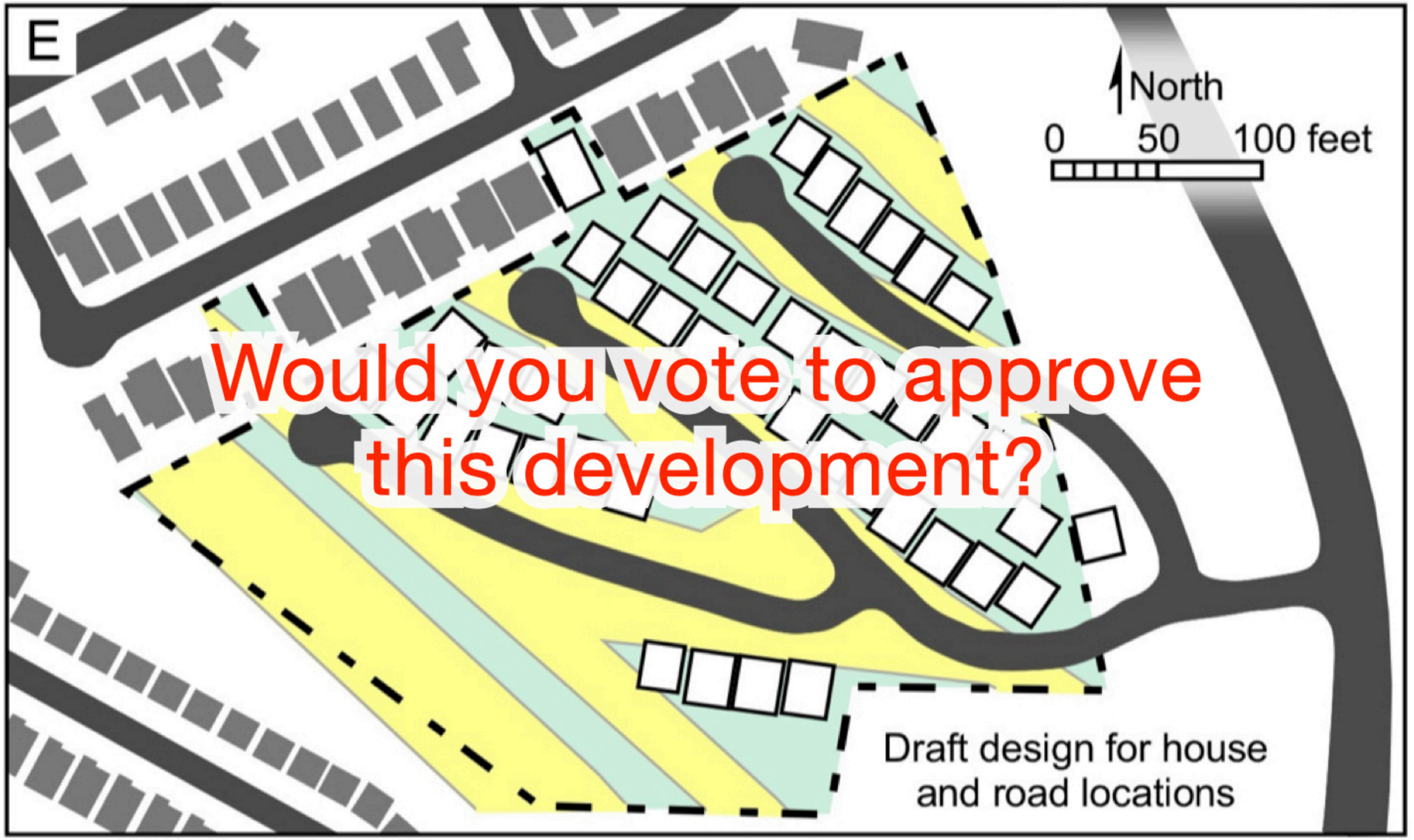

after W.A. Bryant


Google Earth image
March, 2015

“It’s a good thing we mapped the San Andreas fault when we did. They’ve built too many houses on top of it to map the fault zone now.”

Cliff Gray, CDMG

Slosson's Law

Practice will drop to the lowest level permitted by the administration and enforcement of applicable law.

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Practice will drop to the lowest level permitted by the administration and enforcement of applicable law.

(We can do better.)

The ultimate client of
any engineering geologist
is society

Business decisions do not outweigh our professional obligation to protect the public.

If we do not act as responsible scientists in the public interest, the contributions of engineering geologists will not be sought or valued by society.

After Slosson et al. (1991)


https://CroninProjects.org/Oct2024/Geoethics/