

MEMORANDUM

To: Metro Project Team **Date:** June 20, 2013
From: PB Team/Tunnel Advisory Panel
Subject: **Response to Venable Letter dated May 22, 2013 and attached Preliminary Memo from Kenney GeoScience**

Further to our Memorandum of May 23, 2013 (attached), we met with our review team and experts on May 31 to review in more detail the Kenney GeoScience (Kenney) Preliminary Memo dated May 22, 2013. In addition, we revisited previous Metro reports and data related to fault studies in the Century City area. Subsequent to the meeting, we also received copies of the Legg¹ reports cited by the Kenney Memo, and the full size plate, KGS-FM1 illustrating Kenney's interpretations. We note that according to the Kenney Preliminary Memo, a revised Final Report is being prepared to supercede the comprehensive KGS 2012 Report². We request a copy of this Report when available.

Our review focused on two primary technical issues raised by the Kenney Memo, namely:

- The presence of faults at the Constellation Station site; and
- The presence of faults at the previously proposed Santa Monica Boulevard East Station site.

These issues are the primary focus of the May 22 Venable letter. The following three statements and associated comments summarize our conclusions from the review.

1. Faulting younger than at least 600 thousand years does not exist at the Constellation site.

Comment: Metro's geotechnical data show no evidence of faulting of 600-thousand-year-old strata (San Pedro Formation) in the vicinity of the Constellation station site.³ Furthermore, vintage photographs taken during construction of an approximately 100 foot-deep basement excavation in the early 1970s (Theme Towers Project) adjacent to the Constellation station demonstrate the absence of faulting at the locations of the projected "small scale" faults postulated by Kenney (see attached Figures 1 and 2). The attached photo (Figure 2) demonstrates unbroken stratigraphy at these locations and the absence of faults in these 600-thousand-year-old strata. The use of the excavation photos to demonstrate the absence of faulting at the Station Site were previously presented in a Metro response to a Shannon and Wilson Report⁴ prepared in April 2012

http://www.metro.net/projects_studies/westside/images/Westside_Shannon_Wilson_Response_2012_0417.pdf

¹ Legg Geophysical, Independent Review of Metro Century City Area Fault Investigation Report Appendix D, Reports dated January 27 and May 10, 2012.

² Kenney GeoScience, July 18, 2012, Geomorphic, structural and stratigraphic evaluation of the eastern Santa Monica Fault Zone, and West Beverly Hills Lineament, Century City/Cheviot Hills, California.

³ Metro, November 2102, Century City Area Fault Investigation Report.

⁴ Response to Preliminary Review Comments of Century City Area Fault Investigation Report by Shannon & Wilson, Metro, April 7, 2012.

2. Faulting is present along Santa Monica Boulevard and intersects the previously proposed Santa Monica East Station location.

Comment: Based on interpretation of extensive CPT and borehole data, there is clear evidence of the presence of significant faults that cross Santa Monica Boulevard in the middle and edge of the previously proposed Santa Monica Boulevard East Station. Based on Leighton's⁵ new trench data from Beverly Hills High School, which demonstrate that strands of the Santa Monica fault zone extend both farther south and farther east than previously known, the faults strands that cross the previously proposed station site could be associated with the Santa Monica fault system, rather than the Newport-Inglewood fault system. None of the recent studies, including Kenney's, addresses the activity of these faults.

3. The Kenney Memo acknowledges the presence of faulting beneath Santa Monica Boulevard extending eastward from the intersection of South Moreno Drive. Kenney refers to this zone of faulting as the "South Moreno Drive fault zone."

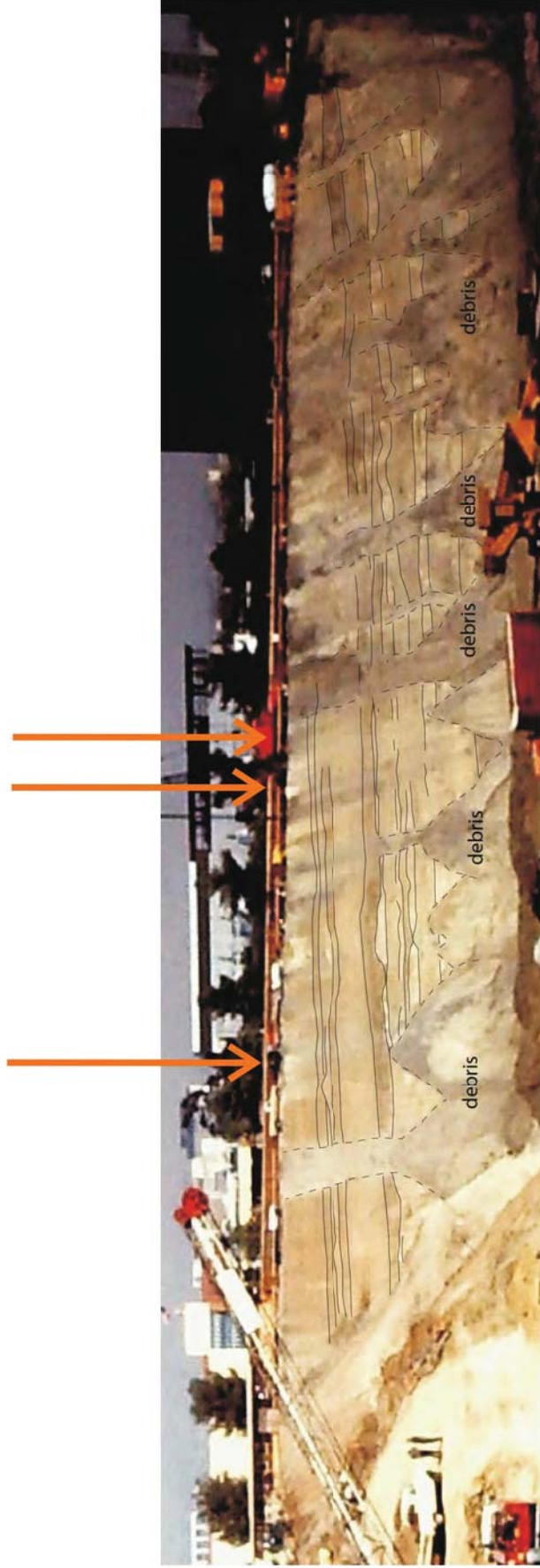
Comment: Kenney echoes Metro's original interpretation that fault strands associated with the northern Newport Inglewood fault system are present in a zone extending eastward from the intersection of Moreno Drive and Santa Monica Boulevard. It is worth noting that although Kenney and Metro find faults in the same general area, the strands are in slightly different locations, with different trends, and with an additional strand farther east than interpreted by Metro. The new Leighton trench data from Beverly Hills High School, however, indicate that the Santa Monica fault zone is a much wider feature than previously known. Thus, it is possible that the fault strands beneath Santa Monica Boulevard in the vicinity of South Moreno Drive could be associated with the ENE-trending Santa Monica fault zone, rather than the NNW-trending Newport-Inglewood fault zone.

In summary, any Santa Monica Boulevard Station option lies within an extremely complex zone of faulting that extends both south and north of the Boulevard and to the east and west of South Moreno Drive. Based on the above, there is no reason to reconsider a Santa Monica Boulevard Station option. In marked contrast, there is direct evidence for the absence of faulting younger than 600,000 years through the Constellation station site. The Kenney Memo does not demonstrate the presence of faulting in the Constellation Station area site.

Attachments: Figure 1 – Location of Excavation Photo and Kenney Postulated Faults
Figure 2 – 1970's Photo along Century Park East
PB/TAP Draft memo dated May 23, 2013.

⁵Leighton Consulting, Inc., *Second Response to California Geological Survey Review Comments, Fault Rupture Hazard Review, Beverly Hills High School, 241 South Moreno Drive, Beverly Hills, CA*, dated December 28, 2012, Project No. 603314-008

Projection of Kenney Faults



Photograph of East Wall of 1970's Basement Excavation Along Century Park East

Depth is Approximately 100 Feet

Note that the faults postulated by Kenney project through exceptionally well-exposed, unfaulted stratigraphy that is at least 600,000 years old. These observations preclude the possibility of late Quaternary faulting through the site.

DRAFT



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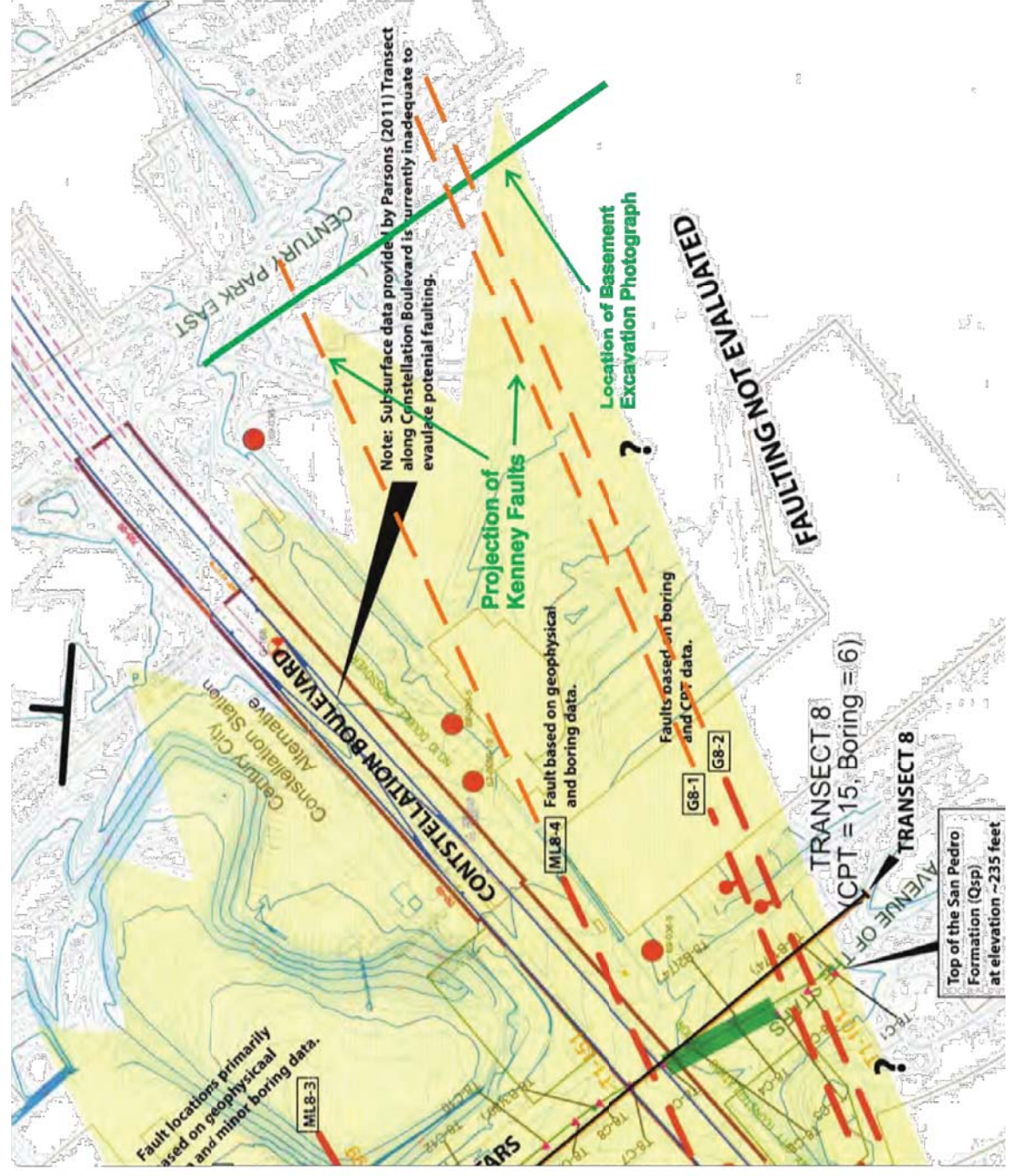
MTA Westside Extension

LT.LNG: _____ NTS
 SCALE: _____ VMN
 DRAWN: _____
 CHKD: R. Munro
 PM: M. Hudson
 DATE: 6/14/2013

FIGURE NO.
2
 PROJECT NO.
 4953-11-1423

1970's Photo Along
 Century Park East

Exhibit B | Page 3



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Base Map:
 Kenny GeoScience, Plate KGS-FM1, dated May 2013
 Amec Extended Faults in Orange and Added Text and Line in Green

MTA Westside Extension

LT.LNG:	NTS
SCALE:	VMIN
DRAWN:	R. MUNRO
CHKD:	M. HUDSON
DATE:	6/14/2013

Location of Excavation
 Photo and Kenney
 Postulated Faults
 Exhibit B | Page 4

FIGURE NO.
1
 PROJECT NO.
 4953-11-1423

MEMORANDUM

To: Metro Project Team **Date:** May 23, 2013

From: Tunnel Advisory Panel and PB Team

Subject: **Response to Venable Letter dated May 22, 2013 and attached Preliminary Report from Kenney GeoScience**

We have briefly reviewed the Kenney GeoScience Report (Kenney Report) of May 15, 2013, and the accompanying letter from Venable LLP dated May 22, 2013. We understand that missing components to the Report (Plate KGS-FM1 and related cited reference documents) have been requested, which are essential for our detailed review. The list of these documents is attached. We have scheduled a meeting of our review team and experts for Friday, May 31, subject to the availability of these items.

In reading the Venable May 22 letter, we note significant inconsistencies between conclusions in the Kenney Report and the conclusions cited in the Venable letter as noted in comments below. The letter states (as shown in italics):

Specifically, the Report concludes that:

- *The Agencies' Seismic Studies failed to conduct adequate seismic testing at Constellation Boulevard.*

Comment: The Report does not explicitly state this. However, we note that the Metro studies complemented drilling and geophysical investigations with analysis of vintage photographs of an extensive deep excavation along the southern side of Constellation Blvd. These data indicated no near surface folding or faulting at the Constellation Station site. The Report does not comment on this excavation.

- *A newly found fault zone exists in the vicinity of Constellation Boulevard. This new fault zone has multiple strands, several of which intersect the Agencies' proposed Constellation Boulevard station location.*

Comment: Metro identified a fault in Kenney's "new" Fault Zone G that was determined to be inactive. We will examine the evidence for additional traces in the "new" fault zone. However, the Kenney GeoScience Report notes that faults identified are relatively small scale faults. In addition, Constellation Boulevard is not shown on the maps provided.

- *The West Beverly Hills Lineament fault zone identified in the Seismic Studies does not exist.*

Comment: The Report does not state this. Rather the portion of the West Beverly Hills Lineament zone east of South Moreno Drive was renamed the South Moreno Drive fault zone, and moved by Kenney GeoScience to the East of Moreno Drive.

- *There is ample room to place a subway station on Santa Monica Boulevard east of Avenue of the Stars without encountering any faults or fault zones.*

Comment: The Report does not address the question of station location on Santa Monica Blvd. or at any other location.

The following is the list of documents cited in the report needed for a complete review of the Kenney Geoscience conclusions. The Kenney Report also states that Kenney GeoScience is preparing a final report; this should also be made available so that we can review before drawing final conclusions on the Kenney Geosciences studies.

The following reports were referenced by Kenney GeoScience. Please provide us with these references, as well as Plate KGS-FM1 that was stated to be attached but not included in the received letter.

1. Leighton Consulting, Inc., 2012, Progress Report of Fault Hazard Assessment, El Rodeo K-8 School, 605 Whittier Drive, Beverly Hills, CA, prepared for Hill, Farrer & Burrill, Project No. 603367-002, dated June 29, 2012.
2. Feffer Geologic Consulting, 2012, Report of Fault Rupture Hazard Investigation, 10000 Santa Monica Boulevard, Los Angeles, California, prepared for Crescent Heights, Project No. 494-64, dated August 24, 2012.
3. Legg Geophysical, Inc., 2012, Independent Review of Metro Century City Area Fault Investigation Report Appendix D, dated January 27, 2012.
4. Legg Geophysical, Inc., 2012, Update Report for Independent Review of Metro Century City Area Fault Investigation Report Appendix D, dated May 10, 2012.
5. We also need Plate KGS-FM1 from the May 22, 2012 Kenney report that was not included in the Venable package.