Figure 2.5-215— {Map Legend for Surficial Geology of the Monmouth Junction Quadrangle, Somerset, Middlesex, and Mercer Counties, New Jersey, Open-File Map OFM 47, Department of Environmental Protection, New Jersey Geological Survey}

SURFICIAL GEOLOGY OF THE MONMOUTH JUNCTION QUADRANGLE, SOMERSET, MIDDLESEX, AND MERCER COUNTIES, NEW JERSEY

by
Scott D. Stanford
2002

MAP UNITS

Age of unit indicated in parentheses. For units spanning more than one period, principal age is listed first.

Order of map units in list does not necessarily indicate chronologic sequence.

ARTIFICIAL FILL--Sand, silt, clay, gravel; brown, gray, yellowish brown; may include angular fragments of shale, sandstone, and diabase bedrock. May also include demolition debris (concrete, brick, asphalt, glass) and trash. As much as 30 feet thick. Many small areas of fill in urban areas are not shown.

Qal ALLUVIUM (Holocene and late Pleistocene)--Sand, silt, clay, peat; yellowish brown, reddish brown, dark brown, gray; and pebble-to-cobble gravel. Abundant organic matter. Sand is chiefly quartz and shale fragments, with some glauconite and mica. Gravel is quartz, shale fragments, and quartzite with minor diabase and ironstone. As much as 20 feet thick. Deposited in floodplains, channels, and groundwater seepage areas.

Qs SWAMP AND MARSH DEPOSITS (Holocene and late Pleistocene)--Peat and organic silt, sand, and clay; dark brown to black. As much as 10 feet thick.

Qcal COLLUVIUM AND ALLUVIUM (Holocene and late Pleistocene)--Interbedded alluvium and colluvium in headwater valleys. As much as 15 feet thick.

Qaf ALLUVIAL FAN DEPOSITS (Holocene and late Pleistocene)--Sand, silt; brownish yellow, reddish brown, brown; and pebble gravel. Minor amounts of organic matter. As much as 15 feet thick. Forms small fans at mouths of steep streams.

Qe EOLIAN DEPOSITS (late Pleistocene and Holocene)--Fine-to-medium sand, very pale brown to reddish yellow. Sand is chiefly quartz and shale fragments with minor mica in places. As much as 15 feet thick. Forms sand sheets.

Qtl LOWER TERRACE DEPOSITS (late Pleistocene)--Sand and minor silt; reddish brown, yellowish brown, reddish yellow; and pebble gravel. Sand is chiefly quartz and red and gray shale fragments with some glauconite and mica. Gravel is quartz, quartzite, gray and red shale and siltstone, with minor diabase, gneiss, and chert. As much as 30 feet thick. Forms stream terraces with surfaces 5 to 20 feet above the modern floodplain.

Qcl LOWER COLLUVIUM (late Pleistocene)--Sand, silt, minor clay; yellow, yellowish brown, reddish yellow, light gray; some quartz and ironstone pebbles. As much as 15 feet thick, generally less than 10 feet thick. Deposited by downslope movement of Cretaceous sand and clay.

Qcs SHALE COLLUVIUM (late Pleistocene)--Sandy, clayey silt; reddish brown; many angular chips and fragments of shale. As much as 10 feet thick. Deposited by downslope movement of weathered shale. Forms aprons on grade with lower terraces.

Qcd DIABASE COLLUVIUM (middle and late Pleistocene)--Sandy, clayey silt to sandy, silty clay; reddish yellow, brown, gray; some to many angular to subrounded pebbles, cobbles, and small boulders of diabase and gray hornfels, and a few rounded pebbles and cobbles of quartz and quartzite. As much as 25 feet thick. Deposited by downslope movement of weathered diabase, hornfels, and Beacon Hill lag.

Tp PENSAUKEN FORMATION (Pliocene)--Sand, minor silt and clay; yellow to reddish yellow; pebble gravel and minor cobble gravel, particularly at the base of the deposit. Sand is chiefly quartz with some weathered feldspar and minor glauconite and mica. Gravel is chiefly quartz and quartzite with some chert and ironstone, and minor sandstone, mudstone, gneiss, and diabase. Gneiss, diabase, and some sandstone and mudstone, clasts are deeply weathered. Locally iron-cemented. As much as 145 feet thick. In erosional remnants of a dissected river plain.

Qwcp WEATHERED COASTAL PLAIN FORMATIONS--Exposed sand and clay of Coastal Plain bedrock formations. May be overlain by thin, patchy alluvium and colluvium. Quartz, chert, and ironstone pebbles left from erosion of surficial deposits may be present on the surface and in the upper several feet of the formation.

Qws WEATHERED SHALE--Silty clay to sandy silt; reddish brown, pale red, reddish yellow, gray; some to many angular chips and fragments of shale and a few quartz, chert, and ironstone pebbles left from erosion of surficial deposits. As much as 10 feet thick, generally less than 3 feet thick.

Qwd WEATHERED DIABASE--Silty clay to clayey sand; yellow, reddish yellow, light gray; some to many angular to subrounded pebbles, cobbles, and small boulders of diabase. A few quartz, chert, and ironstone pebbles and cobbles left from erosion of surficial deposits may be present on the surface and in the upper several feet. As much as 20 feet thick.

MAP SYMBOLS

Contact--Contacts of alluvium, swamp deposits, and lower terrace deposits are well-defined by landforms and are drawn from 1:12,000 scale aerial stereophotos. Contacts of other units are approximately located based on both landforms and field observation points.

Material observed in hand-auger hole, exposure, or excavation.

Shallow topographic basin--Of probable periglacial origin.

28-2459
>54 Well or boring--Upper number (italicized) is identifier, lower number is thickness of surficial material, in feet. Identifiers of the form '28-xxxx' are N. J. Department of Environmental Protection well permit numbers. Identifiers of the form 'Mxxx' are monitoring wells filed under permit numbers 28-31109 to 28-31122. Identifiers of the form '28-xx-xxx' are N. J. Atlas Sheet grid locations of entries in the N. J. Geological Survey permanent note collection. Borings identified by 'H' are N. J. Department of Transportation borings from Harper (1984).

10 Thickness of surficial material--From geophysical survey (D. L. Jagel and D. W. Hall, N. J. Geological Survey, 1995)

20 Elevation of base of Pensauken Formation--In feet above sea level. Contour interval 20 feet. Dashed where eroded Topography of the base of the Pensauken in the Kingston area shows abrupt thickening along the trace of the Kingston Fault, suggesting fault offset of the Pensauken (Stanford and others, 1995). See section AA'.

Trace of Kingston Fault--From Parker and Houghton (1990).

Bedrock strike ridge--Low ridge parallel to strike of bedrock. Drawn from airphotos.

Beacon Hill lag--Pebbles and cobbles of quartz, quartzite, chert, and ironstone left from erosion of the Beacon Hill Gravel, a late Miocene fluvial deposit that formerly covered the quadrangle above an elevation of 320 feet.

Sparse Beacon Hill lag--Pebbles and cobbles as above, but sparsely distributed.

Pensauken lag--Pebbles and a few cobbles of quartz, quartzite, and chert left from erosion of the Pensauken Formation. Only concentrated lags are mapped; sparsely distributed lag pebbles are widespread below 140 feet in elevation.

Upper terrace lag--Pebbles and a few cobbles of quartz and quartzite left from erosion of upper stream terrace deposits. Marks level of Millstone River in the middle Pleistocene.

Fluvial scarp--Line at top, ticks on slope. Cut into shale. On grade with upper terrace lag. Marks level of Millstone River in the middle Pleistocene.

Q Quarry--Line marks perimeter of excavated area at time of mapping. Diabase and hornfels outcrop, quarried rock, and stripped surficial material occur within perimeter.

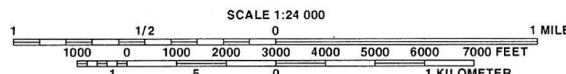
REFERENCES

Harper, D. P., 1984, Geologic compilation map of the Monmouth Junction quadrangle, New Jersey: N. J. Geological Survey Open-File Map 1, scale 1:24,000.

Parker, R. A., and Houghton, H. F., 1990, Bedrock geologic map of the Monmouth Junction quadrangle, New Jersey: U. S. Geological Survey Open-File Report 90-219, scale 1:24,000.

Stanford, S. D., Jagel, D. L., and Hall, D. W., 1995, Possible Pliocene-Pleistocene movement on a reactivated Mesozoic fault in central New Jersey: Geological Society of America Abstracts with Programs, v. 27, no. 1, p. 83.

SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

1981 MAGNETIC NORTH
DECLINATION AT CENTER
OF SHEET IS 11.5°

LOCATION IN
NEW JERSEY

Figure 2.5-216— {Ramapo Seismic Zone}

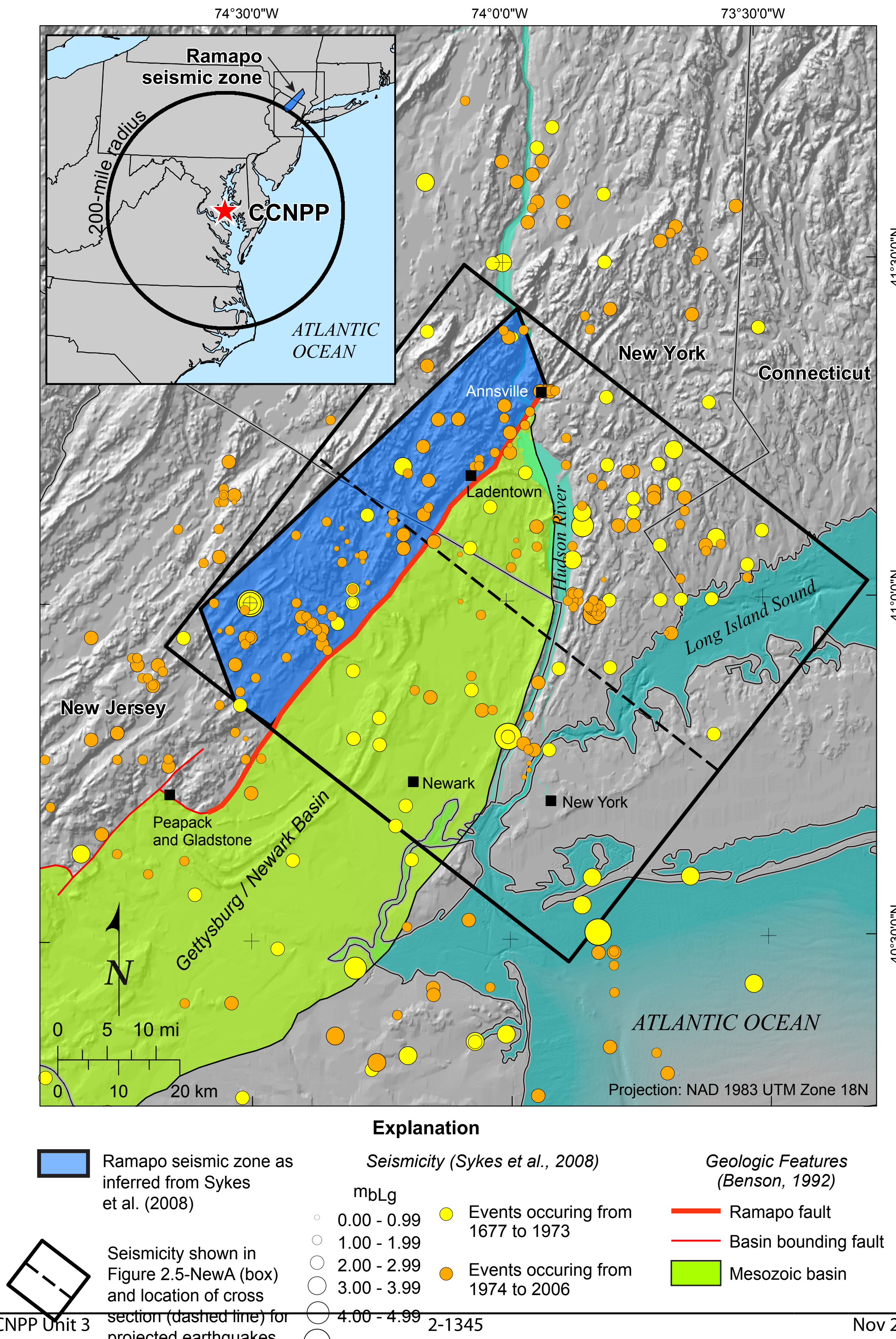


Figure 2.5-217— {Ramapo Seismicity Cross Section}

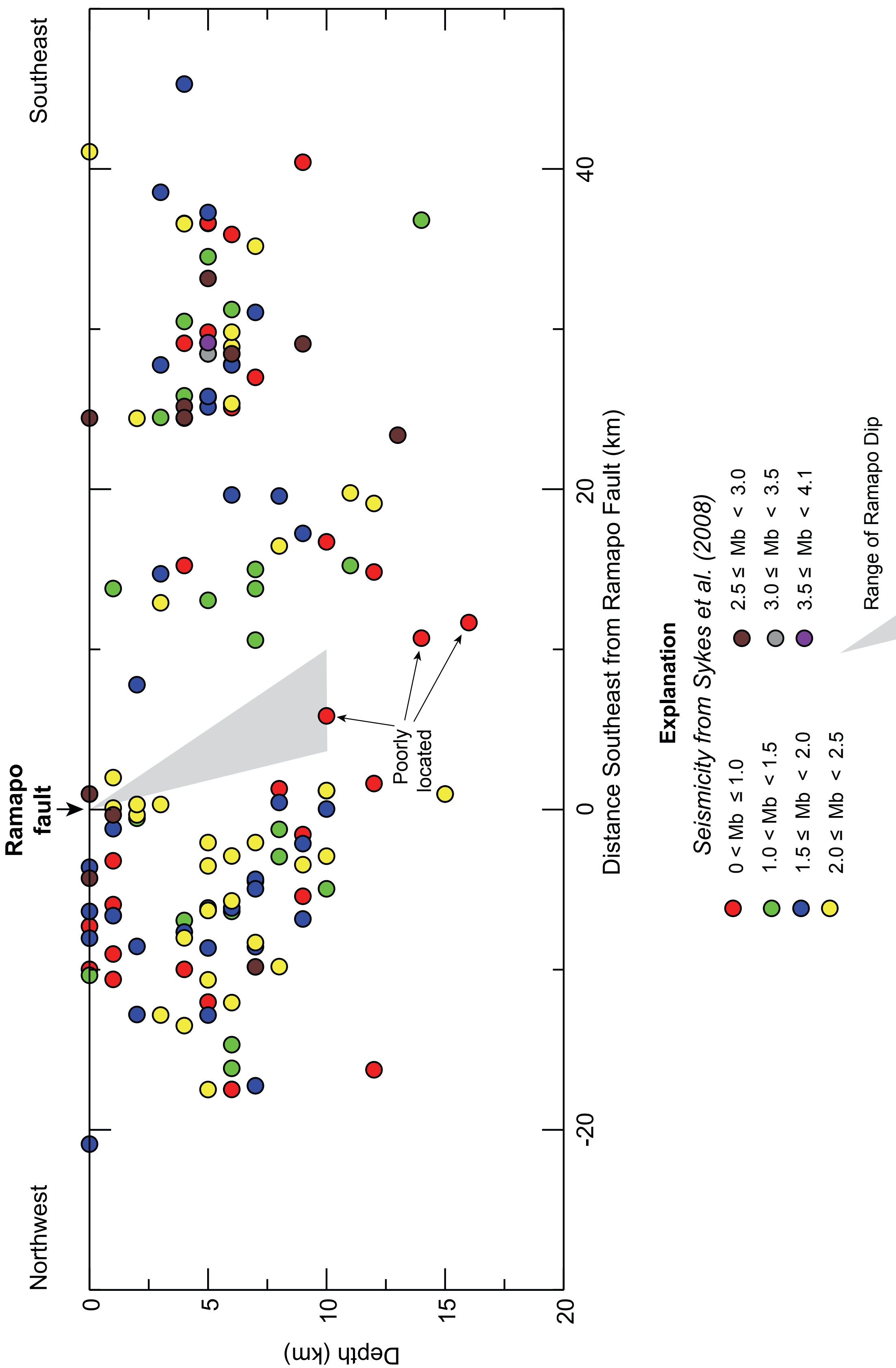


Figure 2.5-218— {Field and Aerial Reconnaissance Map for CCNPP Unit 3}

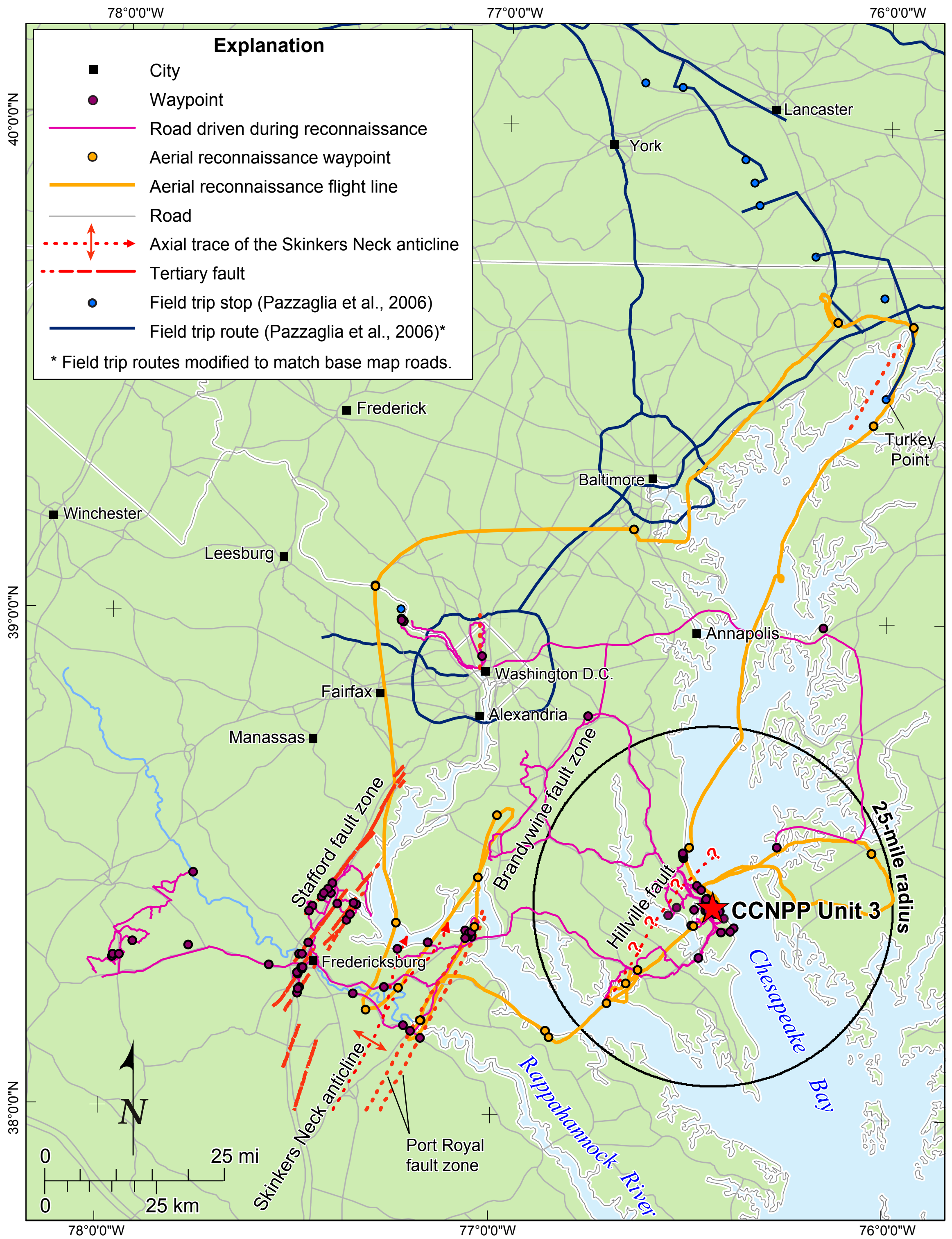
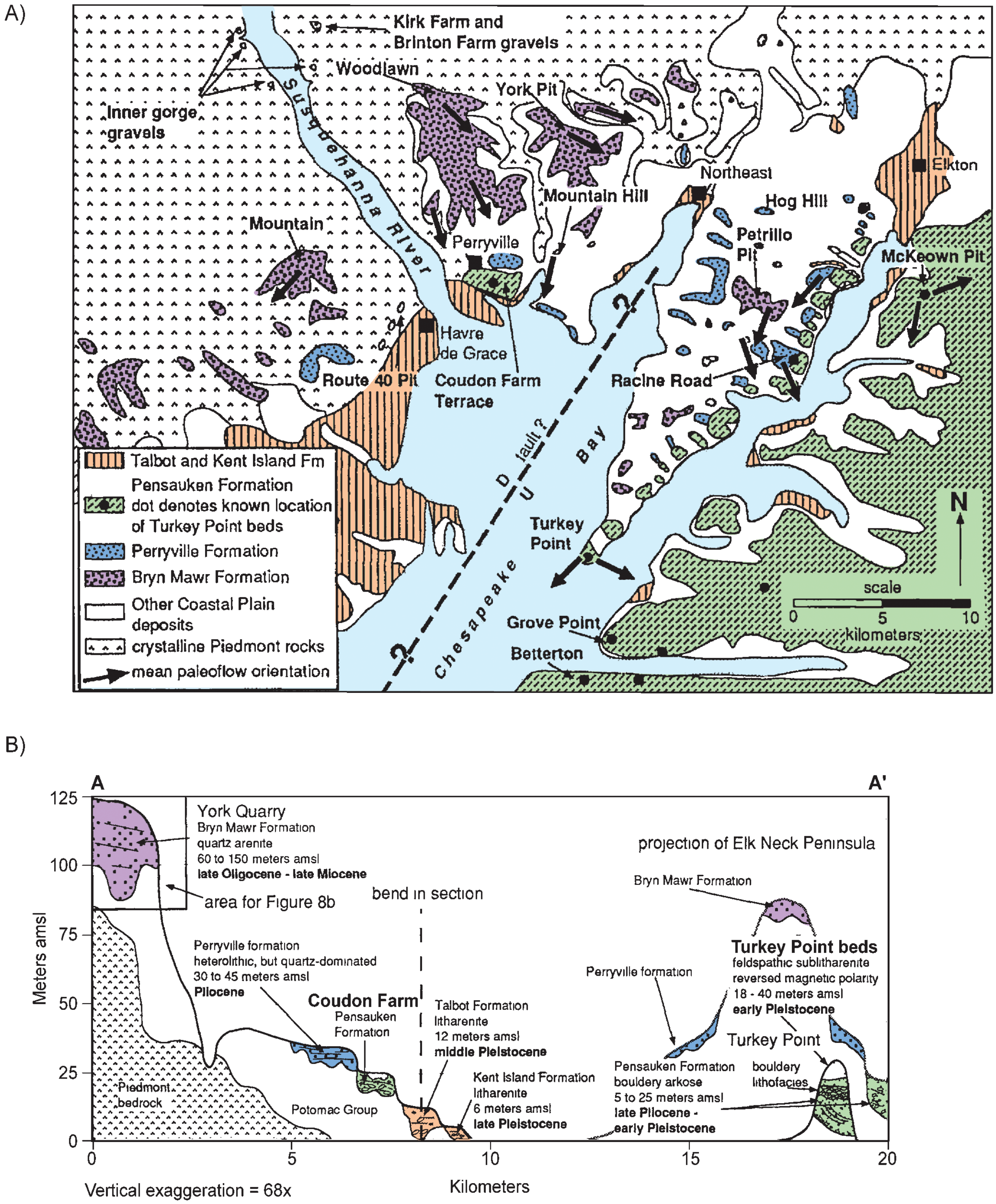
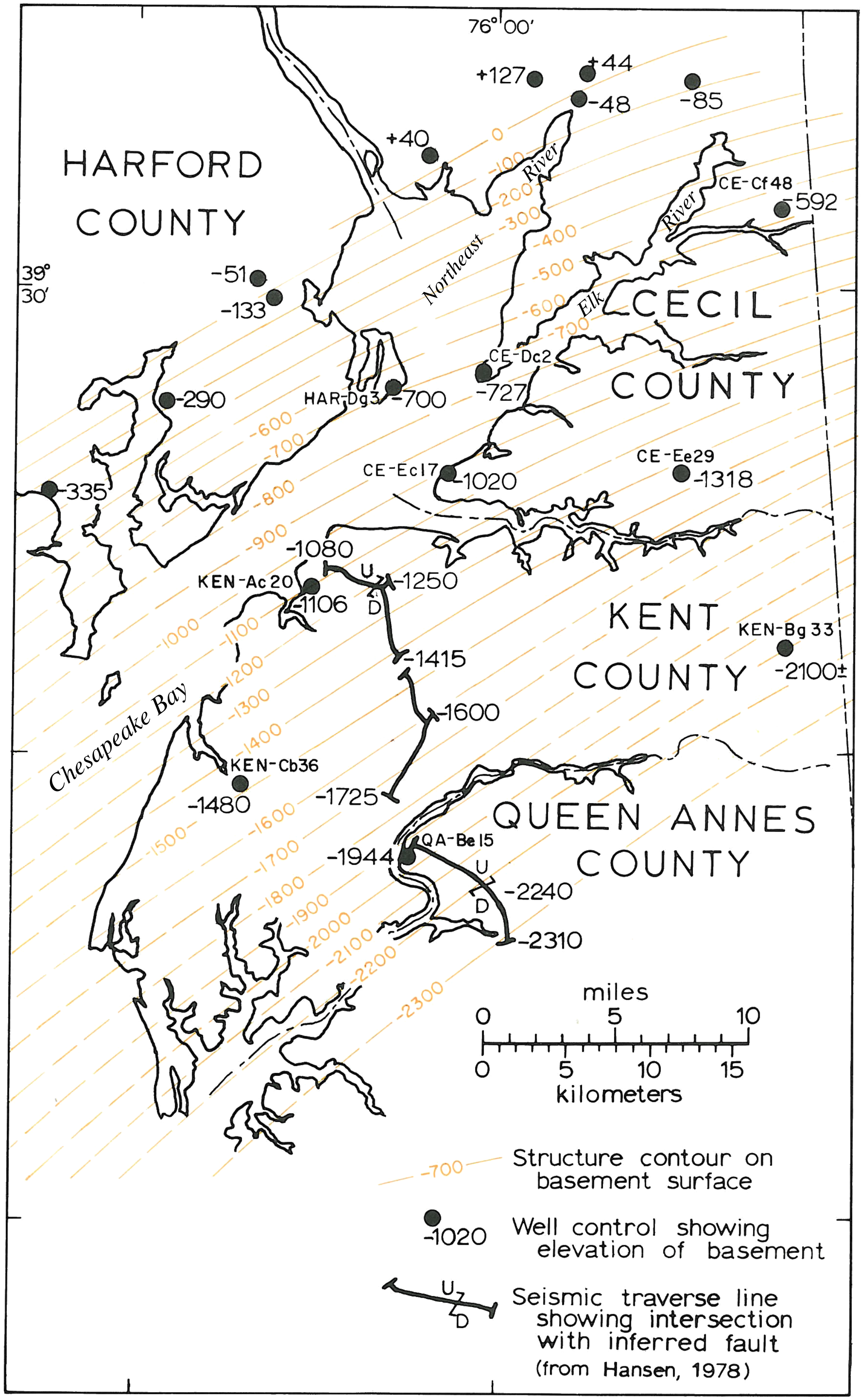


Figure 2.5-219— {(A) Generalized Geological Map and (B) Schematic Cross Section of the Northern Chesapeake Bay}



Note: (A) and (B) modified from Pazzaglia (1993a and 1993b).

Figure 2.5-220— {Generalized Top-of-Basement Structure Contour Map of the Northern Chesapeake Bay}



Reproduced from Edwards and Hansen (1979)

Figure 2.5-221— {LiDAR Elevation Showing Trace of Pazzaglia's Fault}

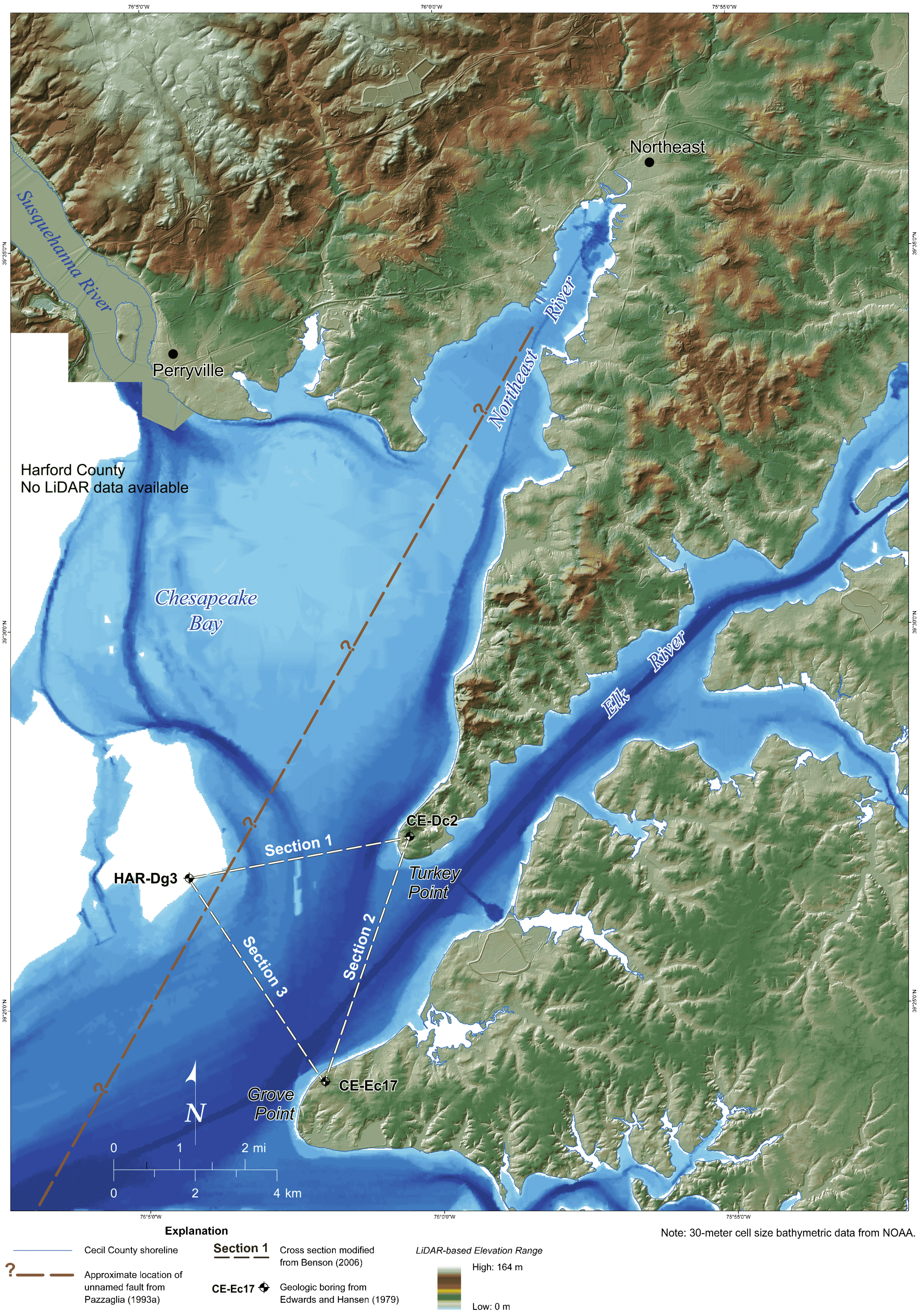


Figure 2.5-222— {Seismic Reflection Line St. M-1 Showing Hillville Fault of Hansen (1978)}

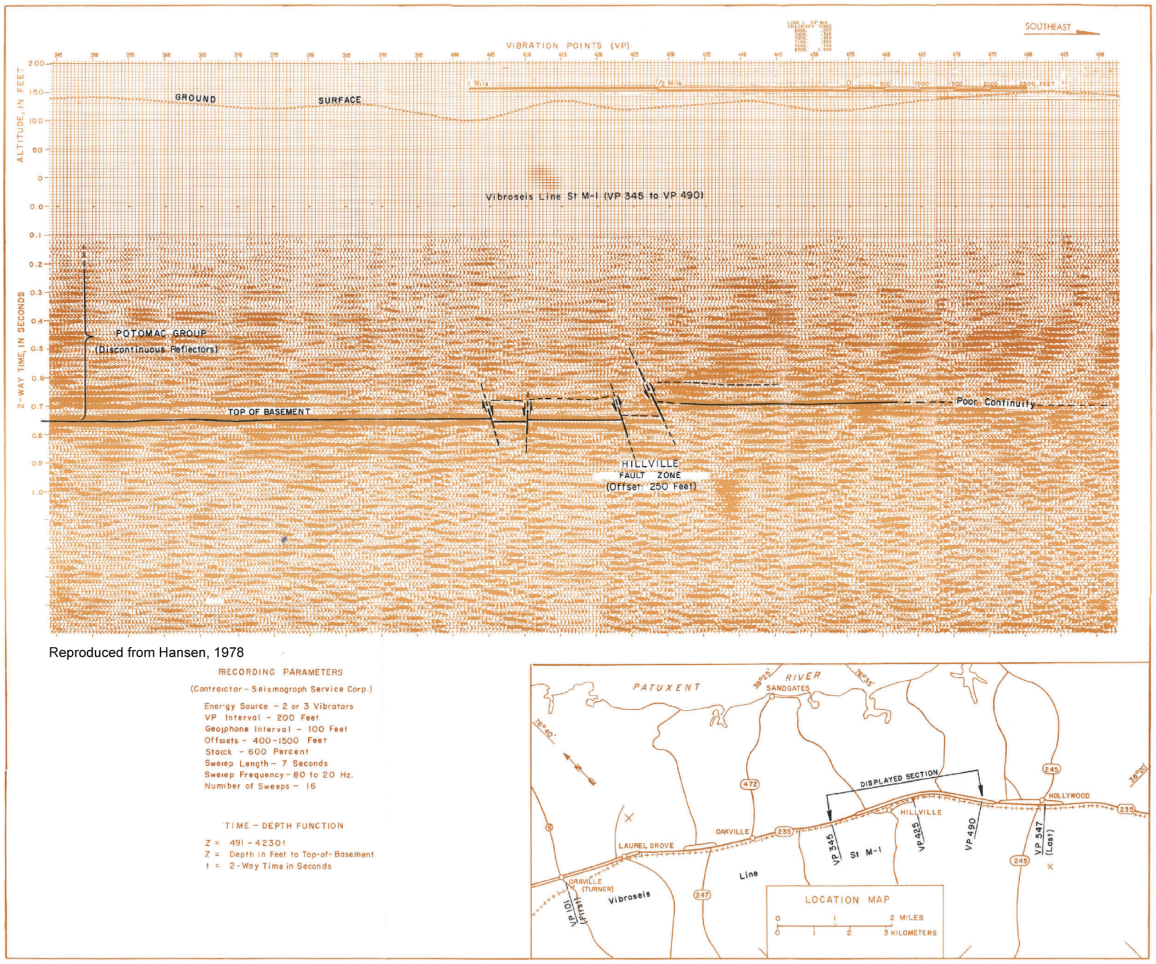


Figure 2.5-223— {Geologic Map of the Ramapo Fault and Vicinity with Seismicity}

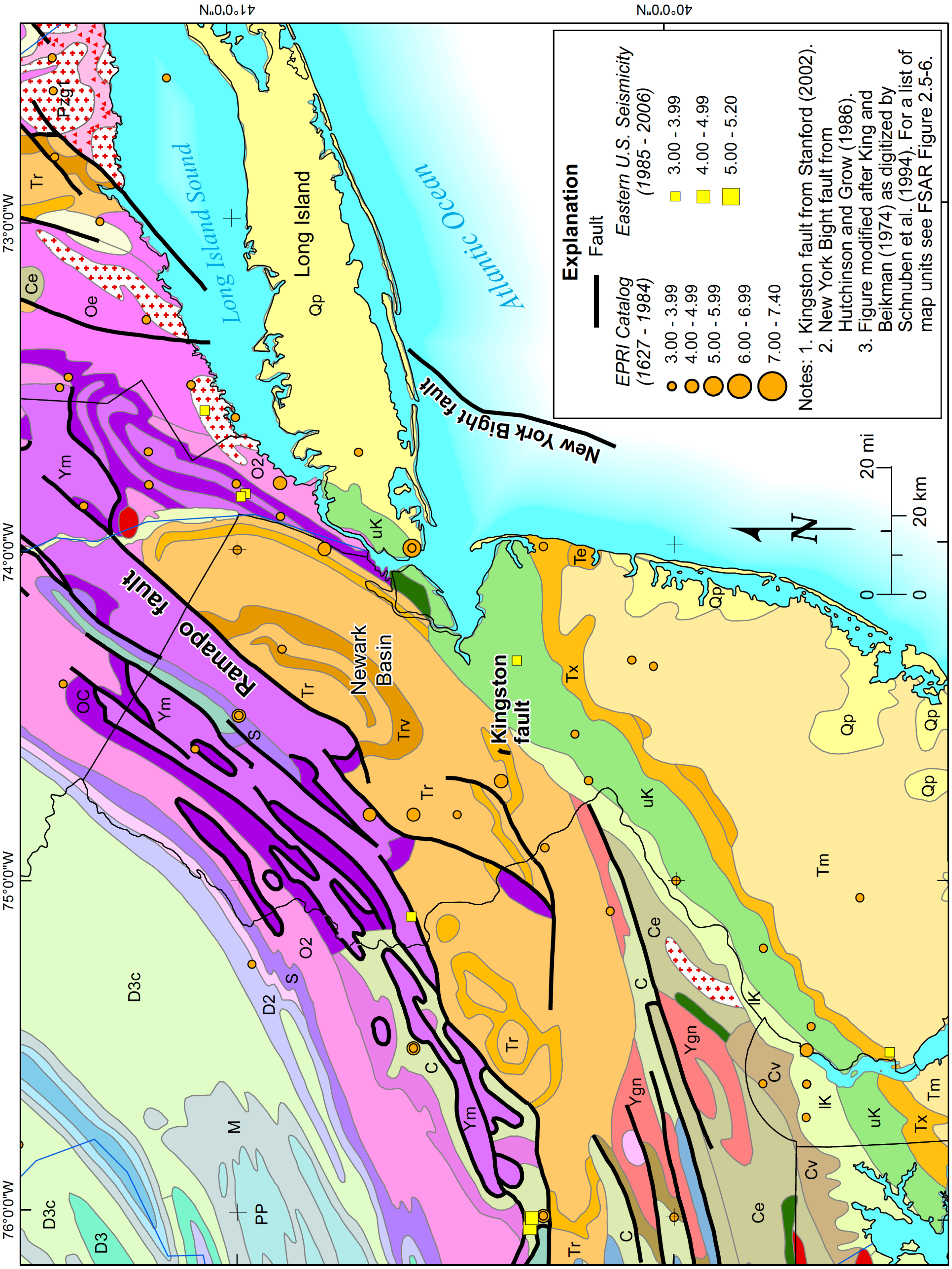
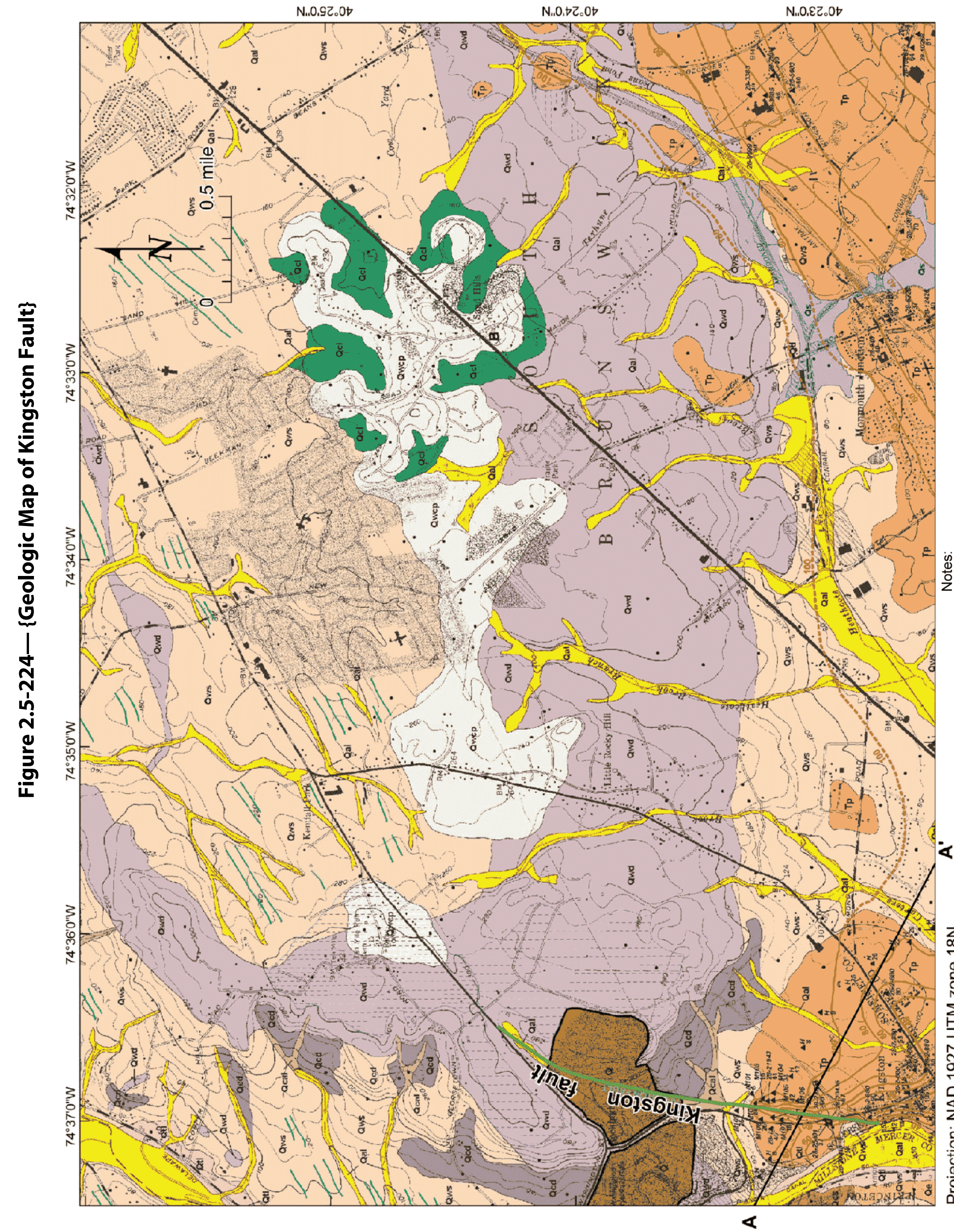


Figure 2.5-224— {Geologic Map of Kingston Fault}



Notes:

1. Reproduced from Stanford, 2002, Surficial Geology of the Monmouth Junction Quadrangle, Sommerset, Middlesex, and Mercer Counties, NJ, 1;24,000.
2. See Figure 2.5-308 for the geologic explanation and cross section A - A'.

Figure 2.5-225— {Explanation of Map Units and Cross Section A- A′ for the Geologic Map of the Kingston Fault}

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- Qal — ALLUVIUM (Holocene and late Pleistocene)--Sand, silt, clay, peat; yellowish brown, reddish brown, dark brown, gray; and pebble-to-cobble gravel. Abundant organic matter. Sand is chiefly quartz and shale fragments, with some glauconite and mica. Gravel is quartz, shale fragments, and quartzite with minor diabase and ironstone. As much as 20 feet thick. Deposited in floodplains, channels, and groundwater seepage areas.
- Qs — SWAMP AND MARSH DEPOSITS (Holocene and late Pleistocene)--Peat and organic silt, sand, and clay; dark brown to black. As much as 10 feet thick.
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- Qcl — LOWER COLLUVIUM (late Pleistocene)--Sand, silt, minor clay; yellow, yellowish brown, reddish yellow, light gray; some quartz and ironstone pebbles. As much as 15 feet thick, generally less than 10 feet thick. Deposited by downslope movement of Cretaceous sand and clay.
- Qcs — SHALE COLLUVIUM (late Pleistocene)--Sandy, clayey silt; reddish brown; many angular chips and fragments of shale. As much as 10 feet thick. Deposited by downslope movement of weathered shale. Forms aprons on grade with lower terraces.
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- Tp — PENSAUKEN FORMATION (Pliocene)--Sand, minor silt and clay; yellow to reddish yellow; pebble gravel and minor cobble gravel, particularly at the base of the deposit. Sand is chiefly quartz with some weathered feldspar and minor glauconite and mica. Gravel is chiefly quartz and quartzite with some chert and ironstone, and minor sandstone, mudstone, gneiss, and diabase. Gneiss, diabase, and some sandstone and mudstone, clasts are deeply weathered. Locally iron-cemented. As much as 145 feet thick. In erosional remnants of a dissected river plain.
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- Q — Quarry--Line marks perimeter of excavated area at time of mapping. Diabase and hornfels outcrop, quarried rock, and stripped surficial material occur within perimeter.

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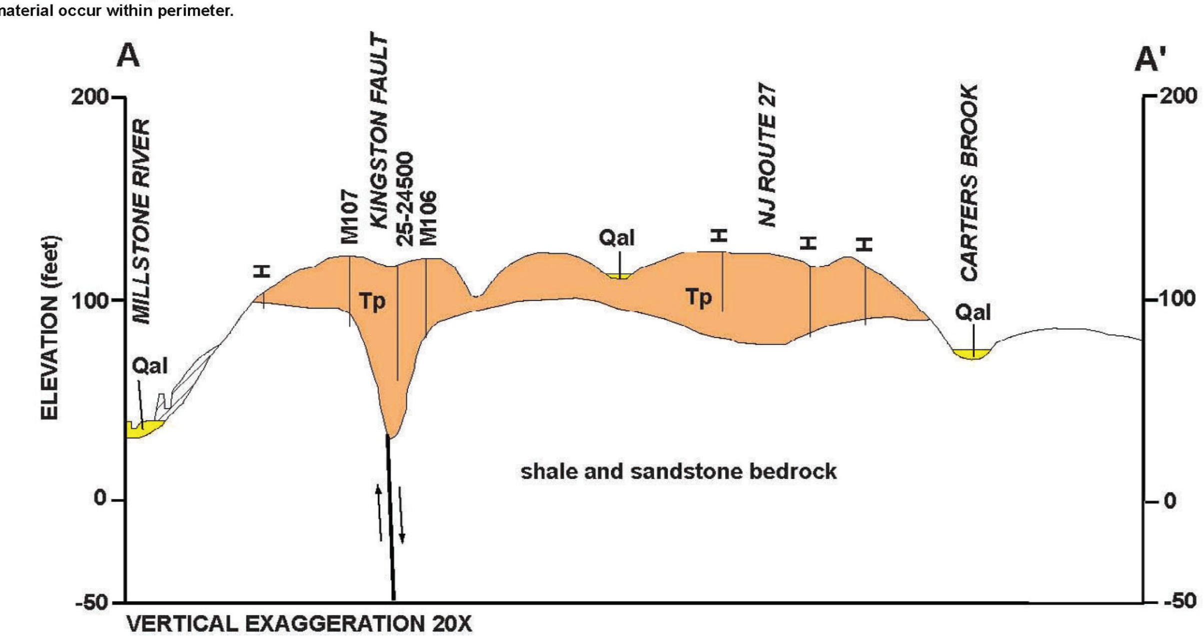

Figure 2.5-226— {Selection of Shear Modulus and Damping Ratios for Soils Deeper than 400 Feet}

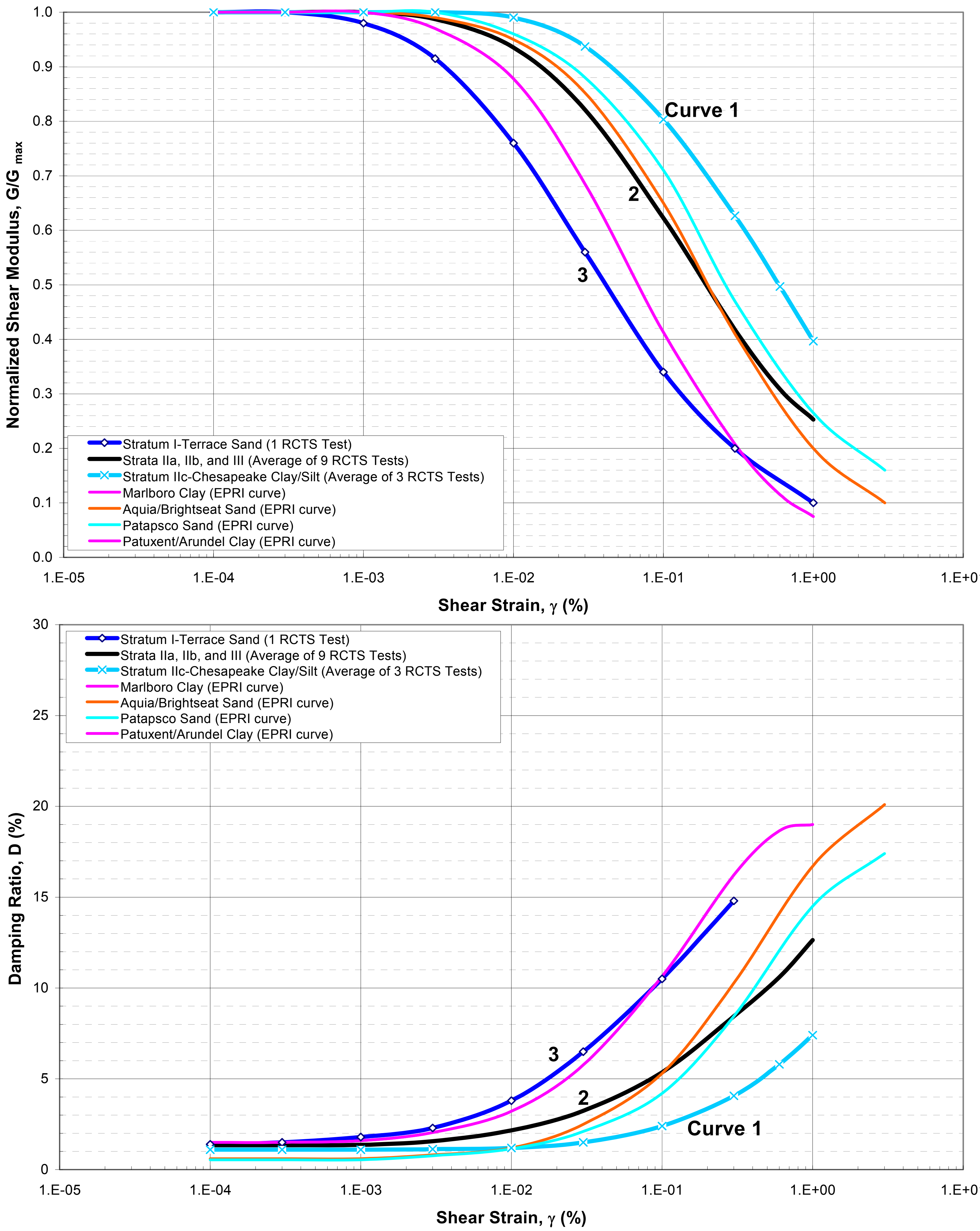

Figure 2.5-227— {Calculated Maximum Strains Based on Initially Adopted EPRI Curves}

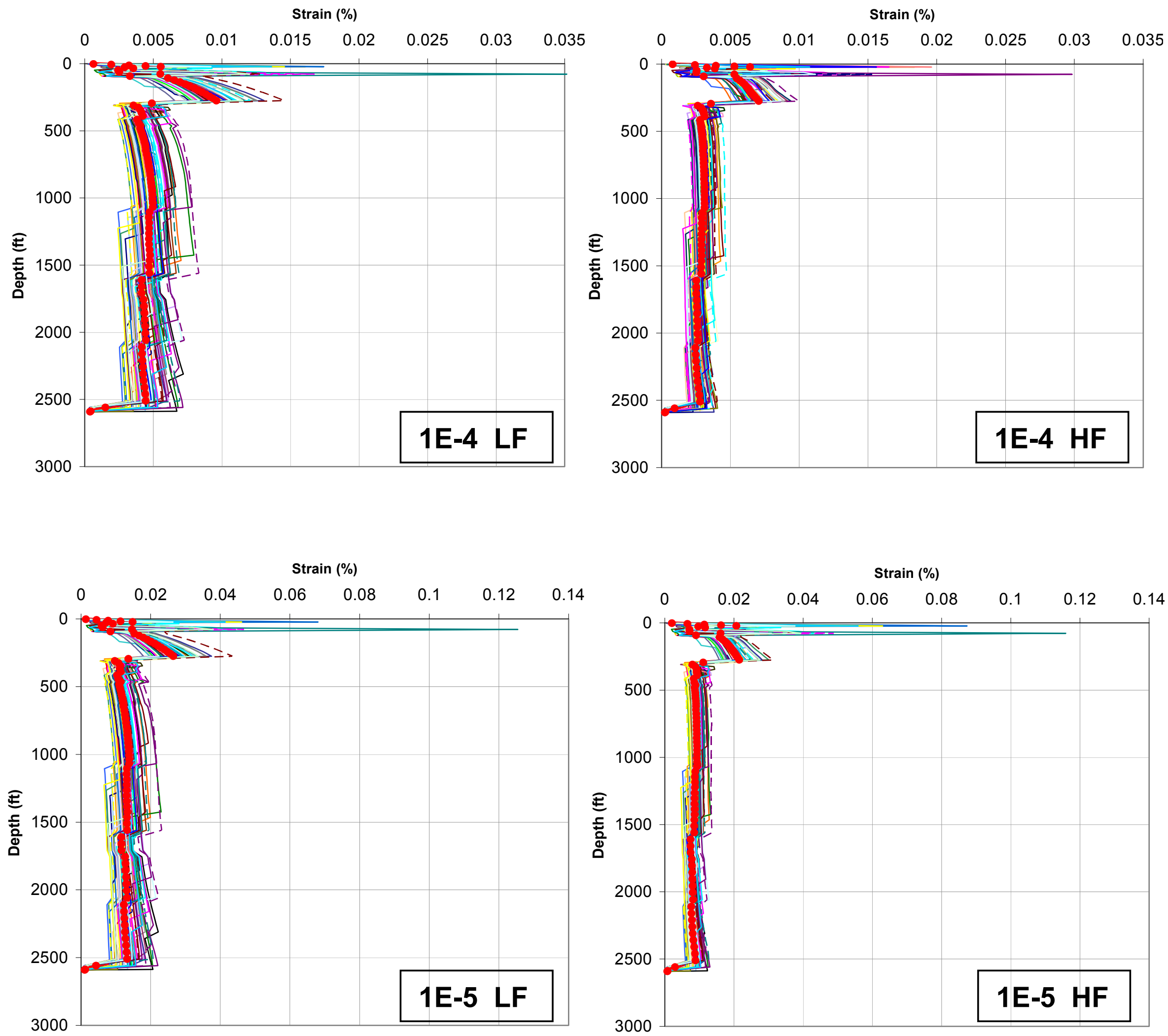

Figure 2.5-228— {Settlement Monitoring Instrumentation in the Powerblock Area}

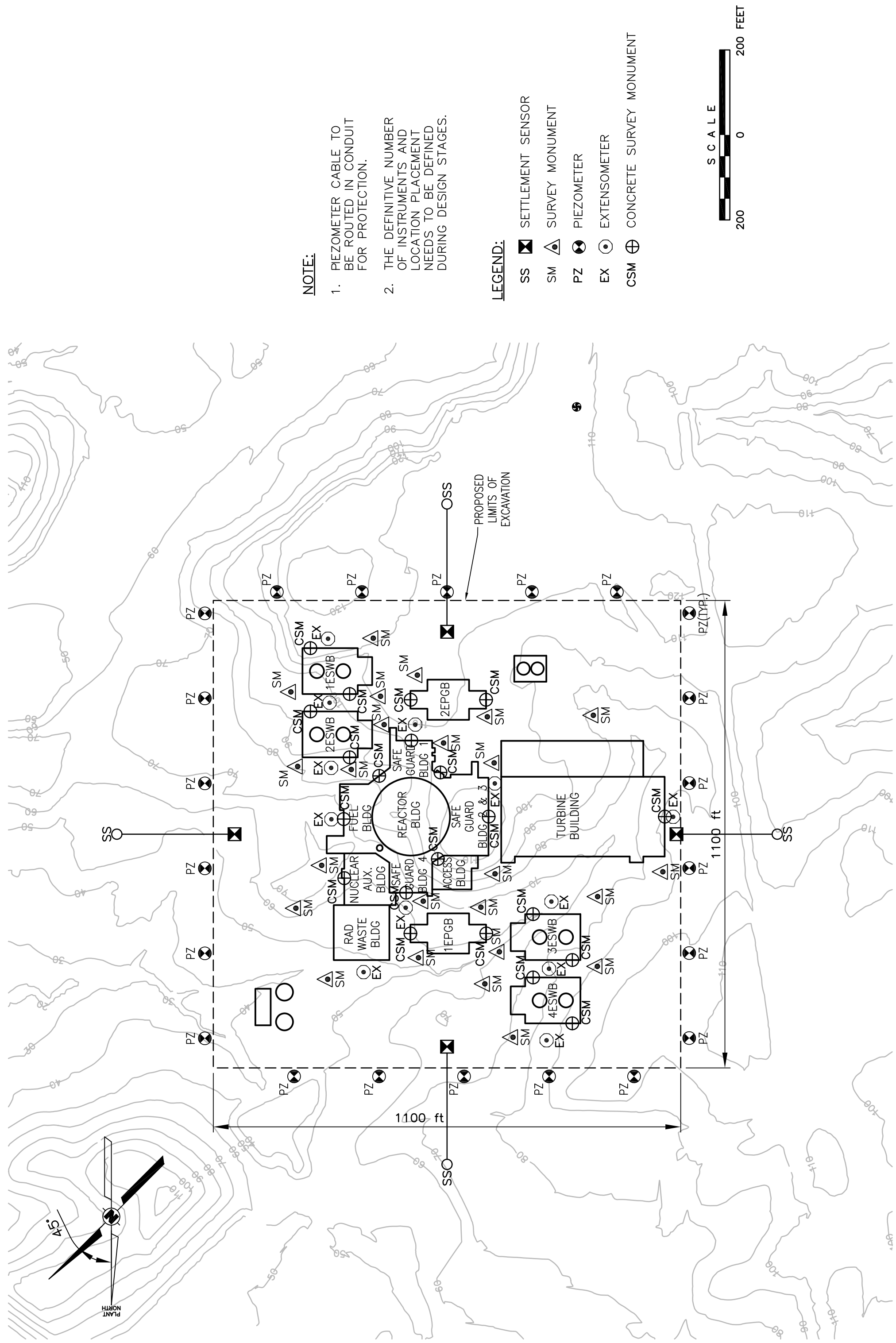

Figure 2.5-229— {Settlement Monitoring Instrumentation at the Intake Area}

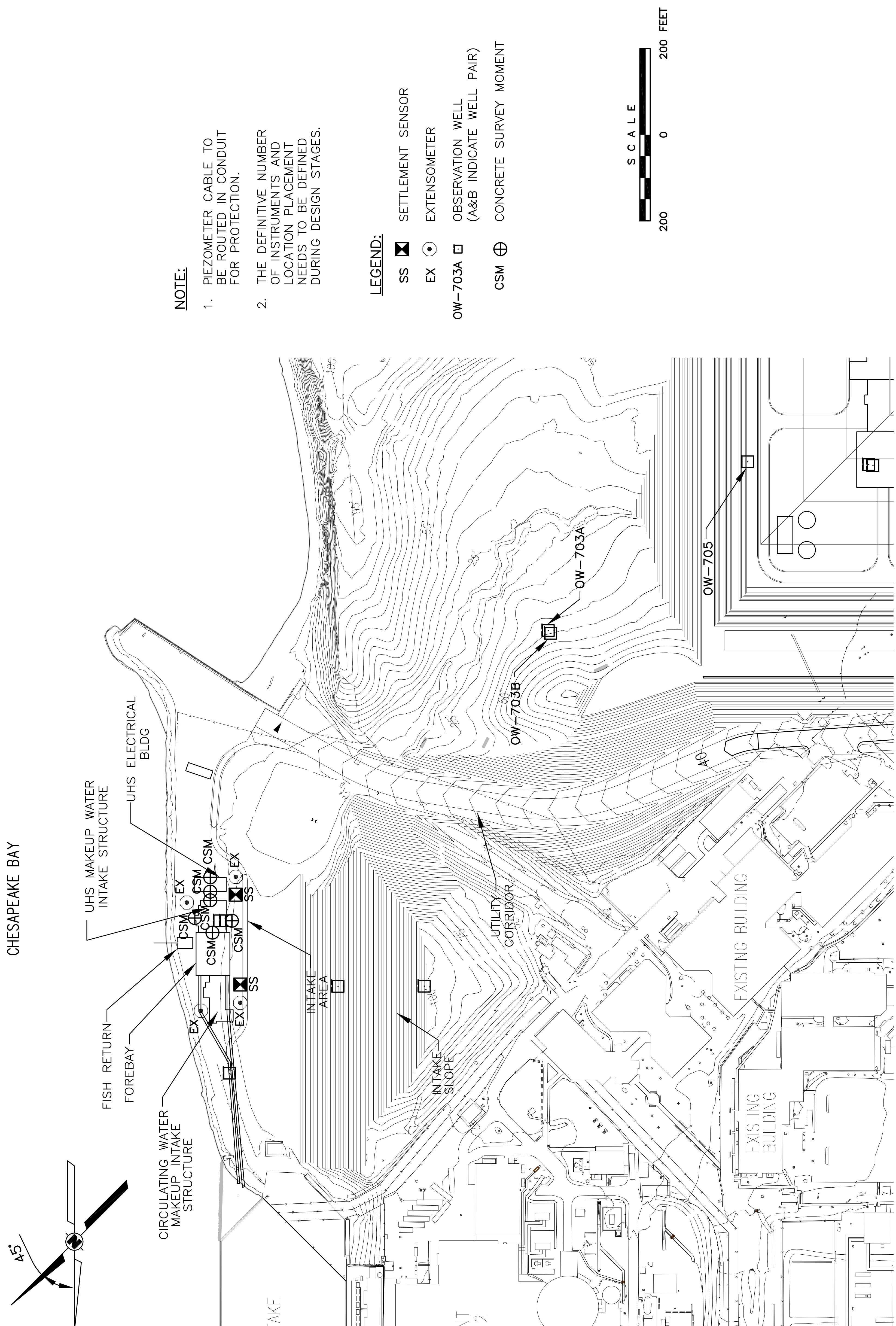

Figure 2.5-230— {Site SSE Comparison with Adjusted FIRS and RG 1.60 - NI Common Basemat Structures}

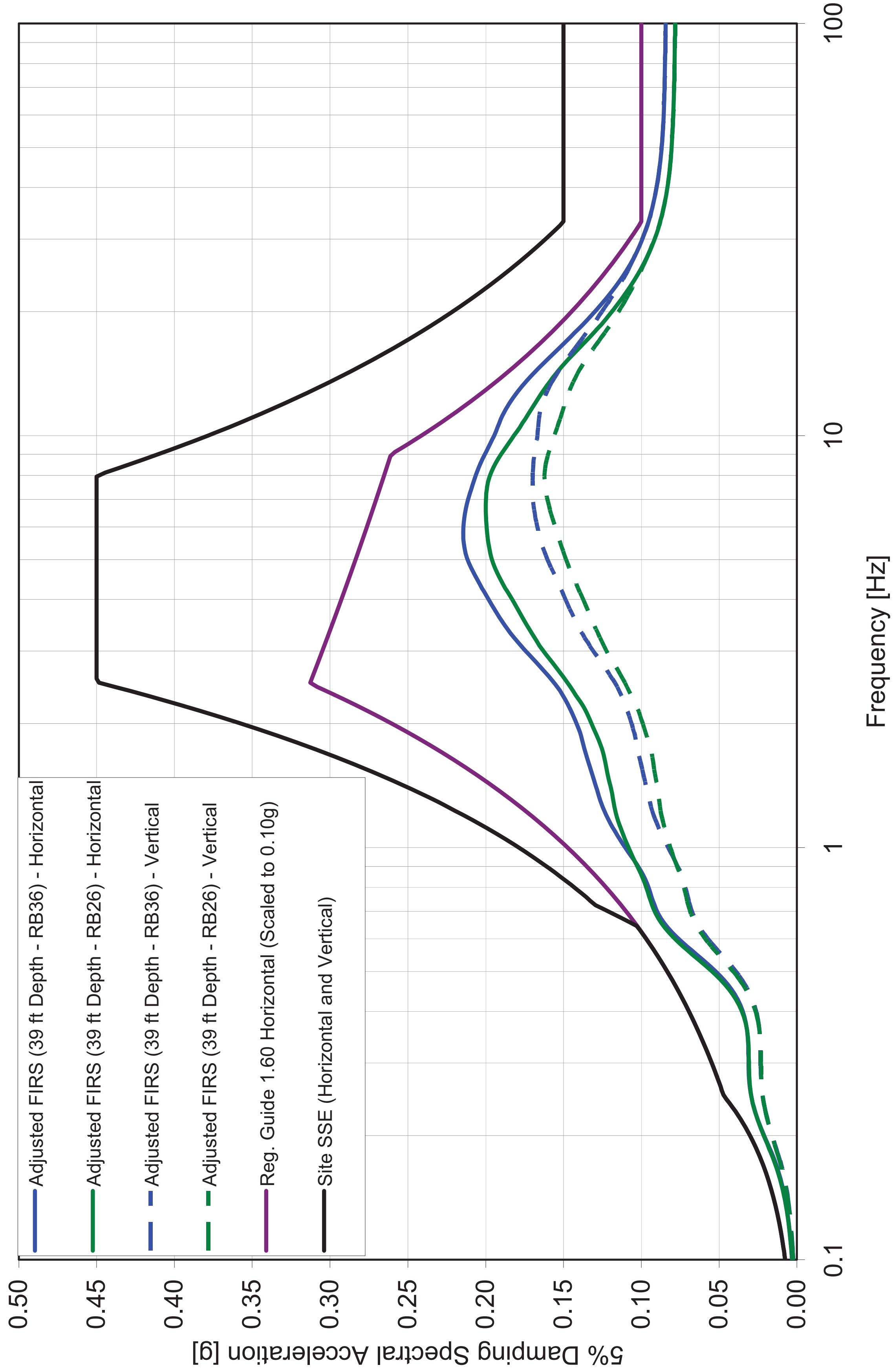

Figure 2.5-231— {CCNPP Unit 3 Strain - Compatible Profiles for NI Common Basemat Structures - RB36 Soil Column}

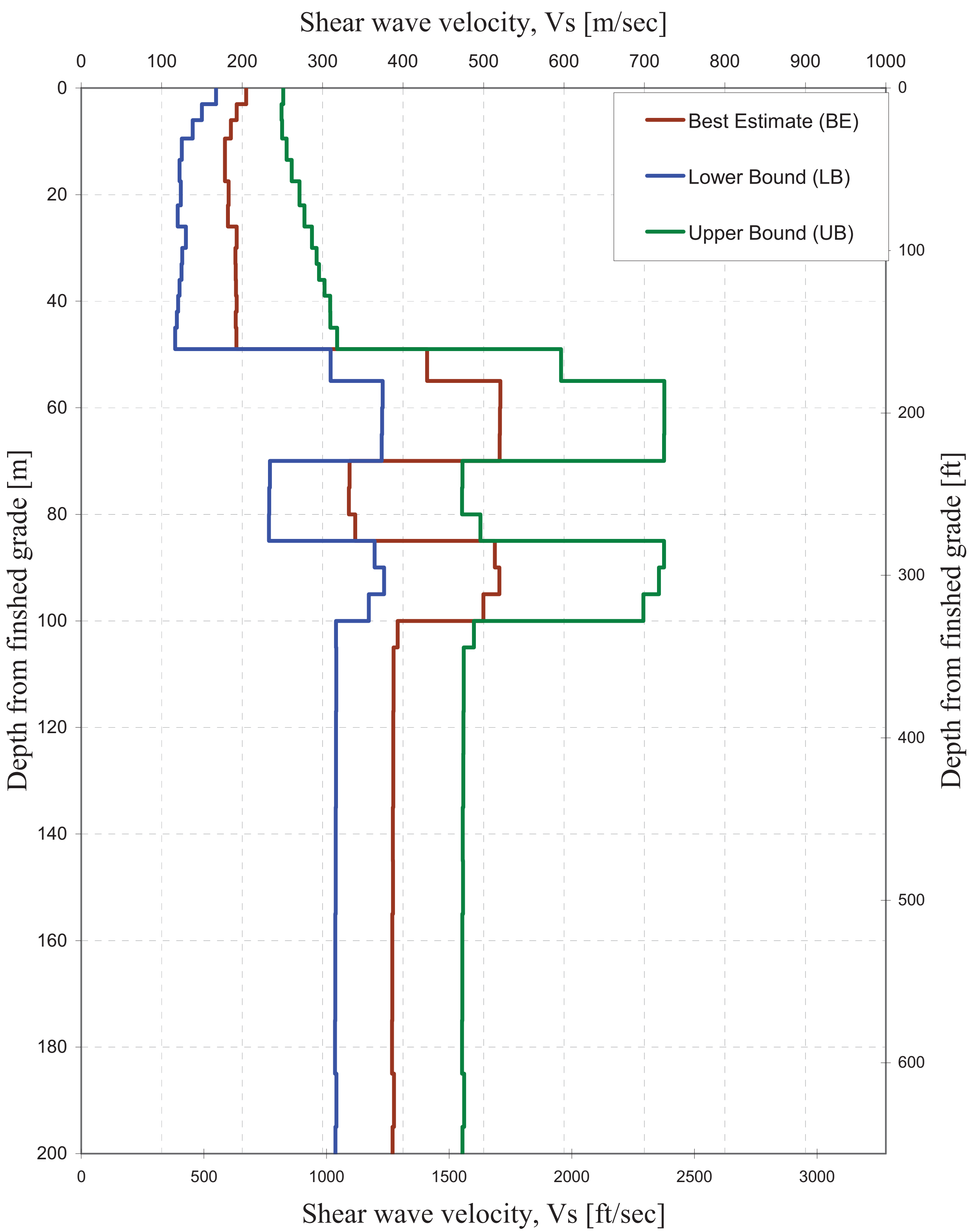

Figure 2.5-232— {CCNPP Unit 3 Strain - Compatible Profiles for NI Common Basemat Structures - RB26 Soil Column}

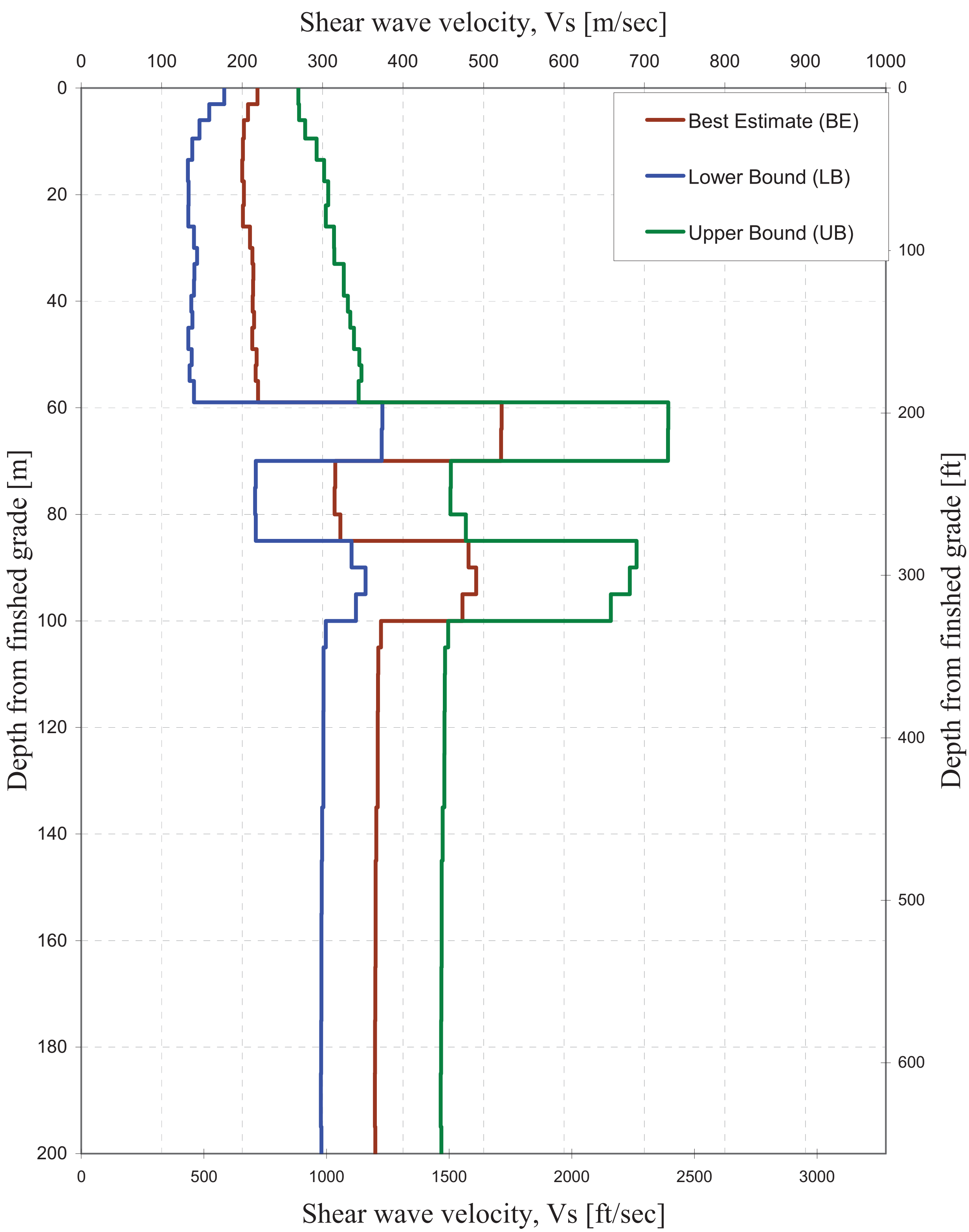

Figure 2.5-233— {Shear-Wave Velocity Profiles Strain-Compatible with FIRS for the RB36 Soil Column}

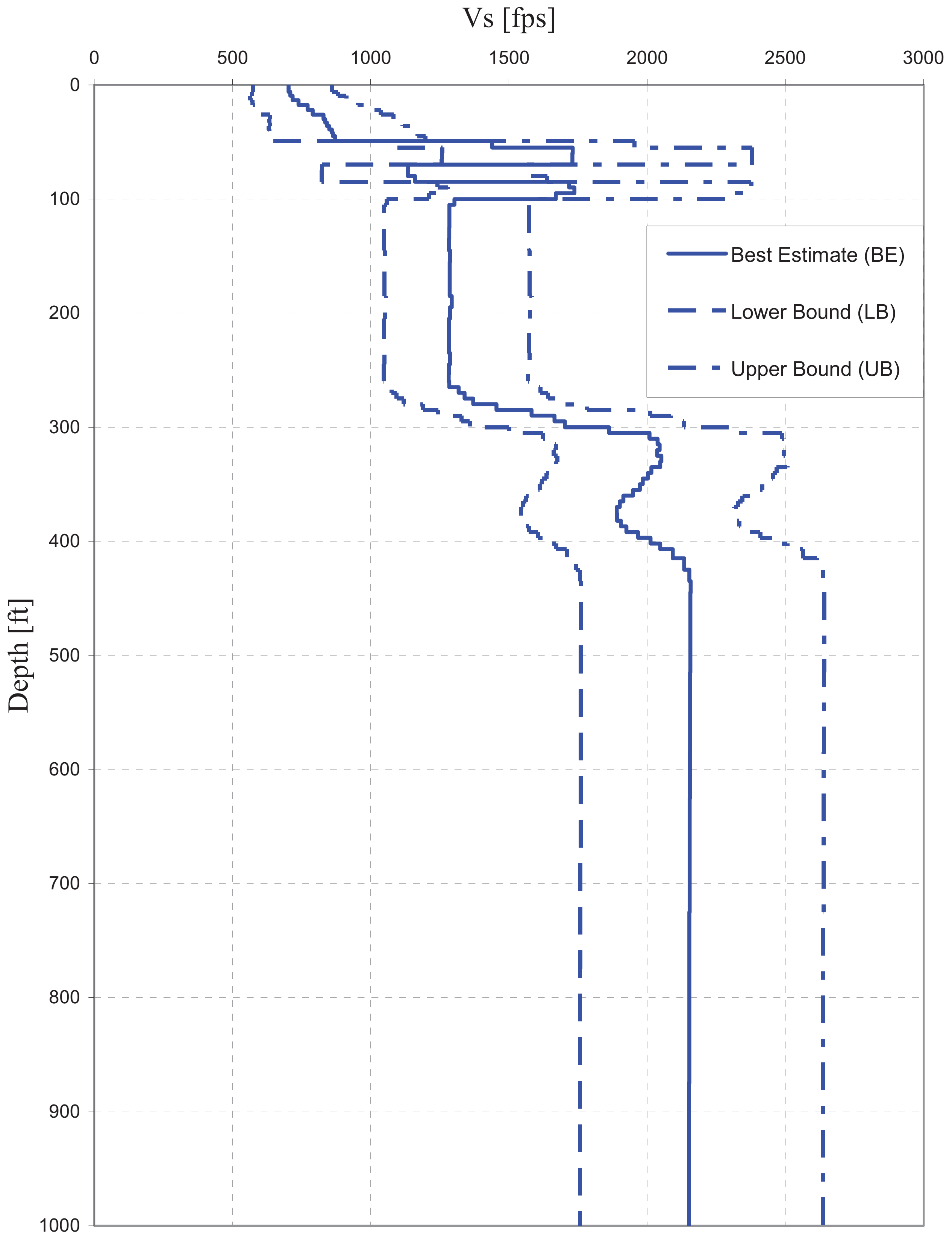

Figure 2.5-234— {Shear-Wave Velocity Profiles Strain-Compatible with FIRS for the RB26 Soil Column}

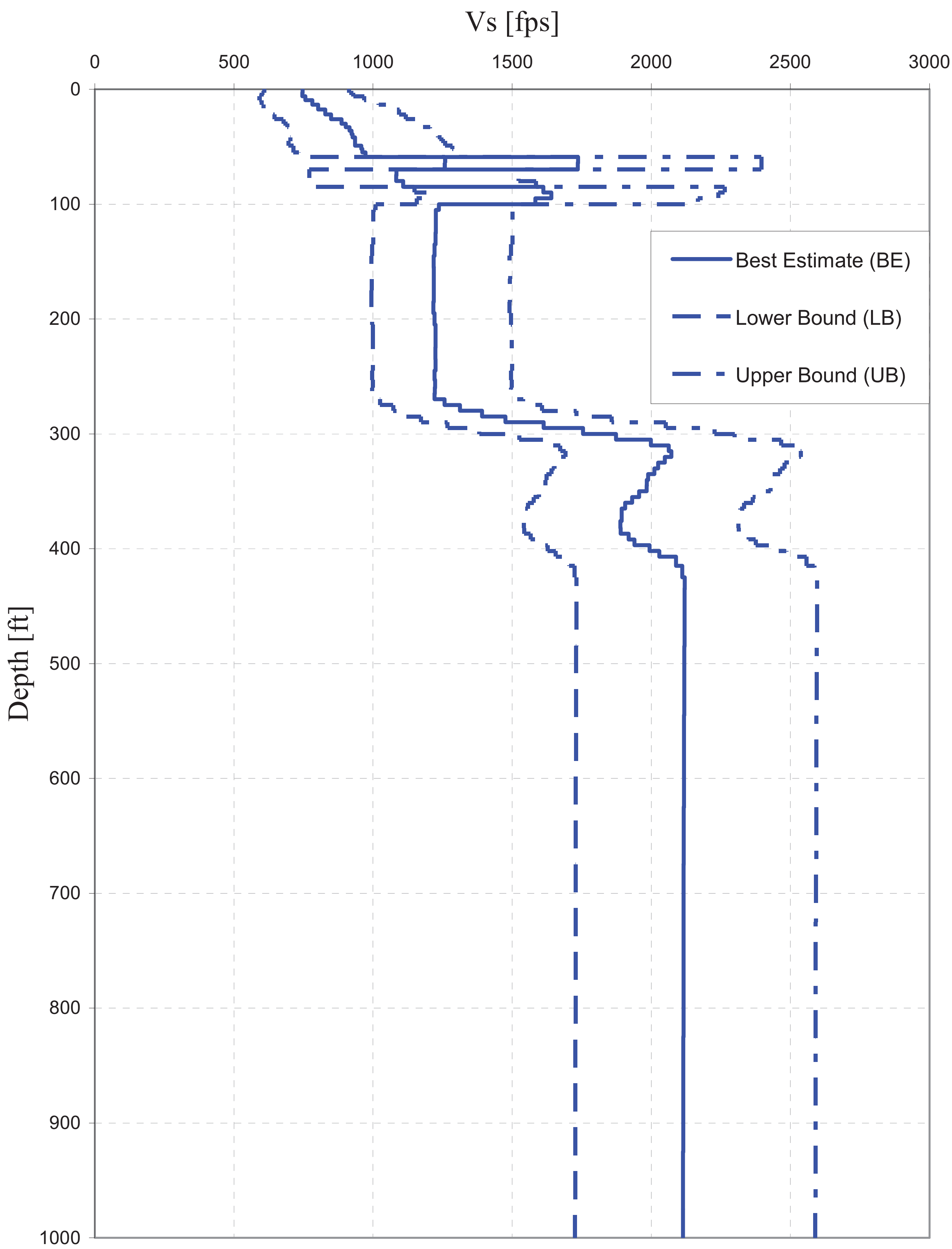

Figure 2.5-235— {EPR Project, Acceleration Profile for Containment Building, X-Direction}

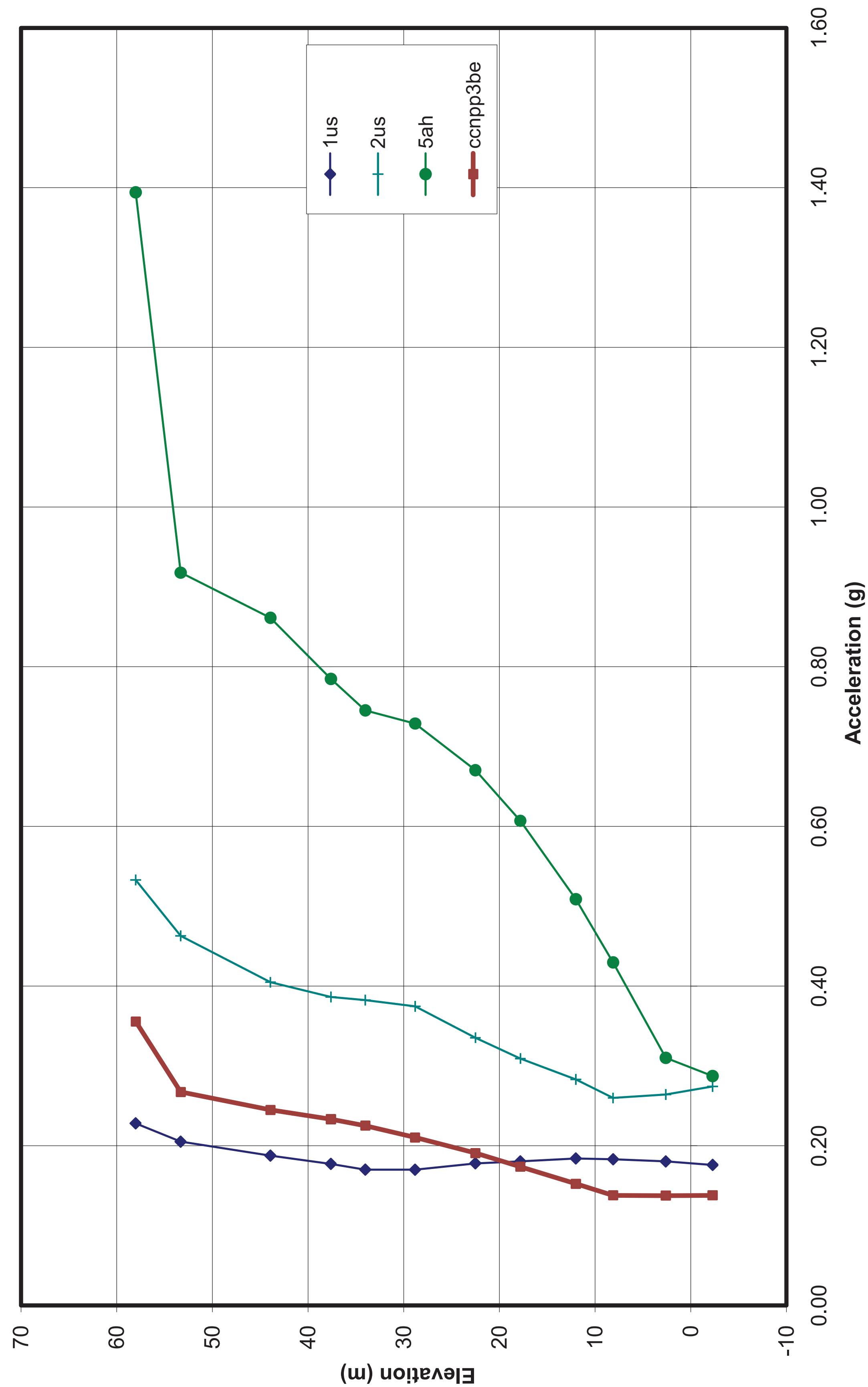

Figure 2.5-236— Comparison of Plots of Shear Wave Velocity Beneath Structural Fill for B-301