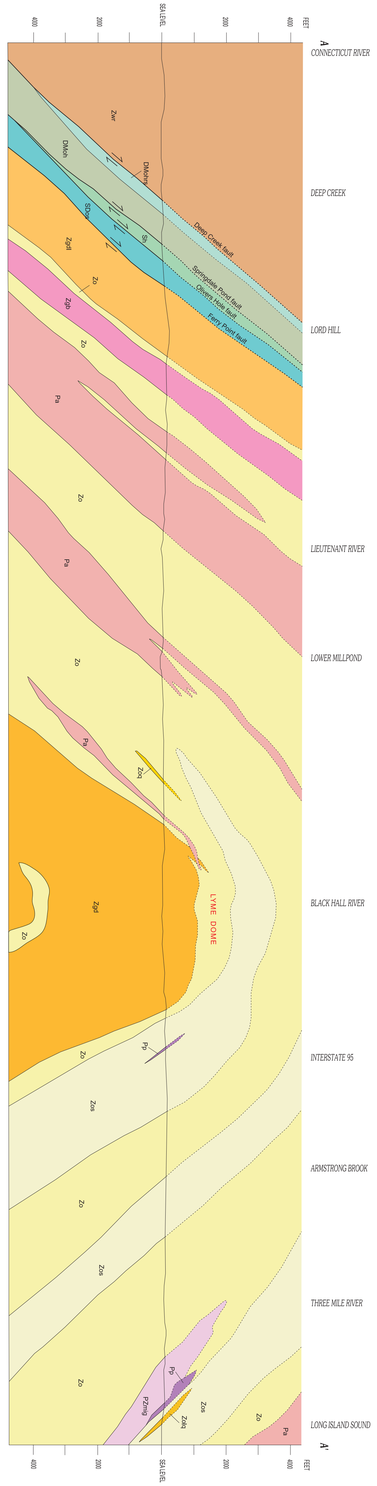
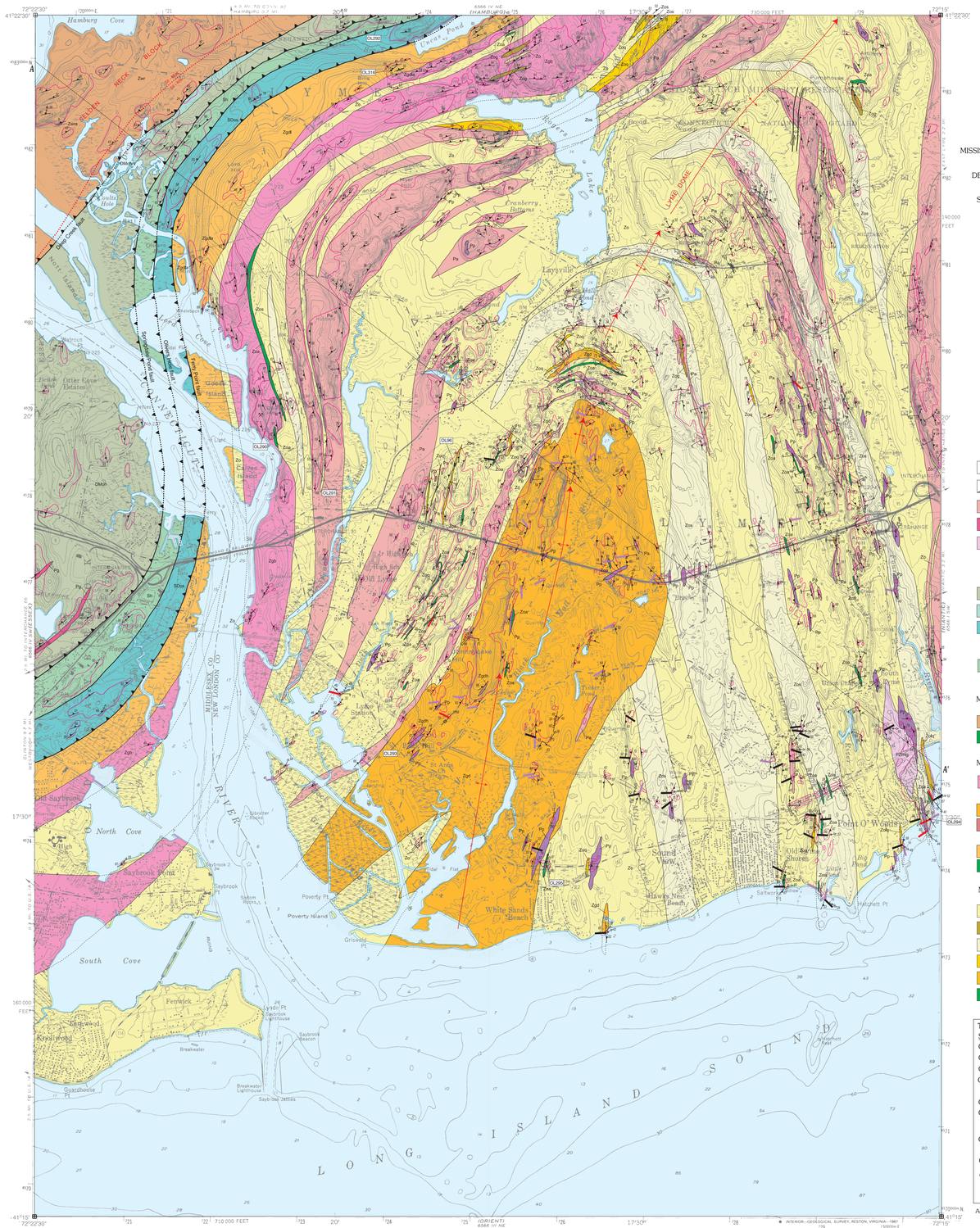
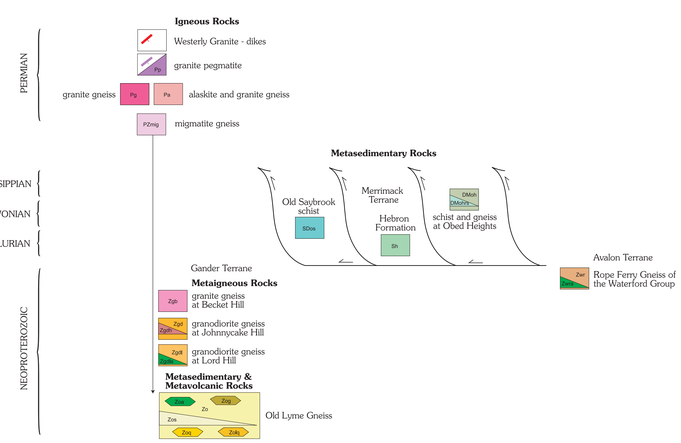
Prepared in Cooperation with
THE STATE OF CONNECTICUT
Geological and Natural History Survey





CORRELATION OF MAP UNITS



SIMPLIFIED DESCRIPTION OF MAP UNITS

PERMIAN IGNEOUS ROCKS

Westerly Granite (Permian) - Dikes shown by strike and dip symbols only

Pp **granite pegmatite - (Permian) -** Pegmatite, shown as map units or as dikes by strike and dip symbols

Pa **alaskite and granite gneiss (Permian)**

Pg **granite gneiss (Permian)**

PZmig **migmatite gneiss (Permian and Neoproterozoic) -** Migmatitic alaskite gneiss and granite gneiss with septa or screens of Old Lyme Gneiss.

SILURIAN TO MISSISSIPPIAN METASEDIMENTARY ROCKS

schist and gneiss at Obed Heights

DMoh Gneiss, schist, amphibolite, and calc-silicate gneiss

DMohrs Rusty weathering, biotite-, garnet-, and sillimanite-rich schist and schistose gneiss

SDos **Old Saybrook schist**

SILURIAN METASEDIMENTRAY ROCKS OF THE MERRIMACK TERRANE

Sh **Hebron Formation**

NEOPROTEROZOIC ROCKS OF THE AVALON TERRANE

Metaigneous Rocks

Rope Ferry Gneiss of the Waterford Group

Zwr Hornblende-biotite-quartz-plagioclase gneiss

Zwa Amphibolite

NEOPROTEROZOIC ROCKS OF THE GANDER TERRANE

Metaigneous Rocks

Zgb **Granite gneiss at Becket Hill**

Granodiorite gneiss at Johnnycake Hill

Zgd Granodiorite gneiss

Zgdh Hornblende granodiorite gneiss

Granodiorite gneiss at Lord Hill

Zgdl Granodiorite gneiss

Zgdlb Amphibolite

Metasedimentary & Metavolcanic Rocks

Old Lyme Gneiss

Zo Biotite gneiss

Zoq Garnetiferous biotite gneiss and schist

Zos Sillimanite schist

Zoq Quartzite

Zoaj Layered quartzite and schist

Zoa Amphibolite

Table 1. Summary of U-Pb zircon ages from the Old Lyme quadrangle

Sample No.	Rock type and map unit		Age (Ma)
OL96	Old Lyme Gneiss quartzite (Zoq) - detrital zircons		c. 925 - 2060
OL290	granite gneiss at Becket Hill (Zgb)		617 ± 6
OL291	alaskite gneiss (Pa)		293 ± 11
OL292	Hebron Formation (Sh)	- detrital zircons - metamorphic overgrowths	c. 420 - 3015 c. 287, 360
OL293	granodiorite gneiss at Johnnycake Hill (Zgd)		616 ± 6
OL294A	Westerly Granite dike	- igneous cores - metamorphic zircons - monazite	279 ± 5 263 ± 6 273 ± 3 and 262 ± 4
OL294B	granite pegmatite (Pp)	- igneous cores - monazite	287 ± 4 289 ± 3 and 263 ± 6
OL295	Old Lyme Gneiss amphibolite (Zoa) - metamorphic zircons		277 ± 6 or 269 ± 12 and 285 ± 10
OL316	granodiorite gneiss at Lord Hill (Zgdl)	- metamorphic zircons	625 ± 14 583 ± 12 or 569 ± 9 and 595 ± 9 c. 280

Ages obtained by Sensitive High Resolution Ion Microprobe (SHRIMP) at Stanford University, Palo Alto, CA

EXPLANATION OF MAP SYMBOLS

Contact - dotted where concealed by water

Outcrops - Areas of exposed bedrock or closely spaced contiguous bedrock exposures examined in this study

FAULTS

(Dotted where concealed by water)

Thrust fault parallel to regional S1 foliation- teeth on upper plate; dotted where concealed by water

Left lateral strike-slip fault

FOLDS

Axial trace of the Lyme dome (Alleghanian) - Upright F2 anticline showing generalized plunge direction

Strike and dip of axial surface of minor fold

F1 fold parallel to S1 schistosity (Alleghanian)
Inclined

F2 fold parallel to S2 cleavage or schistosity (Alleghanian)
Inclined
Vertical

F3 fold parallel to S3 cleavage (Alleghanian)
Inclined

PLANAR FEATURES

Strike and dip of dike
Westerly Granite
Inclined
Pp - granite pegmatite
Inclined
Vertical

Strike and dip of deformed SO or S1 gneissosity parallel to compositional layering
Inclined

Strike and dip of S1 gneissosity (Alleghanian)
Inclined
Vertical

Strike and dip of S2 cleavage or schistosity (Alleghanian)
Inclined
Vertical

Strike and dip of S3 cleavage (Alleghanian)
Inclined
Vertical

Strike and dip of outcrop-scale brittle fault (shown on Plate 2)
Inclined
Vertical

Strike and dip of joint (shown on Plate 2)
Inclined
Vertical

Bearing and plunge of fold axes and lineations

F1 fold axis
F2 fold axis — S1/S2 intersection lineation
F3 fold axis — S1-S2/S3 intersection lineation

Elongation or mineral lineations
L1, consisting of one or more minerals including quartz, plagioclase, k-feldspar, sillimanite, and hornblende
L2, consisting of one or more minerals including sillimanite, quartz, biotite, and k-feldspar

OTHER FEATURES

Abandoned rock quarry (quarries shown on base map are gravel pits)

OL293 U-Pb zircon sample locality (see Table 1 for ages)

Sil - Mus / Sil - Kfs Metamorphic isograd (from Lundgren, 1967)
Sil - sillimanite
Mus - muscovite
Kfs - K-feldspar

REFERENCE CITED

Lundgren, L., Jr., 1967, The bedrock geology of the Old Lyme quadrangle: State Geological and Natural History Survey of Connecticut, Quadrangle Report No. 21, scale 1:24,000.

Base from U.S. Geological Survey, 1958
Photorevised 1970

Hydrography from Connecticut Map And Geographic Information Center (http://magic.lib.uconn.edu/)

Polyconic projection.
1927 North American Datum

MN TN GN 13½° 1°46' APPROXIMATE MEAN DECLINATION, 1970

SCALE 1:24 000

1 1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

CONNECTICUT
MAP LOCATION

Scott
Walsh & Armstrong
INDEX TO MAPPING

Geology mapped by Walsh and Scott in 2002, and by Armstrong in 2001. Geology digitized by Walsh, assisted by Aaron Satkoski[2]. Geochronology by Aleinikoff.

Map compiled from the digital bedrock database of the Old Lyme quadrangle. GIS database compiled in ARC/INFO version 8.2. Topography obtained by scanning a photo positive of the Old Lyme quadrangle at 400 dpi. Final cartography compiled in Adobe Illustrator version 10.0.

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PRELIMINARY BEDROCK GEOLOGIC MAP OF THE OLD LYME QUADRANGLE, NEW LONDON AND MIDDLESEX COUNTIES, CONNECTICUT

By
Gregory J. Walsh[1], Robert B. Scott[2], John N. Aleinikoff[2], and Thomas R. Armstrong[3]

2006

This map is available from:
http://pubs.usgs.gov/OF/2006/1296/

This map was produced on request, directly from digital files, on an electronic plotter.

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