UNIT X: BASALT

Pieces 1-17

CONTACTS: None.

PHENOCRYSTS: Nd (not described).

GROUNDMASS: Nd.

VESICLES: Nd.

COLOR: Nd.

STRUCTURE: Nd.

ALTERATION: Nd.

VEINS/FRACTURES: Nd.

ADDITIONAL COMMENTS: Junk basket. Basalt rubble from unknown depth.
UNIT X: BASALT

Piece 1

CONTACTS: None.
PHENOCRYSTS: Nd (not described).
GROUND MASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from mill bit. Basalt rubble from unknown depth.
UNIT X: BASALT

Pieces 1-3

CONTACTS: None.
PHENOCRYSTS: Nd (not described).
GROUNDMASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from mill bit. Basalt rubble from unknown depth.
UNIT X: BASALT

Pieces 1-3

CONTACTS: None
PHENOCRYSTS: Nd (not described).
GROUNDMASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from mill bit. Basalt rubble from unknown depth.
UNIT X: BASALT

Pieces 1-2

CONTACTS: None.
PHENOCRYSTS: Nd (not described).
GROUNDMASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from mill bit. Basalt rubble from unknown depth.
UNIT X: BASALT

Pieces 1-3

CONTACTS: None.

PHENOCRYSTS: Nd (not described).

GROUNDMASS: Nd.

VESICLES: Nd.

COLOR: Nd.

STRUCTURE: Nd.

ALTERATION: Nd.

VEINS/FRACTURES: Nd.

ADDITIONAL COMMENTS: boot basket from mill bit. Basaltic rubble from unknown depth.
UNIT X: BASALT

Pieces 1-9

CONTACTS: None.
PHENOCRYSTS: Nd (not described).
GROUNDMASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from drill bit. Basaltic rubble from unknown depth in hole.
UNIT 193: SPARSELY PLAGIOCLASE- OLIVINE-CLINOPYROXENE PHYRIC BASALT

Pieces 1-9

CONTACTS: None.

PHENOCRYSTS: Random distribution.
- Plagioclase - 1%, 1-3 mm, rounded to euhedral, fresh.
- Olivine - <1%, 1-3 mm, euhedral, totally replaced by chlorite.
- Clinopyroxene - <1%, 2 mm, rounded, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite. Locally very highly altered: 5-10 mm chlorite patches surrounded by 5-10 mm light gray halos in Pieces 6, 7, and 9.

VEINS/FRACTURES: <1%, <1 mm, horizontal to vertical, filled with white mineral in Pieces 1, 4, and 6.

UNIT 194: MODERATELY PLAGIOCLASE-CLINOPYROXENE- OLIVINE PHYRIC BASALT

Pieces 10-13

CONTACTS: None.

PHENOCRYSTS: Randomly distributed.
- Plagioclase - 2-3%, 2-5 mm, rounded to euhedral, unaltered.
- Clinopyroxene - 1-2%, 1-15 mm, 1-2 mm rounded to 1-2x10-15 mm euhedral laths, unaltered.
- Olivine - 1-2%, 1-2 mm, euhedral, totally replaced by chlorite and pyrite.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Mostly slightly altered. Locally very highly altered, 5-10 mm chlorite patches with 5-10 mm light gray alteration halos in Pieces 12 and 13. Disseminated pyrite.

VEINS/FRACTURES: <1%, <1 mm, near vertical to subhorizontal, white mineral in Pieces 12 and 13. No alteration halos.
UNIT 194: MODERATELY PLAGIOCLASE- CLINOPYROXENE-OLIVINE PHYRIC BASALT

Pieces 1-4

CONTACTS: None.

PHENOCRYSTS: Random distribution.
- Plagioclase - 2-3%, 1-3 mm, rounded to euhedral, fresh.
- Clinopyroxene - 1-2%, 1-2x10-15 mm, euhedral laths, unaltered.
- Olivine - 1-2%, 1-2 mm, euhedral, totally altered to chlorite + pyrite.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive

ALTERATION: Slightly altered, disseminated pyrite. Locally very highly altered in Piece 2, with 5 mm chlorite patches surrounded by 5-10 mm light gray halos.

VEINS/FRACTURES: <1%, <1 mm, horizontal to vertical, open or filled with white mineral, all in Piece 3.
UNIT 195: SPARSELY PLAGIOCLASE- OLIVINE- CLINOPYROXENE PHYRIC BASALT

Pieces 1-22

CONTACTS: None.

PHENOCRYSTs: Random distribution.
- Plagioclase - <1%, 1-2 mm, euhedral, 20% altered to white albite/zeolite.
- Clinopyroxene - <1%, 1-3 mm, rounded to euhedral, unaltered.
- Olivine - <1%, 1-3 mm, euhedral, totally replaced by chlorite and pyrite.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered. Disseminated pyrite. Locally very highly altered in Pieces 3, 5, 8, 10, and 16-18, with 5-10 mm halos around 5 mm chlorite patches.

VEINS/FRACTURES: <1%, <1 mm to 1 mm, mostly subhorizontal. 1 cm light gray alteration halo around chlorite vein in Piece 2, similar halo around chlorite + light green prehnite(?) vein in Piece 9. Piece 3 has white prismatic mineral on fracture surface (anhydrite?).
UNIT 195: APHYRIC TO SPARSELY PLAGIOCLASE- OLIVINE-
CLINOPYROXENE PHYRIC BASALT

Pieces 1-12

CONTACTS: None.

PHENOCRYSTS: Randomly distributed.

- Plagioclase - <1-1%, 1-2 mm, euhedral, 10% altered to white albite(?).
- Clinopyroxene - <1%, 1-3 mm, rounded to euhedral, equant, unaltered.
- Olivine - <1%, 1-2 mm, euhedral, totally replaced by chlorite + talc + pyrite (+ Fe-hydroxides in Piece 10).

GROUNDMASS: Uniformly fine-grained.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite. Locally very highly altered with 5-10 mm light gray halos around 5 mm chlorite patches in Pieces 1, 4, 8, 9, and 11.

VEINS/FRACTURES: <1%, <1 mm, mostly subhorizontal, open vertical crack in Piece 14. Open subhorizontal crack in Pieces 7-9, white mineral in Pieces 2 and 5, chlorite in Piece 1 with 5 mm light gray halo.

UNIT 196: SPARSELY PLAGIOCLASE-OLIVINE-CLINOPYROXENE PHYRIC BASALT

Pieces 13-16

CONTACTS: None.

PHENOCRYSTS: Randomly distributed.

- Plagioclase - 1%, 1-10 mm, mostly 1-3 mm, but up to 10 mm euhedral laths, 10% altered to white albite(?).
- Olivine - 1%, 1-2, euhedral, totally replaced by chlorite + talc + pyrite (+ red Fe-oxide in Piece 15).
- Clinopyroxene - <1%, 1-3 mm, rounded to euhedral, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite. Locally very highly altered (Piece 14), with 5-10 mm light gray halos around 5-10 mm chlorite patches.

VEINS/FRACTURES: <1%, <1 mm, subhorizontal to vertical, open horizontal cracks in Pieces 14 and 16, open vertical crack in Piece 14, white mineral in Piece 14.

ADDITIONAL COMMENTS: Unit 196 separated from unit 195 based on decreased olivine and phenocryst abundance in Pieces 10 and 11, and increased olivine in Pieces 14 and 15.
UNIT 197: SPARSELY PLAGIOCLASE-CLINOPYROXENE PHYRIC BASALT

Pieces 1-4b

CONTACTS: None.

PHENOCRYSTs: Randomly distributed.
   - Plagioclase - 1%, 1-4 mm, euhedral, unaltered.
   - Clinopyroxene - 1%, 1-3 mm, rounded to euhedral, equant, unaltered.
   - Olivine - <1%, 1 mm, euhedral, replaced by chlorite in Piece 2.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite.

VEINS/FRACTURES: <1%, <1 mm, subhorizontal, open cracks in Piece 3, white mineral in Piece 3.

UNIT 198: SPARSELY PLAGIOCLASE-OLIVINE-CLINOPYROXENE PHYRIC BASALT.

Pieces 4c-6

CONTACTS: None.

PHENOCRYSTs: Less abundant in finer grained Piece 4c.
   - Plagioclase - 1-2%, 1-3 mm, euhedral, unaltered.
   - Olivine - 1-2%, 1-2 mm, euhedral, totally replaced by chlorite, talc, and pyrite.
   - Clinopyroxene - <1%, 2-3 mm, euhedral, unaltered.

GROUNDMASS: Fine-grained, finest grain size in Piece 4c.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite.

VEINS/FRACTURES: <1%, <1 mm, subhorizontal, open and filled with white mineral in Piece 5.
UNIT 199: APHYRIC TO SPARSELY PLAGIOCLASE-OLIVINE-
CLINOPYROXENE PHYRIC BASALT

Pieces 1-17

CONTACTS: None.
PHENOCRYSTS: Randomly distributed. Plagioclase - <1-1%, 1-2 mm, euhedral, 10% altered to white albite?
Olivine - <0.5-1 mm, euhedral, totally replaced by chlorite and pyrite.
GROUNDMASS: Fine-grained, finest in Piece 1, which is a chilled dike margin very close to a contact.
VESICLES: None.
COLOR: Mostly greenish gray, with darker gray color in Pieces 2, 3 and 15-17.
STRUCTURE: Massive basalt, with chilled margin at top in Piece 1.
ALTERATION: Generally moderately altered to greenish gray color. Pieces 15-17 contain 5-10 mm chlorite patches with 5-10 mm light gray halos.
VEINS/FRACTURES: <1%, <1 mm, random. Breccia in Piece 5 is cemented by chlorite, and cut by later vein of white prismatic anhydrite(?). Anhydrite(?) also coats fractures in Pieces 6, 8, and 9. Chlorite veins in Pieces 3, 6, 10 and 16. 5 mm light gray alteration halo around vein in Piece 3.

UNIT 200: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE PHYRIC BASALT

Pieces 18-24

CONTACTS: None.
PHENOCRYSTS: Random distribution. Olivine more abundant and clinopyroxene less abundant in Piece 24.
Plagioclase - 3%, 1-3 mm, euhedral, unaltered.
Clinopyroxene - 2%, 1-3 mm, rounded to euhedral laths, unaltered.
Olivine - <1%, 0.5-1 mm, euhedral, totally replaced by chlorite, talc and pyrite.
GROUNDMASS: Uniformly fine-grained.
VESICLES: None.
COLOR: Dark gray.
STRUCTURE: Massive basalt.
ALTERATION: Slightly altered. Locally very highly altered in Pieces 18-20, and 22, with 5-10 mm chlorite patches surrounded by 5-10 mm light gray halos.
VEINS/FRACTURES: <1%, <1 mm, horizontal, open fracture in Pieces 18 and 24.
UNIT 201: MODERATELY PLAGIOCLASE- OLIVINE-CLINOPYROXENE PHYRIC BASALT

Pieces 1-6

CONTACTS: None.

PHENOCRYSTS: Random distribution.
- Plagioclase - 1-2%, 0.5-2 mm, euhedral, unaltered.
- Olivine - 1-2%, 0.5-2 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - <1%, 2-10 mm, anhedral to euhedral laths, unaltered.

GROUNDMASS: Fine-grained, finer grained in Pieces 1 and 6.

VESICLES: None.

COLOR: Mostly dark gray, lighter greenish gray in Pieces 3, 4, and 6.

STRUCTURE: Massive basalt.

ALTERATION: Slightly to moderately altered. Disseminated pyrite.

VEINS/FRACTURES: <1%, 1 mm, horizontal and vertical, 1 mm chlorite vein in Piece 1 is rimmed by 0.5 mm dark green chloritized zone plus 5 mm light gray halo.

ADDITIONAL COMMENTS: Very fine grained Pieces 1 and 6 are interpreted as margins of dike unit. Decreased phenocryst abundance, in particular olivine content, distinguishes underlying Unit 202.

UNIT 202: APHYRIC TO SPARSELY PLAGIOCLASE- OLIVINE-CLINOPYROXENE PHYRIC BASALT

Pieces 7-17

CONTACTS: None.

PHENOCRYSTS: Random distribution, most abundant in Pieces 9 and 17.
- Plagioclase - <1%, 0.5-2 mm, euhedral, unaltered. Most abundant in Piece 17.
- Olivine - <1%, 0.5-2 mm, euhedral, completely replaced by chlorite and pyrite.
- Clinopyroxene - <1%, 1-3 mm, euhedral laths, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive basalt.

ALTERATION: Slightly altered. Disseminated pyrite.

VEINS/FRACTURES: <1%, <1 mm, subhorizontal, one open fracture in Piece 13.
UNIT 203: MODERATELY PLAGIOCLASE- OLIVINE-CLINOPYROXENE PHYRIC BASALT

Pieces 1-4

CONTACTS: None.

PHENOCRYSTS: Randomly distributed.
- Plagioclase - 3%, 1-5 mm, euhedral, unaltered.
- Olivine - 2%, 0.5-4 mm, euhedral, totally replaced by chlorite, talc, pyrite, and Fe-oxides.
- Clinopyroxene - <1%, 1-2 mm, rounded to euhedral, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive basalt.

ALTERATION: Slightly altered. Locally very highly altered in Piece 4, with 5 mm chlorite patches surrounded by 5-10 mm light gray halos.

VEINS/FRACTURES: <1%, <1 mm, horizontal and vertical, open fractures in Piece 1, white mineral in Piece 4.
UNIT X: BASALT.

Pieces 1-11

CONTACTS: None.
PHENO CRYSTALS: Nd (not described).
GROUND MASS: Nd.
VESICLES: Nd.
COLOR: Nd.
STRUCTURE: Nd.
ALTERATION: Nd.
VEINS/FRACTURES: Nd.
ADDITIONAL COMMENTS: Boot basket from drill bit. Basalt rubble from unknown depth.
UNIT 204: MODERATELY OLIVINE-PLAGIOCLASE- CLINOPYROXENE PHYRIC BASALT.

Piece 1

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 1%, 0.5-1 mm, unaltered, euhedral, tabular.
- Olivine - 3%, 0.5-2 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - <1%, 2mm, anhedral.

GROUNDMASS: Very fine-grained.

VESICLES: None.

COLOR: Gray.

STRUCTURE: Massive, very fine-grained, close to dike margin?

ALTERATION: Slightly altered.

ADDITIONAL COMMENTS: Separated from Unit 205 below based on relative abundances of phenocrysts. This is a 4-inch diameter core from the diamond bit.

UNIT 205: MODERATELY PLAGIOCLASE- CLINOPYROXENE-OLIVINE PHYRIC BASALT.

Pieces 2-9

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 3-5%, 0.5-5 mm, euhedral tabular prisms.
- Olivine - 1-2%, 0.5-2 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - 2%, 1-3 mm, euhedral tabular prisms, unaltered.

GROUNDMASS: Fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive. Aligned phenocrysts in Piece 7 indicate flow structure?

ALTERATION: Mostly slightly altered. Very highly altered in light gray alteration halos around veins, and in 5-10 mm patches.

VEINS/FRACTURES: <1%, <1 mm, vertical to horizontal. Filled with chlorite+actinolite, and with 5-10 mm lighter gray alteration halos in Pieces 2-8.

ADDITIONAL COMMENTS: This is a 4-inch diameter core from the diamond bit.
UNIT 205: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE PHYRIC BASALT.

Pieces 1-8

CONTACTS: None.

PHENOCRYSTs:
- Plagioclase - 3-5%, 0.5-5 mm, euhedral tabular prisms.
- Olivine - 1-2%, 0.5-2 mm, euhedral, completely replaced by chlorite, pyrite, and red Fe-oxides.
- Clinopyroxene - 2%, 1-3 mm, euhedral tabular prisms, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.


ALTERATION: Slightly altered. Locally very highly altered in 5-10 mm light gray patches and in 5 mm light gray halos around veins.

VEINS/FRACTURES: <1%, <1 mm, vertical to horizontal. Filled with actinolite and chlorite, with 5-10 mm light greenish gray alteration halos. Open crack in Pieces 1 and 4.

ADDITIONAL COMMENTS: This is a 4-inch diameter core from the diamond bit.
UNIT 206: SPARSELY CLINOPYROXENE-PLAGIOCLASE- OLIVINE PHYRIC BASALT

Pieces 1-5, 7

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 1%, 0.5-3 mm, euhedral, unaltered.
- Olivine - <1%, 0.5-3 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - 1%, 1-5 mm, euhedral tabular prisms, unaltered.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered, disseminated pyrite. Locally very highly altered, 5 mm chlorite patches with 5-10 mm lighter greenish alteration halos.

VEINS/FRACTURES: <1, <1-1 mm, unoriented piece. Filled with chlorite and actinolite, surrounded by 5-10 mm alteration halos.

ADDITIONAL COMMENTS: This is 4-inch diameter core from the diamond bit. Pieces 1 and 2 show bit markings indicating that they were "cored twice"—that is, they are actually from the lowermost section of Core 180M.

UNIT 207: SPARSELY PLAGIOCLASE-OLIVINE-CLINOPYROXENE PHYRIC BASALT.

Piece 6

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 1%, 2 mm, euhedral, equant to tabular prisms. Unaltered.
- Olivine - <1%, 1 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - <1%, 2 mm, equant, unaltered.

GROUNDMASS: Uniformly fine- to medium-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered.

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: Four-inch core from diamond bit. Pieces 6 and 7 are rollers that likely switched positions during drilling and curation causing repetition of Unit 206 in Piece 7.
- Plagioclase - 3-5%, 1-3 mm, euhedral, equant. Phenocrysts and glomerocrysts ± clinopyroxene.
- Olivine - <1-1%, 1-4 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - 1-3%, 2-7 mm, euhedral, equant to tabular.
- Phenocrysts and glomerocrysts with plagioclase.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Generally slightly altered. Locally very highly altered in 5-10 mm chlorite + actinolite patches with 5-10 mm greenish alteration halos in Pieces 3, 4, 5, 7, 9, 11, and 12.

VEINS/FRACTURES: <1%, 1 mm, random. Filled with chlorite and actinolite, with 5-10 mm greenish alteration halos in Pieces 5, 7, and 10-12.

ADDITIONAL COMMENTS: Four-inch diamond core. Piece 7A contains 1x5 cm very fine-grained, dark gray xenolith.
UNIT 208: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE PHYRIC BASALT.

Pieces 8-12

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 3-5%, 1-3 mm, euhedral, equant. Phenocrysts and glomerocrysts ± clinopyroxene.
- Olivine - <1-1%, 1-4 mm, euhedral, totally replaced by chlorite, pyrite, and red Fe-oxides.
- Clinopyroxene - <1-3%, 2-7 mm, euhedral, equant to tabular prisms.
- Phenocrysts and glomerocrysts with plagioclase.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered. Very highly altered in Piece 11, with 5 mm chlorite and actinolite surrounded by 5 mm greenish alteration halo.

VEINS/FRACTURES: <1%, <1-1 mm, random. Filled with chlorite and actinolite, with 5-10 mm greenish alteration halos.

ADDITIONAL COMMENTS: Four-inch diamond core.
UNIT 208: MODERATELY PLAGIOCLASE- CLINOPYROXENE-OLIVINE PHYRIC BASALT.

Pieces 1-12

CONTACTS: None.

PHENOCRYSTS:
- Plagioclase - 3-5%, 1-3 mm, euhedral, equant. Phenocrysts and glomerocrysts ± clinopyroxene.
- Olivine - <1-1%, 1-4 mm, euhedral, totally replaced by chlorite and pyrite.
- Clinopyroxene - 1-3%, 2-7 mm, euhedral, equant to tabular. Phenocrysts and glomerocrysts with plagioclase.

GROUNDMASS: Uniformly fine-grained.

VESICLES: None.

COLOR: Dark gray.

STRUCTURE: Massive.

ALTERATION: Generally slightly altered. Locally very highly altered in 5-10 mm chlorite + actinolite patches with 5-10 mm greenish alteration halos in Pieces 3, 4, 6, 7, 9, 11, and 12.

VEINS/FRACTURES: <1%, 1 mm, random. Filled with chlorite and actinolite, with 5-10 mm greenish alteration halos in Pieces 5, 7, and 10-12.

ADDITIONAL COMMENTS: Four-inch diamond core. Piece 7A contains 1x5 cm very fine-grained, dark gray xenolith.
ROCK NAME: Sparsely plagioclase-olivine-clinopyroxene phyric basalt.

GRAIN SIZE: Fine- to medium-grained.

TEXTURE: Subophitic.

<table>
<thead>
<tr>
<th>PRIMARY MINERALOGY</th>
<th>PERCENT PRESENT</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>Phenocrysts</td>
<td></td>
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<tr>
<td>Olivine</td>
<td>0</td>
<td>&lt;1</td>
<td>0.8-2.0</td>
<td>Euhedral</td>
<td></td>
<td>Replaced by chlorite and actinolite, large plucked areas were olivine?</td>
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<td>2</td>
<td>0.4-2.0</td>
<td>Anhedral to euhedral.</td>
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<td>Both as phenocrysts and as glomerocrysts.</td>
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<tr>
<td>Clinopyroxene</td>
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<td>&lt;1</td>
<td>0.8</td>
<td>Anhedral</td>
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<td>&lt;1% altered to chlorite along fractures.</td>
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<tr>
<td>Groundmass</td>
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<td>One crystal in plagioclase glomerocryst.</td>
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<td>Subhedral</td>
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<td>Intergrown with clinopyroxene.</td>
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<td>Clinopyroxene</td>
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<td>0.1-0.8</td>
<td>Anhedral</td>
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<td>Intergrown with plagioclase, 20% replaced by actinolite.</td>
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<tr>
<td>Olivine</td>
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<td>5</td>
<td>0.1-0.4</td>
<td>Euhedral</td>
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<td>Partly (10%) replaced by sphene(?).</td>
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<td>Secondary Mineralogy</td>
<td>PERCENT FILLING</td>
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<td>Chlorite</td>
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<td>Olivine, plagioclase, pore space.</td>
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<tr>
<td>Actinolite</td>
<td>5</td>
<td>Clinopyroxene, olivine, filling pore space.</td>
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<tr>
<td>Sphene</td>
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<td>Replacing titanomagnetite.</td>
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<td>Pyrite</td>
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<td>Replaces silicates, igneous sulfides. 0.01-1.0 mm.</td>
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<tr>
<td>Chalcopyrite</td>
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<td>Silicates, primary sulfides. 0.01-0.05 mm.</td>
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<tr>
<td>Vesicles/Cavities</td>
<td>PERCENT LOCATION SIZE (mm) FILLING SHAPE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vugs.</td>
<td>&lt;1</td>
<td>0.05-0.10 Chlorite Irregular.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>chlorite and actinolite.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
137-504B-173R-01 (Piece 11,103-106 cm)  

**ROCK NAME:** Moderately olivine-plagioclaseclinopyroxene phryic basalt.  

**GRAIN SIZE:** Fine-grained.  

**TEXTURE:** Subophitic.  

<table>
<thead>
<tr>
<th>PRIMARY MINERALOGY</th>
<th>PERCENT PRESENT</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHENOCRYSTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>2</td>
<td>2</td>
<td>0.5-2.4</td>
<td></td>
<td>Subhedral.</td>
<td>Some with rounded cores containing glass inclusions. Both as phenocrysts and 3 mm glomerocrysts. Unaltered.</td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>6</td>
<td>0.5-2.4</td>
<td></td>
<td>Euhedral.</td>
<td>Replaced by chlorite, talc, Fe-oxides and pyrite.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>1</td>
<td>1</td>
<td>0.5-2.8</td>
<td></td>
<td>Anhedral.</td>
<td>Both phenocrysts and as glomerocrysts with plagioclase. Outer rim of pyroxene is intergrown with groundmass plagioclase.</td>
</tr>
<tr>
<td><strong>GROUNDMASS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>46</td>
<td>46</td>
<td>0.1-0.6</td>
<td></td>
<td>Euhedral to subhedral.</td>
<td>1-5% replaced by chlorite.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>32</td>
<td>39</td>
<td>0.1-0.6</td>
<td></td>
<td>Anhedral.</td>
<td>10% recrystallized to actinolite plus magnetite &quot;dust.&quot;</td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>2</td>
<td>0.1-0.4</td>
<td></td>
<td>Euhedral.</td>
<td>100% replaced by chlorite, talc and magnetite.</td>
</tr>
<tr>
<td>Magnetite</td>
<td>4</td>
<td>4</td>
<td>0.01-0.2</td>
<td></td>
<td>Skeletal-euhedral.</td>
<td>10-20% replaced by sphene.</td>
</tr>
<tr>
<td><strong>SECONDARY MINERALOGY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorite</td>
<td>7</td>
<td></td>
<td></td>
<td>Replacing olivine, fills pores.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actinolite</td>
<td>6</td>
<td></td>
<td></td>
<td>Replaces clinopyroxene.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphene</td>
<td>&lt;1</td>
<td></td>
<td></td>
<td>Replaces magnetite.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyrite</td>
<td>&lt;1</td>
<td></td>
<td></td>
<td>Replaces olivine, 0.1-0.8 mm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VESICLES/CAVITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vugs.</td>
<td>&lt;1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VESSICLES/CAVITIES**  

**PERCENT**  

**LOCATION**  

**SIZE (mm)**  

**FILLING**  

**SHAPE**  

| Vugs. | <1 | | Chlorite. | Irregular. |
SITE 504

137-504B-174R-01 (Piece 8.30-53 cm)  OBSERVER: ALT  WHERE SAMPLED: Unit 195.

ROCK NAME: Sparsely plagioclase-clinopyroxene-olivine phyric basalt.

GRAIN SIZE: Fine (0.1-1.0 mm).

TEXTURE: Subophitic.

<table>
<thead>
<tr>
<th>PRIMARY MINERALOGY</th>
<th>PERCENT PRESENT</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHENOCRYSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>2</td>
<td>2</td>
<td>0.4-4.0</td>
<td>Euhedral.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>&lt;1</td>
<td>0.5-1.2</td>
<td>Euhedral.</td>
<td></td>
<td>Phenocrysts and as 3 mm glomerocrysts. Mostly about 10% replaced by chlorite and albite.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>1</td>
<td>1</td>
<td>0.8-2.8</td>
<td>Anhedral.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GROUNDMASS</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plagioclase</td>
<td>51</td>
<td>0.1-1.0</td>
<td>Anhedral.</td>
<td></td>
<td>Slightly altered to chlorite.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>34</td>
<td>0.1-1.0</td>
<td>Anhedral.</td>
<td></td>
<td>Partly replaced by actinolite and magnetite.</td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>0.1-0.2</td>
<td>Rouded to Euhedral.</td>
<td></td>
<td>100% replaced by chlorite, actinolite, and magnetite.</td>
</tr>
<tr>
<td>Magnetite</td>
<td>5</td>
<td>0.01-0.20</td>
<td>Skeletal-Euhedral.</td>
<td></td>
<td>20% replaced by sphene.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECONDARY MINERALOGY</th>
<th>PERCENT REPLACING/ FILLING</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorite</td>
<td>5</td>
<td>Replaces olivine, fills pores.</td>
</tr>
<tr>
<td>Actinolite</td>
<td>2</td>
<td>Replaces olivine and clinopyroxene, fills vugs with chlorite.</td>
</tr>
<tr>
<td>Sphene</td>
<td>&lt;1</td>
<td>Replaces magnetite.</td>
</tr>
<tr>
<td>Pyrite</td>
<td>&lt;1</td>
<td>Replaces igneous sulfides, 0.01-0.05 mm.</td>
</tr>
<tr>
<td>Chalcopyrite</td>
<td>&lt;1</td>
<td>Replaces igneous sulfides, 0.01-0.02 mm.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VESICLES/ CAVITIES</th>
<th>PERCENT LOCATION SIZE (mm)</th>
<th>FILLING SHAPE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vugs.</td>
<td>5</td>
<td>0.1-3.0</td>
<td>Chlorite and actinolite.</td>
</tr>
</tbody>
</table>

COMMENTS: One corner of thin section contains 5 mm chlorite-filled vugs with 5-10 mm light gray alteration halos, where the rock is very highly altered. Plagioclase is replaced (50%) by albite and chlorite, clinopyroxene is replaced (80%) by actinolite and magnetite, and magnetite is replaced (90%) by sphene.
SITE 504

137-504B-174R-02 (Piece 14.85-88 cm) OBSERVER: ALT WHERE SAMPLED: Unit 196.

ROCK NAME: Moderately clinopyroxene-plagioclase-olivine phyric basalt.

GRAIN SIZE: Fine-grained (0.1-1.0 mm).

TEXTURE: Subophitic.

<table>
<thead>
<tr>
<th>PRIMARY MINERALOGY</th>
<th>PERCENT PRESENT</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHENOCRYSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>&lt;1</td>
<td>0.5-1.2</td>
<td>Skeletal-euhedral.</td>
<td></td>
<td>100% replaced by chlorite and magnetite.</td>
</tr>
<tr>
<td>Plagioclase</td>
<td>1</td>
<td>1</td>
<td>0.4</td>
<td>Subhedral.</td>
<td></td>
<td>Phenocrysts and glomerocrysts. Some with rounded cores containing glass inclusions. Unaltered.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>3</td>
<td>3</td>
<td>0.4-2.4</td>
<td>Anhedral.</td>
<td></td>
<td>Phenocrysts and glomerocrysts. Tabular prisms with outer edges intergrown with groundmass plagioclase. Unaltered.</td>
</tr>
<tr>
<td>GROUNDMASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>53</td>
<td>53</td>
<td>0.1-1.0</td>
<td>Subhedral.</td>
<td></td>
<td>Slightly altered to chlorite. Locally up to 40% replaced by chlorite and albite around vugs.</td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>4</td>
<td>0.2-0.4</td>
<td>Subhedral.</td>
<td></td>
<td>100% replaced by chlorite, magnetite and pyrite.</td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>27</td>
<td>35</td>
<td>0.1-0.6</td>
<td>Anhedral.</td>
<td></td>
<td>10-20% replaced by actinolite.</td>
</tr>
<tr>
<td>Magnetite</td>
<td>4</td>
<td>4</td>
<td>0.01-0.20</td>
<td>Skeletal.</td>
<td></td>
<td>Partly replaced by sphene.</td>
</tr>
<tr>
<td>SECONDARY MINERALOGY</td>
<td>PERCENT PRESENT</td>
<td>FILLING</td>
<td>LOCATION</td>
<td>SHAPE</td>
<td>COMMENTS</td>
<td></td>
</tr>
<tr>
<td>REPLACING/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zeolites</td>
<td>&lt;1</td>
<td>In vug with quartz.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorite</td>
<td>4</td>
<td>Replaces olivine, fills vugs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actinolite</td>
<td>8</td>
<td>Replaces clinopyroxene and olivine, fills vugs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphene</td>
<td>&lt;1</td>
<td>Magnetite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartz</td>
<td>&lt;1</td>
<td>Fills vug center.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyrite</td>
<td>&lt;1</td>
<td>Replaces olivine and igneous sulfides, 0.01-0.06 mm.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chalcopyrite</td>
<td>&lt;1</td>
<td>Replaces olivine and igneous sulfides, 0.01-0.05 mm.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VESICLES/CAVITIES</th>
<th>PERCENT</th>
<th>LOCATION</th>
<th>FILLING</th>
<th>SHAPE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vugs.</td>
<td>&lt;1</td>
<td>3</td>
<td>Irregular.</td>
<td></td>
<td>One vug with zoned filling: 1. chlorite, 2. quartz and interstitial zeolite.</td>
</tr>
</tbody>
</table>

83
137-504B-176R-01 (Piece 23,126-127 cm)  OBSERVER: ALT  WHERE SAMPLED: Unit 200.

ROCK NAME: Moderately plagioclase-clinopyroxene-olivine phyric basalt.

GRAIN SIZE: Fine-grained (0.1-1.0 mm).

TEXTURE: Subophitic.

<table>
<thead>
<tr>
<th>PRIMARY MINERALOGY</th>
<th>PERCENT PRESENT</th>
<th>PERCENT ORIGINAL</th>
<th>SIZE (mm)</th>
<th>COMPOSITION</th>
<th>MORPHOLOGY</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHENOCRYST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>1</td>
<td>0.5-1.2</td>
<td></td>
<td>Rounded.</td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>5</td>
<td>5</td>
<td>0.4-2.0</td>
<td></td>
<td>Subhedral.</td>
<td></td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>5</td>
<td>5</td>
<td>0.8-2.5</td>
<td></td>
<td>Anhedral.</td>
<td></td>
</tr>
<tr>
<td>GROUNDMASS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plagioclase</td>
<td>52</td>
<td>52</td>
<td>0.1-1.0</td>
<td></td>
<td>Subhedral.</td>
<td></td>
</tr>
<tr>
<td>Clinopyroxene</td>
<td>24</td>
<td>30</td>
<td>0.1-0.4</td>
<td></td>
<td>Anhedral.</td>
<td></td>
</tr>
<tr>
<td>Olivine</td>
<td>0</td>
<td>2</td>
<td>0.1-0.4</td>
<td></td>
<td>Rounded.</td>
<td></td>
</tr>
<tr>
<td>Magnetite</td>
<td>5</td>
<td>5</td>
<td>0.01-0.2</td>
<td></td>
<td>Skeletal-anhedral.</td>
<td>Extensively (50-90%) altered to sphene.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECONDARY MINERALOGY</th>
<th>PERCENT</th>
<th>REPLACING/REPLACING</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorite</td>
<td>3</td>
<td>Replaces olivine, fills vugs.</td>
<td></td>
</tr>
<tr>
<td>Actinolite</td>
<td>6</td>
<td>Replaces clinopyroxene, olivine, fills vugs.</td>
<td></td>
</tr>
<tr>
<td>Sphene</td>
<td>&lt;1</td>
<td>Magnetite.</td>
<td></td>
</tr>
<tr>
<td>Chalcopyrite</td>
<td>&lt;1</td>
<td>Replaces olivine, 0.01-0.05 mm.</td>
<td></td>
</tr>
<tr>
<td>Pyrite</td>
<td>&lt;1</td>
<td>Replaces olivine and igneous sulfides, 0.01-0.05 mm.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VESICLES/CAVITIES</th>
<th>PERCENT</th>
<th>LOCATION</th>
<th>SIZE (mm)</th>
<th>FILLING</th>
<th>SHAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vugs</td>
<td>&lt;1</td>
<td></td>
<td>0.5</td>
<td>Chlorite and actinolite.</td>
<td></td>
</tr>
</tbody>
</table>