

<Type 1>

TEXTURE : moderately phyrlic  
COLOR : light gray - reddish gray  
PHENOCRYSTS : 1% ol (completely altered)  
max: 2mm mod: 1.5mm  
spr pl max: 1.5mm mod: 1mm  
GROUNDMASS : fine grained  
VESICLES : 2% , elongate , subangular

<Type 2>

TEXTURE : aphyric  
COLOR : gray , brown  
PHENOCRYSTS : 0%  
GROUNDMASS : fine grained  
VESICLES : 0 - 10% , elongate , subrounded

330-U1373A-1R-1-A\_SHLF2724501\_20110101181552

2-3cm  
pumice  
in photo is probably buried  
beneath other pebbles

Type 1  
Moderately ol-ol phyrlic

Type 2  
Aphyric

Type 3  
Highly vesicled  
aphyrlic  
(ol-micro)



Type 2

Type 2

Type 2

<Type 3>

TEXTURE : aphyric  
COLOR : light gray  
PHENOCRYSTS : 1% ol microphenocryst  
max : 0.5mm mod : 0.2mm  
GROUNDMASS : fine grained  
VESICLES : 15% elongate subrounded

Type 4  
Highly ol-phyric

9

Type?

Type 5  
Highly Vesicled  
Aphyric  
(ol, px micro)

15

Type 2

Type 6  
Pl-phyric

TS

<Type 4>

TEXTURE  
highly phyric

COLOR  
orange-light gray

PHENOCRYSTS  
20% ol  
max: 5mm mod: 2mm

GROUNDMASS  
fine grained

VESICLES 3%  
moderate rounded

<Type 5>

TEXTURE - aphyric

COLOR  
blue gray  
reddish gray

PHENOCRYSTS  
ol micro (0.5%)  
px micro (0.2%)

GROUNDMASS  
fine grained

VESICLES 15%  
elongated  
subrounded

Type 7

Type 2

87-89cm vein network  
max 2mm, mean 1mm  
70-72°C

Type 7  
Highly ol-px-pl  
phyric

<Type 6>

TEXTURE  
moderately phyric

COLOR  
medium gray

PHENOCRYSTS  
ol micro max 0.8mm  
mod 0.5mm  
pl 5% max: 1.2mm  
mod: 1.0mm

GROUNDMASS  
fine grained

VESICLES  
10% low  
subrounded

TS

<Type 7>

TEXTURE  
highly phyric

COLOR  
medium gray

PHENOCRYSTS  
ol 7%  
max: 5mm mod: 3mm

px 5%  
max: 8mm mod: 4mm

pl 1%  
max: 3mm mod: 1mm

GROUNDMASS  
fine grained

VESICLES 0%



Type 7

7-8cm  
vein network  
max 2mm  
avg 1mm  
90-180°

Type 2

Type 1



Type 7

Type 5

Type 5

63-64cm  
geopetal x2  
→179°

→TS



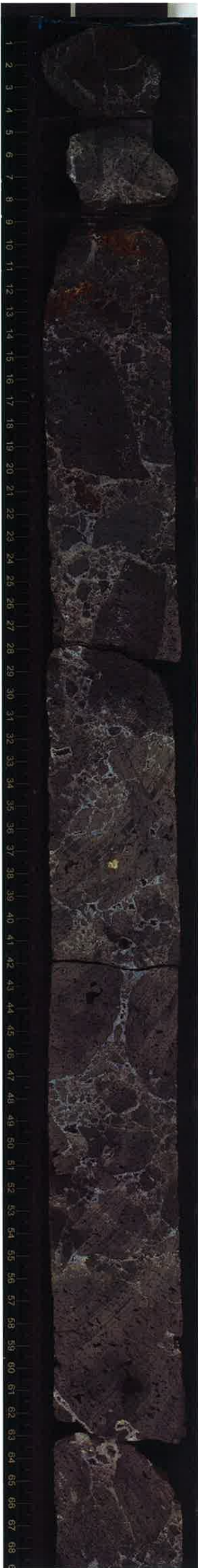
UNIT ①

0cm

#Aphyric Basalt  
#Autobrecciated  
lava flow?

Phenocryst: none  
μphenocryst: olivine  
0.1% 0.5 / 0.3 mm  
(max) (mod)

Volcanic Alkibates  
150/10 mm  
80% clast



13.5-14cm geopetal  
180°

19-19.5cm geopetal  
180°

24.5cm geopetal  
179°

28.5cm geopetal  
179°

52.5cm geopetal  
180°

68.5-69cm  
geopetal  
180°



Vesicles: 1%  
Elongate, subrounded  
4/1 mm  
(very heterogeneous)  
3 n/cm²

123-124cm  
geopetal  
181°

MB10

UNIT (1) 5cm  
UNIT (2)

Aphyric Basalt  
Volcanic Breccia

Phenocryst: none

Volcanic Attributes:

60/5mm

Low, Very Angular

Brownish gray

Vesicles:  
(in clasts)  
5% low/subangular  
1/0.5mm

UNIT (2) 49cm  
UNIT (3)

Moderately Ol-Phyric  
Basalt Breccia

Olivine 5% (altned)  
5/2mm

Pyroxene (microphenoc)

Reddish medium gray

Vesicles: 15%  
low, Angular  
10/2mm  
4n/cm<sup>2</sup>

vesicles

96.5-98cm  
vein  
1mm wide  
80-7006

Dusky red



UNIT 3

UNIT (3)  
(continued)



XRD  
aligned  
oblique

vesicles (in patches)  
1% Po, subrounded  
2/1 mm  
1u/cm<sup>2</sup>

→ B  
134-142cm  
vein 2mm wide  
network  
70-108'

UNIT 3  
(continued)



Vesicles: 8%  
Elongate, Subangular  
7/1 mm  
10 n/cm<sup>2</sup>

9-10cm  
vein  
0.5mm  
50-140

35cm (vesicles)

45cm

UNIT 3

UNIT 4

Aphyric Basalt

Volcanic Breccia

(microphenocrysts of Plag)  
in some clast



Vesicles in clast:  
3%, elongate, subangular  
6/0.5  
10 n/cm<sup>2</sup>

vesicles intercal  
15% low, subrounded  
6/3 mm  
3 n/cm<sup>2</sup>

Vesicles  
1% low, subangular  
0.5/0.3 mm



UNIT 4  
(continued)

Aphyric Basalt  
Autobrecciated lava flow

0.5% Plag (1 to 4mm)  
(max mod)

fine grained

moderately altered

highly altered matrix

light reddish gray



carbonate

22-28 non-oriented vesicle band in clast

carbonate

moderately altered

Vesicles - 3%  
low, subangular  
Size: 10/1 mm  
5 n/cm<sup>2</sup>  
in clasts

moderately altered clast



55-66 vein, in network, irregular non-oriented

64-66 straight vein steep dip ~ 45° in clast!

Volcanic attributes:  
95% clasts  
Strongly bimodal  
low sphericity, very angular

highly altered clast



Brownish gray

UNIT 4  
UNIT 5

moderately olivine-Augite  
-phyric basalt

Autobrecciated  
lava flow

5% Olivine (altered)  
Size: 6/2 mm

1% Augite  
Size: 5/1 mm

0.5% Plagioclase  
Size: 1/0.4 mm

Carbonate  
light reddish gray

-45-52  
vein, steep dip -> open  
in clast

UNIT 5  
UNIT 6  
TYPE CLASTS  
FROM UNIT 1

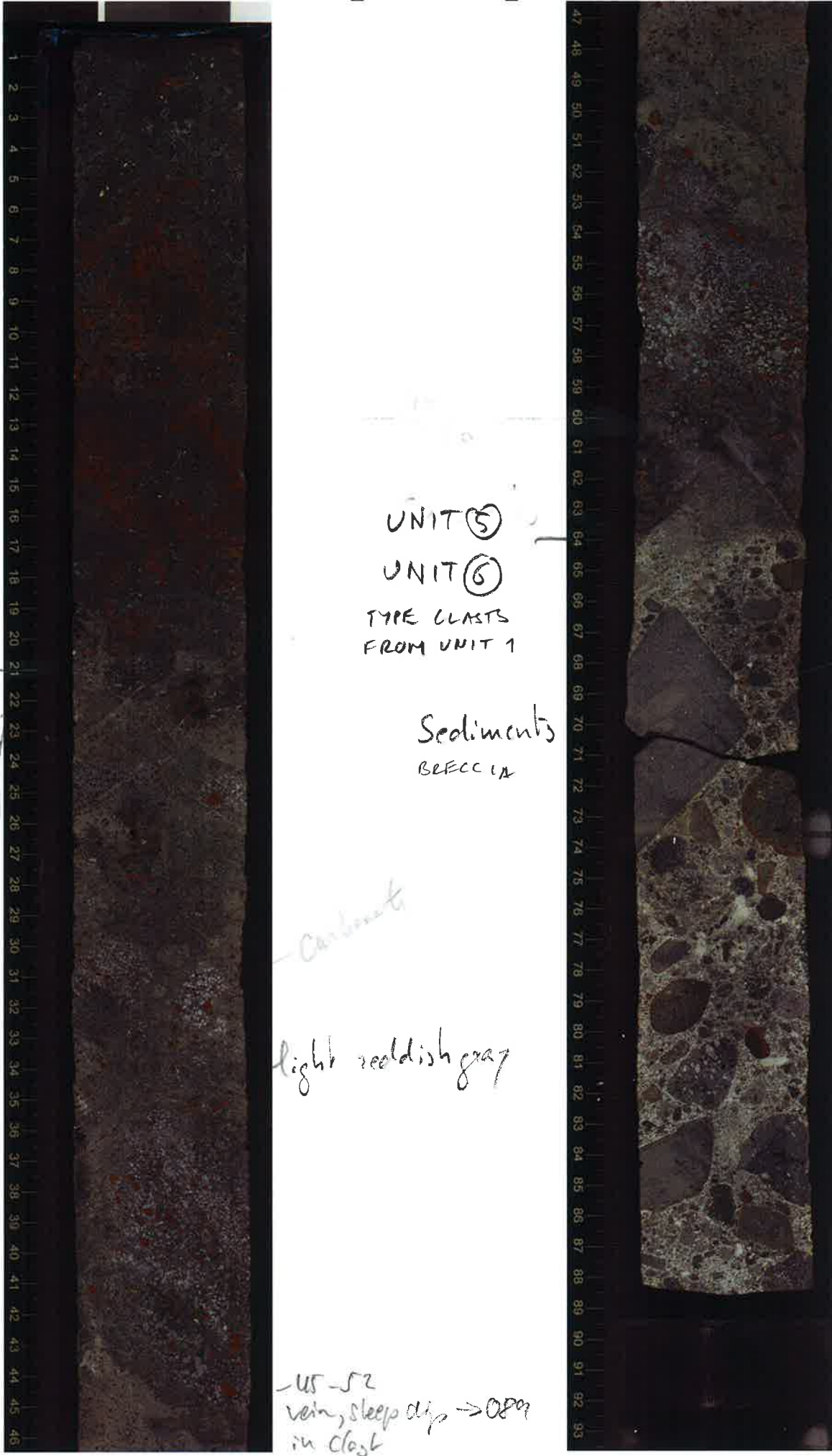
Sediments  
BRECCIA

Vesicles 5%  
low, subangular  
Size: 5/2 mm  
10 u/cm<sup>2</sup>

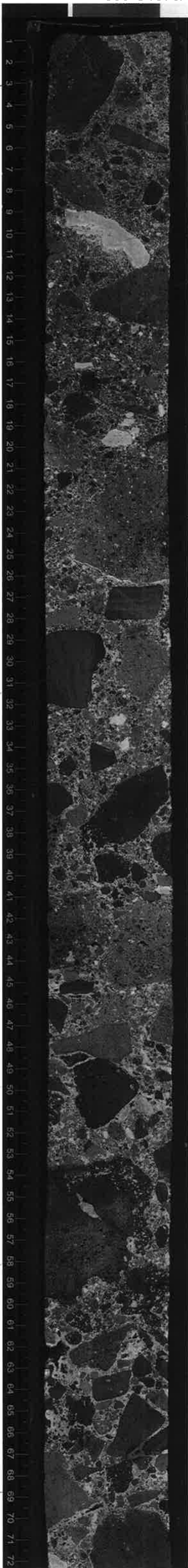
Carbonate

-66-71 fracture, steep & local  
in column

Type 2



Type 1



TS  
Type 6

TS  
Type 1

28-29.5  
vesicle banding in clast  
30-31 vesicle banding

Type 2

hyal  
clast

Type 1

non-orient  
clast

57-58 apopetal in clast  
non-oriented

Type 1

Type 3

Type 2

72-76  
vesicle banding in clast



TS  
addupide

Type 4  
10% VESICLES  
LOW SUBROUNDED

Type 2

109-111 vesicle banding  
in clast

Type 8  
TEXTURE: APHYRIC  
COLOUR: BROWN ORANGE  
GRAY  
PHENOCRYSTS - NONE  
GROUNDMASS - FINE-  
GRAINED  
≤ 1mm  
VESICLES - 10%  
ELONGATE  
SUBANGULAR  
Max 8mm  
wide: 3mm

Type 5

127-130  
sed. bedding → 149, steep dip

132-135 steep dip → 109  
bedding



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4-7  
bedding  
74-83

Type 2

Type 8

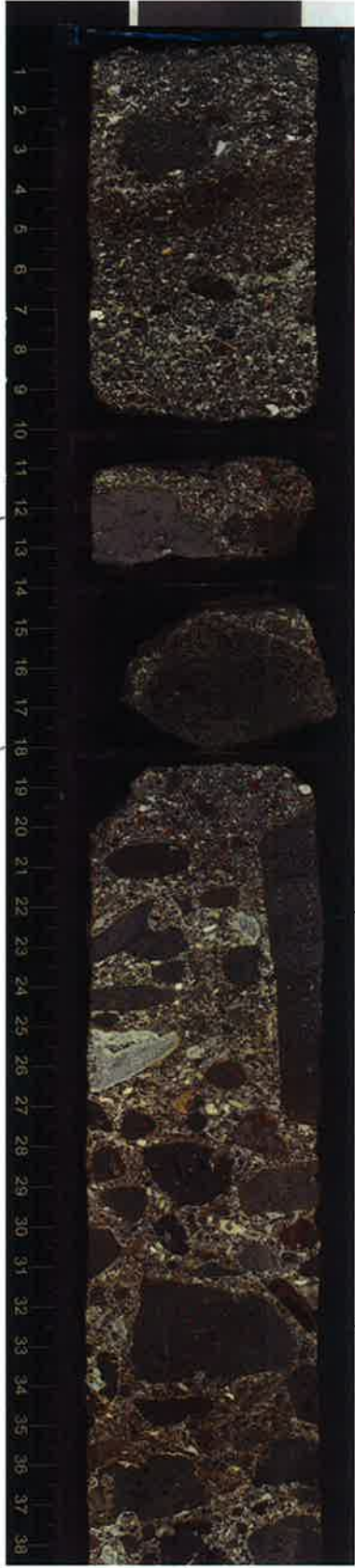
Type 6

62-72  
bedding  
89-852

Type 7

Type 5

TS





irregularly  
abundant

VESICLE ZONES = TYPE 8  
MORE MASSIVE ZONES  
= TYPE 3  
TYPE 3 & TYPE 8 MAY  
ORIGINATE FROM SAME  
MATERIAL?

TYPE 3

brown clay + calcite  
6.5-9  
vesicle band,  
sub-horiz → 18°  
moderately  
abundant

13-16  
vesicle band  
80 → 191°

15-17 band of  
veins, network  
steep dip → 201°

18-21 band of vesicles  
70 → 010°

25-27 single veins  
non-drummed  
brown clay

↓  
SEDIMENTOLOGICAL

61-63  
bedding, straight  
non-drummed



68-71 bedding  
sub-horiz → 18°

72-74 bedding  
sub-horiz → 18°

90-91 bedding  
sub-horiz → 171°

97-107  
bedding sub-horiz → 199°

123-124  
vein, straight, non-  
drummed - calcite



BASALT  
CONGLOMERATE  
(SED. UNIT)  
SAME CLAST TYPES  
AS CORE 1



TYPE 2  
0-37cm

TYPE 2  
APHYRIC LOW  
VESICULARITY  
(0-2%)  
(0-37cm)

TYPE 7  
OL+PX PHYRIC  
50-64.5cm

5-7  
straight vein  
grey ol + p  
calcs +  
brown clay vein

16-16 vein  
85 → 016 (matrix +  
calcs +  
brown clay)

23-26 vein vein  
non-oriented, irreg  
calcs + brown clay

TS (sed)

Slightly  
altered

58.5-60 vein - calcs  
85 → 2165  
enclast  
60-62 vein vein  
irreg.



TYPE 2  
74-86cm

87-90 non-oriented  
vein vein  
calcs

TYPE 2  
90-107cm

moderately  
altered  
clasts

TYPE 2  
110-117cm

TYPE 7  
ol + px phyric  
122-127.5cm

TYPE 6  
plag phyric +  
ol micro  
127.5-132.5cm

TYPE 7  
132.5-136.5cm

138-138.5  
non-oriented

TYPE 2  
APHYRIC  
137-145cm

BASALT  
CONGLOMERATE  
(SED. UNIT)

TYPE 9

TYPE 7  
4-8cm

TYPE 2  
aphric 8-12cm

TYPE 7  
ol + px phric  
16-27cm

18-21  
band of  
minerals, 60 → 229

23-26  
band of minerals  
60 → 330

27-33  
vein, 89 → 237  
calcs

MATRIX  
MATERIAL

TYPE 7  
ol + px  
phric  
28-47cm

TYPE 9  
48-52cm

TYPE 1  
55.5-59.5cm

TYPE 1  
ol + plag

TYPE 9:  
TEXTURE: PLAG PHRIC  
10% mid. 15 max 2.5mm  
COLOR: MEDIUM GRAY  
GROUNDMASS: FINE-  
GRAINED  
VESICULARITY: 1%  
- max 0.1mm  
- mid 0.1mm  
HIGH  
ROUNDED

Medium sized  
clasts

MATRIX  
MATERIAL  
EVIDENCE  
THAT THEY  
ARE BROKEN  
CLASTS IN  
CONGLOMERATE;  
UNSYSTEMATIC  
VARIATIONS IN  
MINERAL ABUNDANCE  
AND ASSEMBLAGE  
SUGGEST THIS  
TOO.

55-59  
band of minerals  
- 66 vesicle band  
sleep → 190°  
67-69 propeta 1 → 200°

TYPE 1  
71.5-80.5cm

TYPE 1  
81.5-94cm

TYPE 2  
94-101cm  
APHRIC

105-113  
vein network,  
img. non-oriented  
calcs

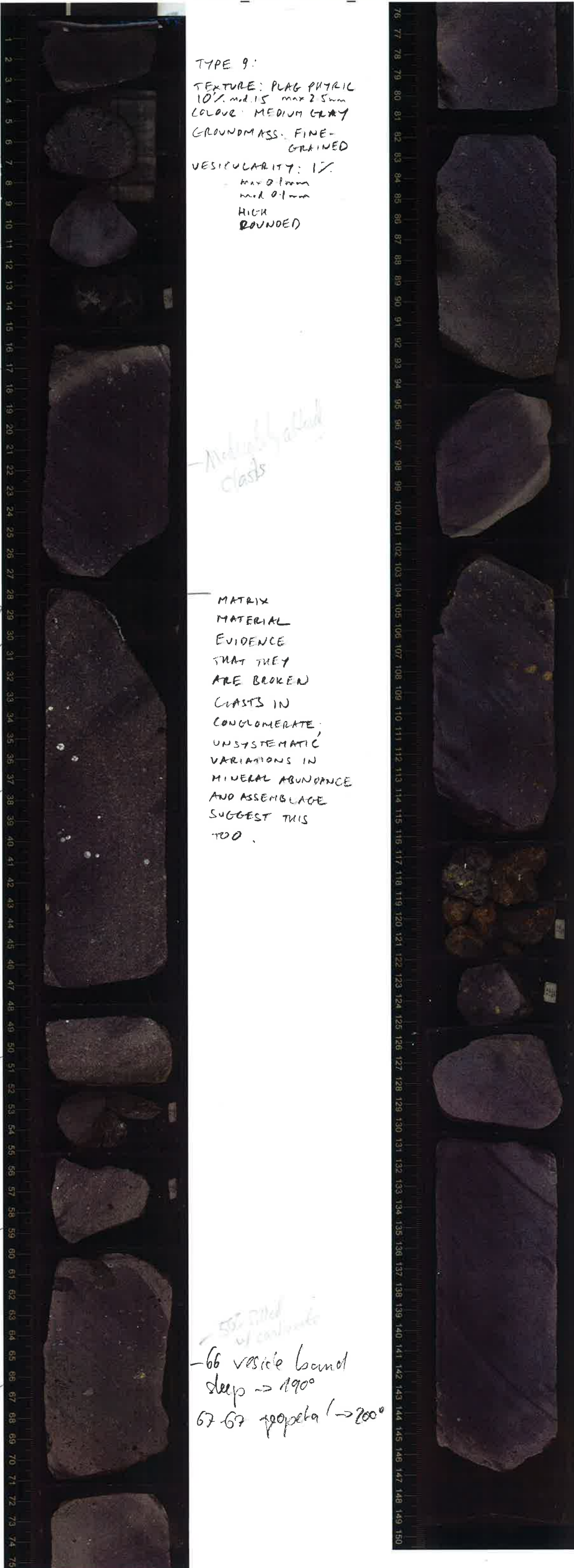
TYPE 7  
102-116cm

TYPE 7

TYPE 7

114-117  
band of minerals  
61 → 2090

TYPE 7





Type 4a

Type 6a

18-25cm  
vein  
curved  
0.2mm wide  
steeply dipping  
look brown  
clay  
look brown  
clay

Type 7a

Type 10a

17-25cm  
magmatic  
fracture  
steep dip → 179

TYPE 10  
TEXTURE: APHYRIC  
PHENOCRYSTS: NONE  
COLOUR: PALE ORANGE  
GLAZ  
VESICULARITY: 15%  
LOW  
SUBROUNDED  
10mm MAX  
4mm MIN  
GROUNDMASS: fine grained

Type 4a

Type 7a

64.5-66cm vein 0.2mm  
straight 88 → 160°

MB10

72.5-76cm  
vein 0.5 to 1mm wide  
150° - orient piece

Type 7a

85-88cm vein (on opposite side)  
50 → 040 1mm straight  
40% brown clay  
60% carbonate

88-90cm 82 → 164°  
vein, branched 2mm wide

90-91cm 90% carb  
10% brown clay  
vein, single fracture 89 → 158°  
blocky

93 → 95.5cm vein network, branched  
max 3mm steeply dipping  
avg 2mm  
90% carb  
10% brown clay

TYPE 6a

UNIT BOUNDARY

Type 1b

Moderately Plagioclase-phyric  
Basalt

3% Plagioclase laths  
Reddish medium grey  
fine grained

10% vesicles: subrounded  
- low to elongate



Type 2b

Aphyric basalt

light reddish gray  
fine grained

Vesicles: 1% elongate,  
subrounded

1-3cm  
7-10cm, 12-15cm  
vein  
irregular (follows chert  
boundaries) avg 0.5  
max 1m  
90% carb.  
10% green clay

Type 2b

17.5-19.5 vein  
irregular, follows chert boundary  
0.5mm  
100% carb.

Type 2b

Type 1b

28-29cm vein  
irregular, follows  
chert boundary  
100% carb.

Type 3b

Aphyric basalt

Brownish red  
fine grained

0.5% vesicles  
elongate, angular

TS (set)

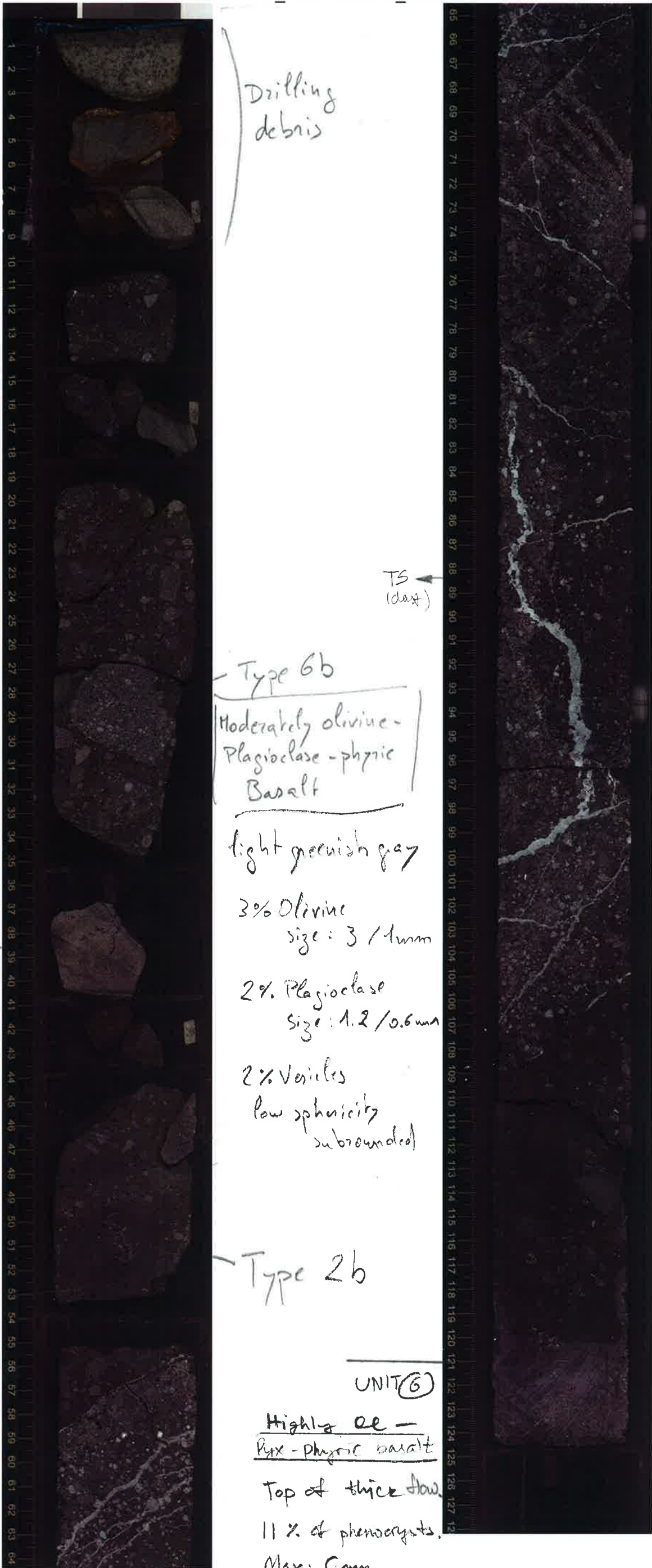
Type 2b



Type 2b

Type 2b





12.5-13cm  
vein  
0.1mm  
irregular

Drilling  
debris

65-66.5cm vein max 3mm  
avg 1mm 70 → 340°

66-78cm vein max 1mm  
avg 0.5mm  
irregular

72.5cm-77cm vein  
max 2mm avg 1mm 70 → 034°

79.5-82.5cm vein  
max 3mm avg 1mm 80 → 210°

85.5-87cm vein straight  
max 1mm avg 0.5mm 75 → 168°

80-88cm vein, irregular, steeply dipping.  
max 10mm  
avg 5mm  
cross fiber

Clast 7b

Highly olivine-aurifer phytic  
Basalt

greenish medium gray

7% Olivine

5% Augite

1% Plag.

fine grained

10% vesicles (filled)

98-100cm vein straight 5mm max  
cross fiber 52 → 338° 3mm avg

100-107cm vein straight 2mm avg  
54 → 308°

102.5-103cm  
vein straight steeply dipping → 190°  
2mm thick  
conjugate

Type 2b

Type 6b

Moderately olivine-  
Plagioclase-phytic  
Basalt

light greenish gray

3% Olivine  
size: 3 / 1mm

2% Plagioclase  
size: 1.2 / 0.6mm

2% Vesicles  
low sphericity  
subrounded

Type 2b

UNIT (6)

Highly ol -  
Phy - phytic basalt

Top of thick flow

11% of phenocrysts.

Max: 5mm  
Mod: 2.5mm.

equant/euhedral to subhedral  
ol are altered.

55.5-59cm  
vein straight  
1mm wide  
80 → 330°

59-64cm  
vein straight  
3mm wide  
70 → 310°

60-66cm  
vein network  
branched  
max 2mm  
avg 1mm  
80 → 320°

Vesicles  
None.

UNIT 6 CONTINUES



1-4 cm  
vein straight  
1mm wide  
85 → 128°

2-12 cm  
fracture  
straight  
80 → 107°

16-24 cm (opposite side of core)  
fracture 20 → 184°

25-34 cm  
(on opposite side of core)  
fracture 20 → 150°

38-40.5 cm  
fracture, straight  
68 → 334°

44-44.5 cm  
fracture, straight  
65 → 356°

49-54 cm  
fracture, straight  
50 → 105°

↓  
piece in photo  
the wrong way

59-60.5 cm  
vein straight 1mm  
86 → 010°

60-68 cm  
vein straight 0.1mm  
step dip → 105°



75.5-77 cm  
vein 2mm straight 70 → 340°

76-80 cm  
vein straight 0.1mm 80 → 022°

82 cm vein straight 1mm  
non-oriented piece

85-91.5 cm vein straight 4mm  
85 → 110°

92-101 cm vein straight width?  
60 → 300°

109-111 cm conjugate vein 0.5mm wide straight  
30 → 230°

110-112 cm  
vein straight 3mm max  
2mm avg  
30 → 158°

112-114 cm  
vein 1mm straight 76 → 134°

117.5-119.5 cm vein, straight 0.5mm  
78 → 022°

119-119.5 cm fracture straight 88 → 184°

119-124 cm vein curved max 3mm  
30 → 035° avg 1mm

→ TS (unit)

132.5-135 cm vein 2mm wide 35 → 164°

135-139 cm vein network, branching  
0.5mm 80 → 022°

stick fibers 17°  
↓  
4mm straight 80 → 034°

138-141.5 cm vein

139.5-141.5 cm vein 3mm 54 → 020°

UNIT 6



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64-72  
fracture 62-70

64-70  
fracture 60-70

83-86 vein - oriented

84-86 vein 81-82

84-90 vein, sub horizontal

Volcanic breccia between the lava flows  
max highly altered  
calcite

90-100 vein, steep dip

100-106 fractures  
sub horizontal -> 100

Lava flow

110-114 vein  
80 -> 110  
partly altered

115-116 vein, non-oriented

vein, non-oriented

6.10  
fracture 60-70

Early fracture in pressure

16-19 vein  
non-oriented

18-22 vein  
80 -> 80

19-20 fracture

28-211

20-21 vein, non-oriented

20-27 vein, steep dip

23-26 vein  
22 -> 22

25-28 vein, non-oriented

28-31 vein, 24 -> 24

BASE OF UNIT 6

TOP OF UNIT 7

Highly olivine-angite  
phyric basalt

11% of phenocrysts

7% olivine  
4% angite

greenish medium gray

5mm max > phenocryst  
2mm max > angite

No vesicle

equant/enhedral to subhedral

Ol are altered

TS (unit) 7

BASE UNIT 7



UNIT 8

Highly olivine-angite-phyric basalt

Slight to moderate alteration

calcite

36-40  
contorted vein, steep dip  
-> 209  
-> 156

42-46  
vein, non-oriented

46-50 vein  
laminar  
vein - oriented

61-62  
vein  
24 -> 24  
calcite



TOP UNIT 8  
Aphyric basalt  
 0.5% olivine  
 Vesicular  
 Vesicle (20%)  
 sphericity; moderate  
 roundness, rounded.  
 max: 7mm  
 mod: 4mm  
 10% - filled.  
 2 n/cm<sup>3</sup>  
 brownish gray color

calcite

medium

BASE OF UNIT 8

TOP OF UNIT 9

Medium brownish gray  
 Vesicular.  
 0.5% Olivine  
 max: 4mm  
 mod: 2mm

Aphyric basalt

Vesicle (5% filled)

high, rounded  
 25% { 24 - 64 cm interval  
 max: 10mm  
 mod: 4mm 3 n/cm<sup>3</sup>

20% { 64 - 87 cm interval  
 max: 20mm  
 mod: 1mm  
 Low, angular  
 10 n/cm<sup>3</sup>

Thin sediment (1cm)  
 boundary between the  
 UNIT 8 and UNIT 9.

TS(unit)

14-16 vein web.  
 non-oriented  
 4-9 vein web. ->  
 60 -> 226  
 14-16 vein web,  
 non-oriented

BASE OF UNIT 9.

TOP OF UNIT 10.

Aphyric basalt  
 0.8% Olivine phen  
 max: 4.5mm  
 mod: 1mm.

Medium brownish  
 gray color.

TS(unit)

high  
 alteration

Vesicle (15%)

Low, subangular.  
 max: 10mm  
 mod: 1mm  
 10 n/cm<sup>3</sup>  
 (40% of vesicles)  
 are filled

24-26 vein web.

non-oriented  
 29-31 goopchar  
 -> 207

41-47 vein, 70 -> 134

calcite  
 + green  
 clay

53-55 vein  
 sub-horiz. 174

64-87 cm interval  
 Vesicles are (20% filled)  
 max: 20mm.  
 mod: 1mm.  
 Low, subangular.

2cm sedimentary  
 boundary between the  
 UNIT 9 and UNIT 10.

93-124 cm  
 peperite.

TS(unit)

139-142 cm  
 peperite

