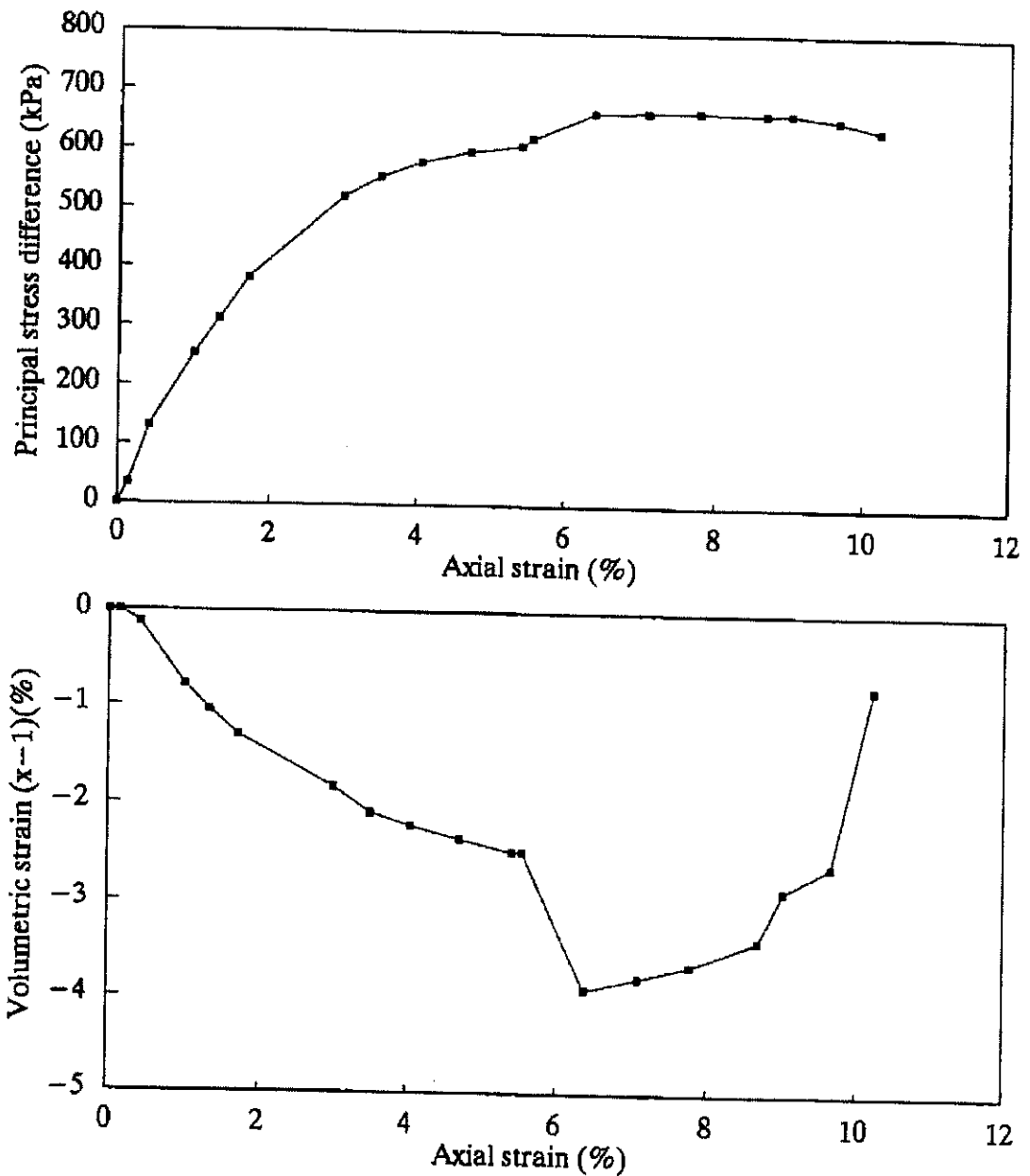


Job Name: 41 HIGHGATE
BH Number: 1

Sample No.: U4
Depth (m): 16.60

SHEAR STAGE (TEST #2)

machine rate of strain (%/hr):	0.95
cell pressure (kPa):	535
measured max. deviator stress (kPa):	668
membrane + filter drain correction (kPa)	11.7
corrected max. deviator stress (kPa):	656
pore pressure at failure (kPa):	300



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S · G · C

Soil & Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No:U4
BH Number: 1 Depth (m):16.60

SPECIMEN DETAILS (TEST #3)

description: Firm orange brown & grey
(visual) fine SAND with silt & pockets of clay
preparation: Undisturbed
orientation within original sample: Vertical
test started: 04/03/2009

TEST 3

INITIAL STAGE

type of side drains: Vertical
membrane thickness (mm): 0.3
particle density (Mg/m³): assumed 2.67
voids ratio: 0.70
degree of saturation (%): 99.0

SATURATION STAGE

method: increments of cell pressure only
final pore water pressure (kPa): 381
final degree of saturation (%): 99.0

CONSOLIDATION STAGE

effective stress (kPa): 335
initial pore water pressure (kPa): 615
final pore water pressure (kPa): 300
pore pressure dissipation (%): 100.0

SHEAR STAGE

failure criterion: maximum deviator stress (kPa)
cell pressure (kPa): 635
initial pore water pressure (kPa): 300
rate of strain (mm/min): 0.012
strain at failure (%): 7.40
volumetric strain at failure (%): 2.23
eff. major principal stress (kPa): 1060
eff. minor principal stress (kPa): 335
time to peak dev. stress (min): 458

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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Surrey Geotechnical Consultants Limited

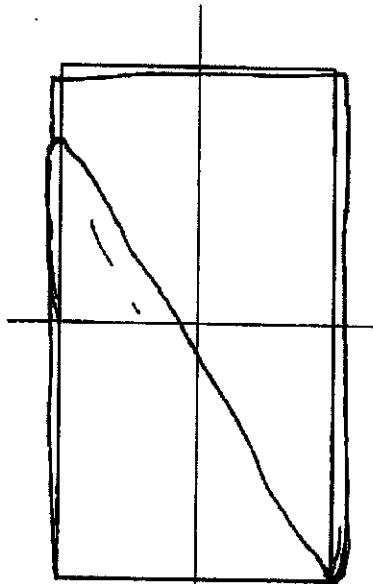
Job name: 41 HIGHGATE Sample No.: U4
BH Number: 1 Depth : 16.60 (m)

SPECIMEN DETAILS

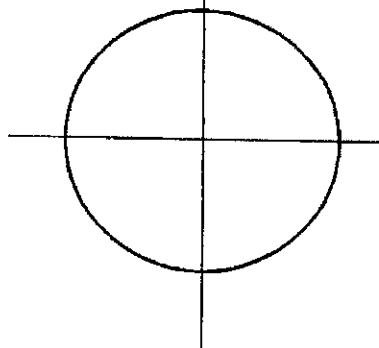
Description : Firm orange brown & grey
(visual) fine SAND with silt & pockets of clay
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation



Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE
BH Number: 1

Sample No.: U4
Depth (m): 16.60

SPECIMEN DETAILS (TEST #3)

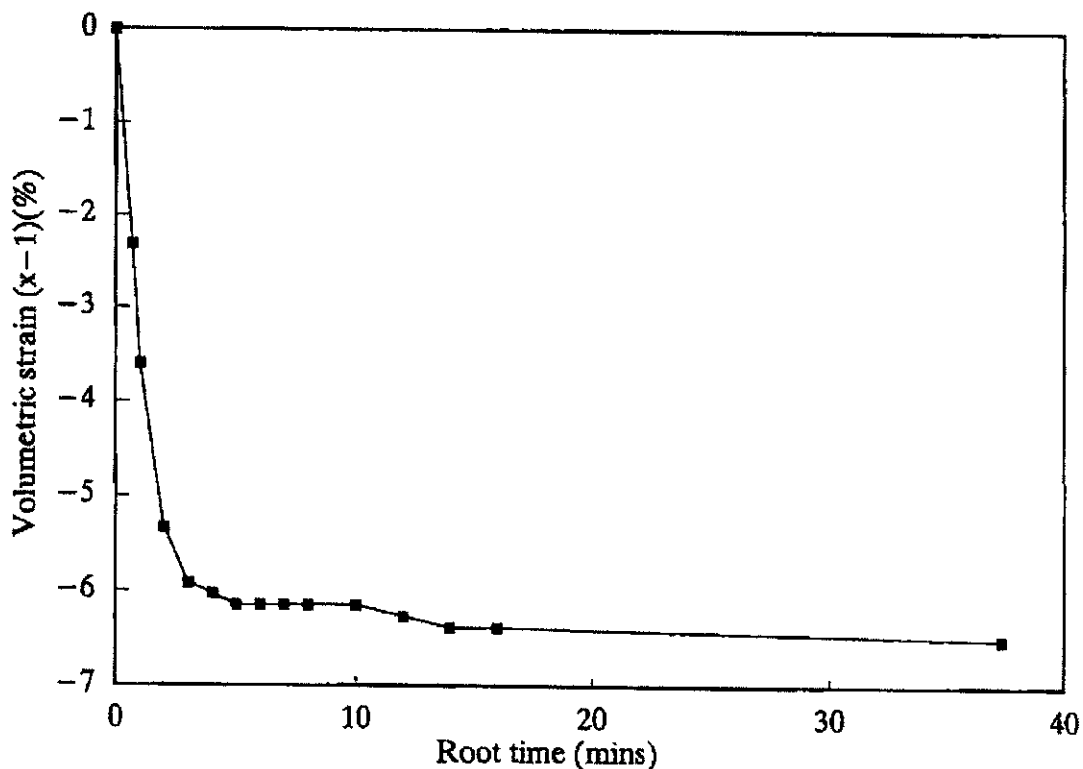
description: Firm orange brown & grey
(visual) fine SAND with silt & pockets of clay
initial and final m/c (%): 26 23
initial bulk density (Mg/cu.m): 1.98
initial dry density (Mg/cu.m): 1.57
height and diameter (mm): 76 38

SATURATION STAGE

cell and back pressure (kPa):
B value: 0.99

CONSOLIDATION STAGE

cell and back pressure (kPa): 635 300
effective consolidation pressure (kPa): 335
base, side, top drainage y y y



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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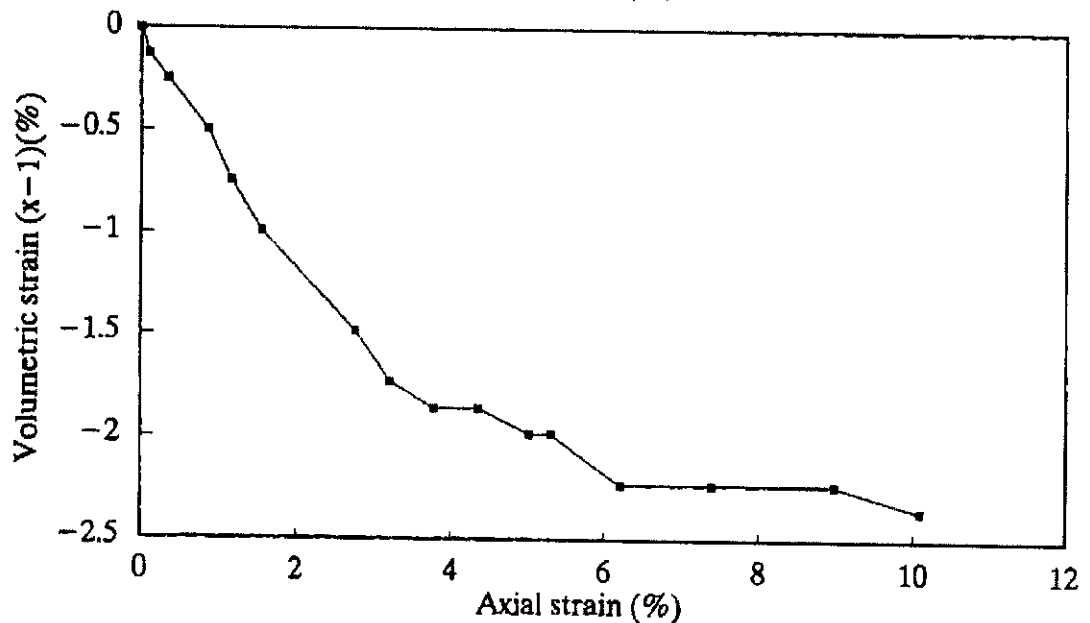
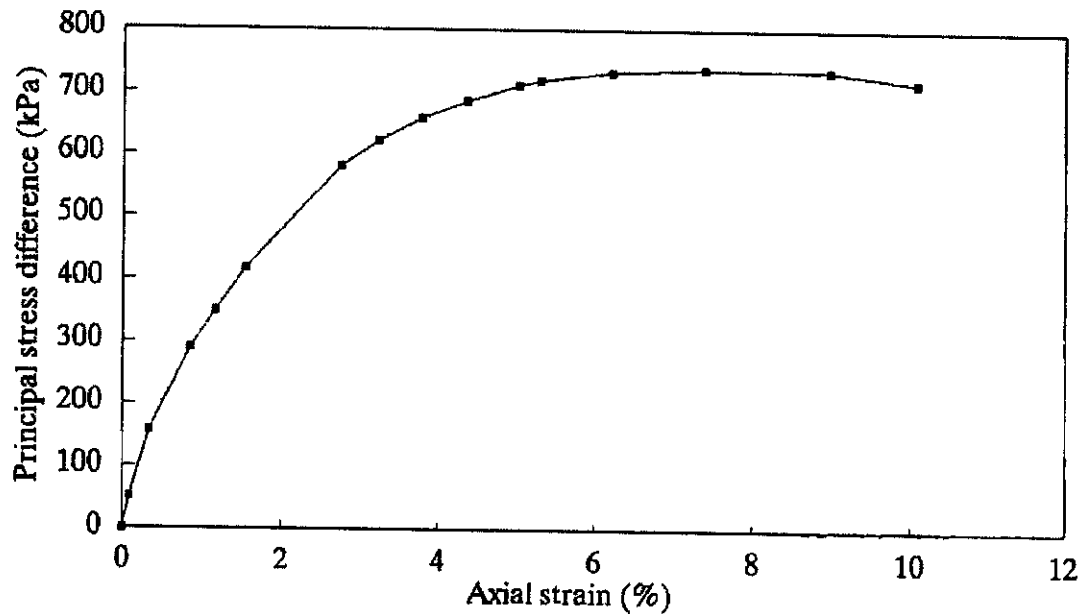
Survey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 1

Sample No.: U4
Depth (m): 16.60

SHEAR STAGE (TEST #3)

machine rate of strain (%/hr):	0.95
cell pressure (kPa):	635
measured max. deviator stress (kPa):	737
membrane + filter drain correction (kPa)	11.6
corrected max. deviator stress (kPa):	725
pore pressure at failure (kPa):	300



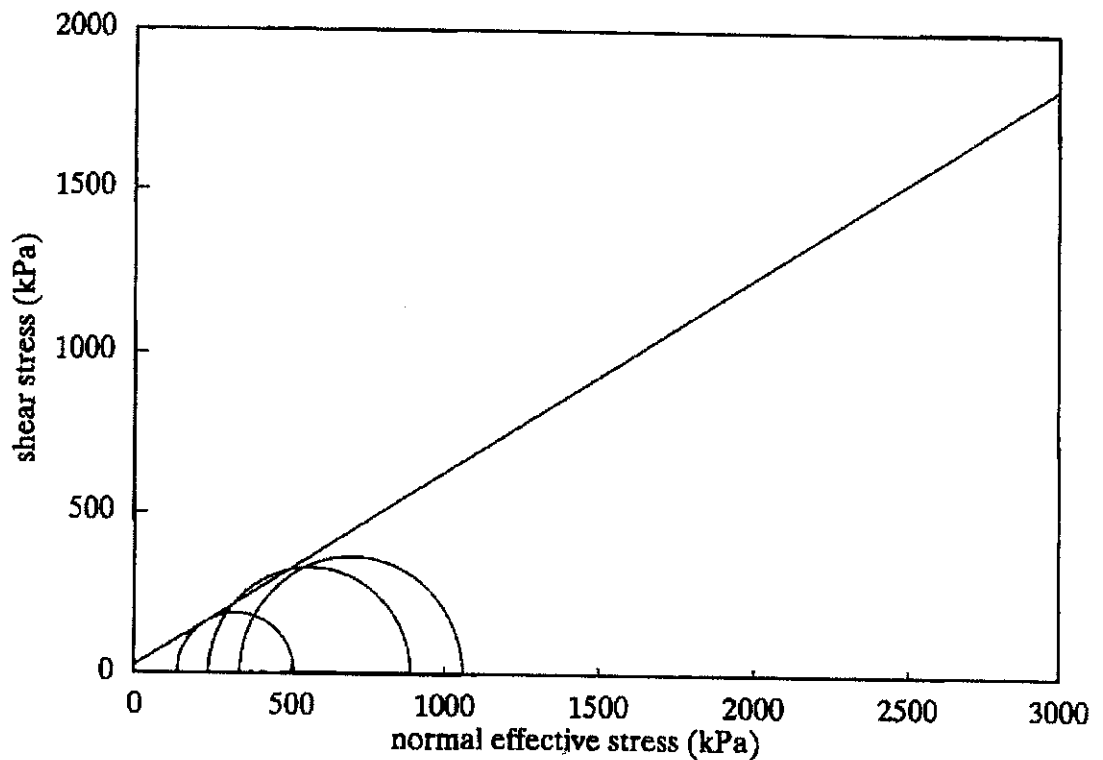
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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Soils Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 1

Sample No.: U4
Depth (m): 16.60



SUMMARY

At maximum principal stress difference:

	#1	#2	#3
cell pressure (kPa)	435	535	635
deviator stress (kPa)	375	656	725
pore pressure (kPa)	300	300	300

Effective strength parameters:

effective cohesion intercept (kPa)	25.0
effective angle of friction (degrees)	31.0

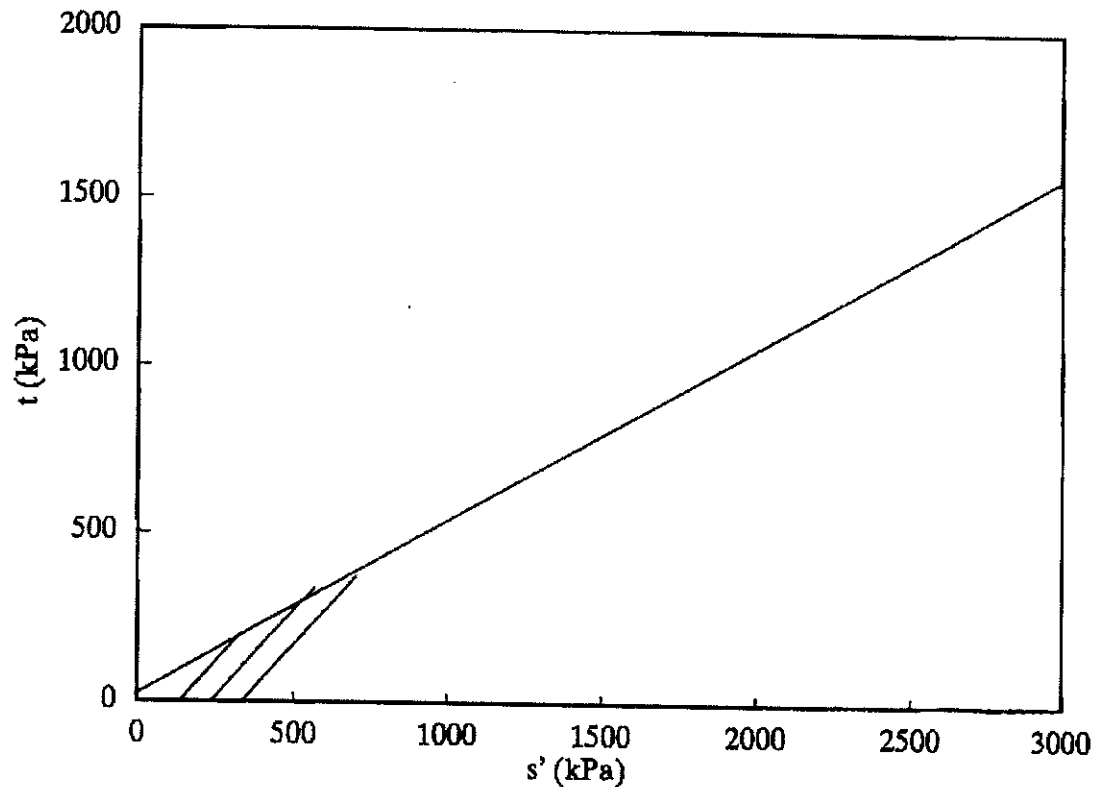
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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Survey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 1

Sample No.: U4
Depth (m): 16.60



NOTES ON STRESS PATH PLOTS

1. No membrane or filter drain corrections made to stress path plots
2. Effective stress paths assume full pore water pressure equalization at all times after the start of shear. This assumption is incorrect. The rate of shearing has been estimated to give 95% equalization only at failure.

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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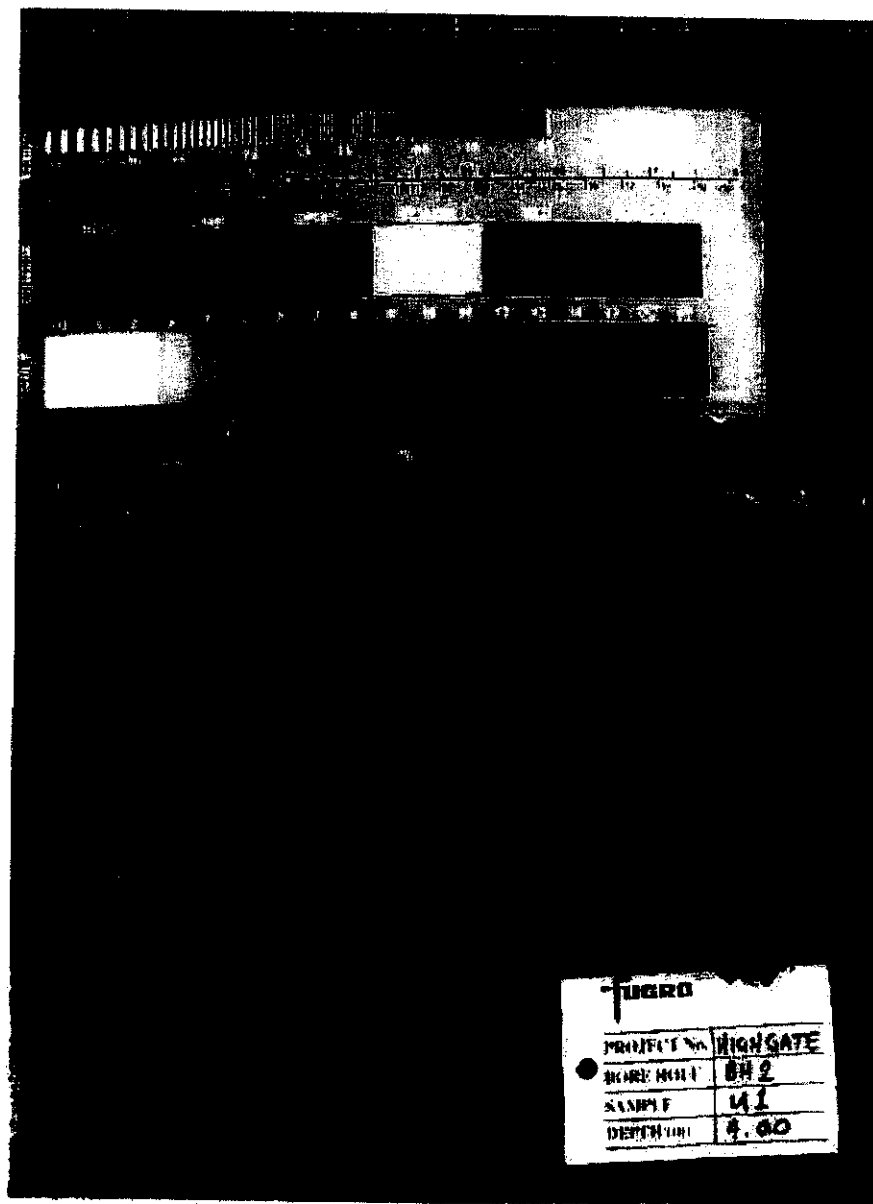
Survey Geotechnical Consultants Limited

**GROUND ENGINEERING
HIGHGATE**

VISUAL DESCRIPTION

Firm very closely fissured light grey CLAY with thin laminae of brown sand and pockets of silty sand

SPECIMEN PHOTOGRAPHS



TUGRO
PROJECT No. HIGHGATE
BORE HOLE BH 2
SAMPLE U1
DEPTH (m) 4.00

Borehole
Sample
Depth (m)

BH2
U1
4.00

Report No: 20921005

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Survey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No:U1
BH Number: 2 Depth (m):4.00

SPECIMEN DETAILS (TEST #1)

description: Firm brown sand with
(visual) pockets of light grey clay
preparation: Undisturbed
orientation within original sample: Vertical
test started: 17/03/2009

TEST 1

INITIAL STAGE

type of side drains: Vertical
membrane thickness (mm): 0.3
particle density (Mg/m³): assumed 2.69
voids ratio: 0.63
degree of saturation (%): 95.9

SATURATION STAGE

method: increments of cell and back pressure
final pore water pressure (kPa): 393
final degree of saturation (%): 98.0

CONSOLIDATION STAGE

effective stress (kPa): 40
initial pore water pressure (kPa): 329
final pore water pressure (kPa): 300
pore pressure dissipation (%): 100.0

SHEAR STAGE

failure criterion: maximum deviator stress (kPa)
cell pressure (kPa): 340
initial pore water pressure (kPa): 300
rate of strain (mm/min): 0.012
strain at failure (%): 5.41
volumetric strain (%): -0.58
eff. major principal stress (kPa): 195
eff. minor principal stress (kPa): 40
time to peak dev. stress (min): 342

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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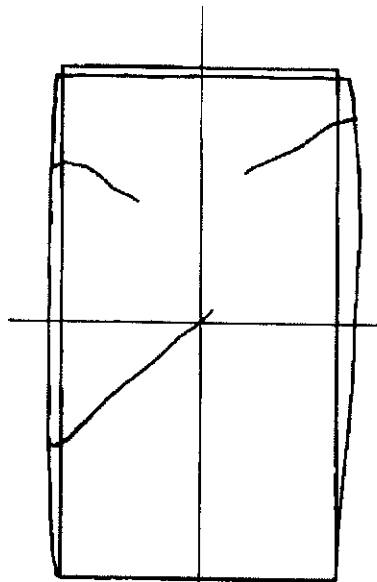
Job name: 41 HIGHGATE Sample No.: U1
BH Number: 2 Depth : 4.00 (m)

SPECIMEN DETAILS

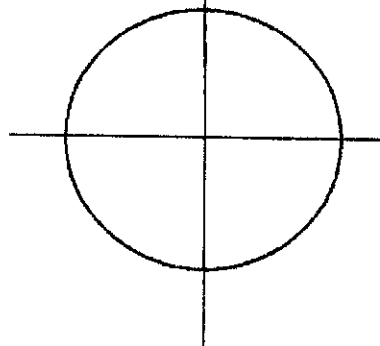
Description : Firm brown sand with
(visual) pockets of light grey clay
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation



Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SPECIMEN DETAILS (TEST #1)

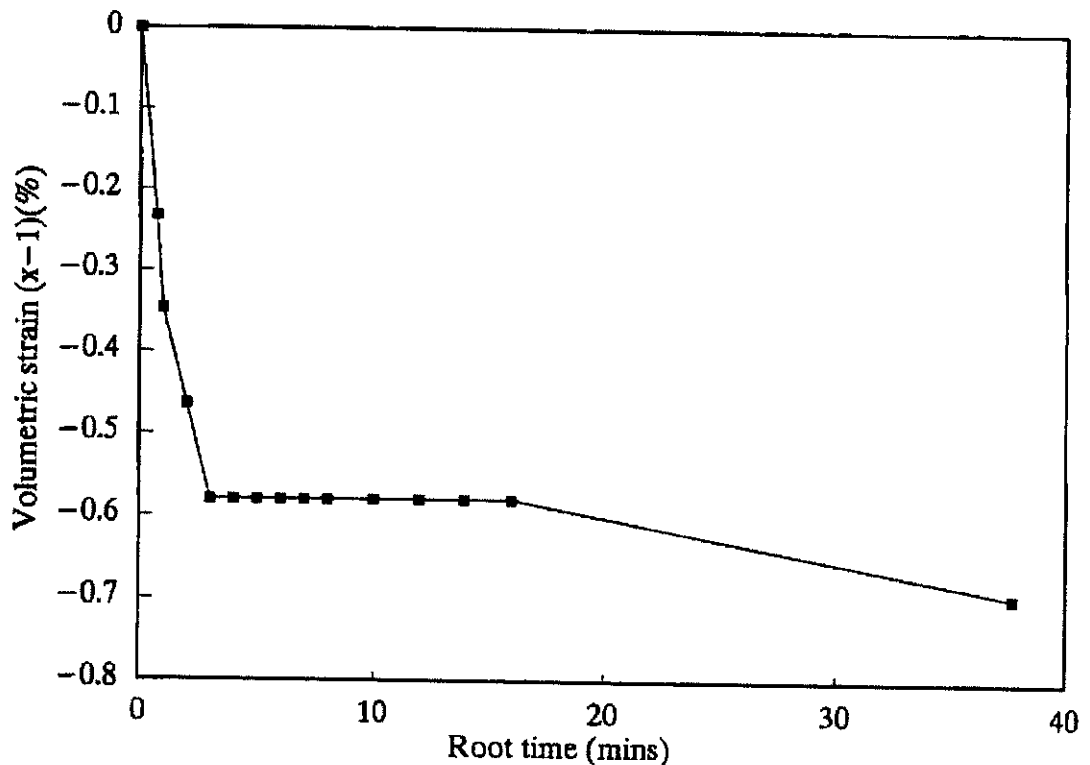
description: Firm brown sand with
(visual) pockets of light grey clay
initial and final m/c (%): 23 24
initial bulk density (Mg/cu.m): 2.02
initial dry density (Mg/cu.m): 1.65
height and diameter (mm): 76 38

SATURATION STAGE

cell and back pressure (kPa): 310 300
B value: 0.98

CONSOLIDATION STAGE

cell and back pressure (kPa): 340 300
effective consolidation pressure (kPa): 40
base, side, top drainage y y y



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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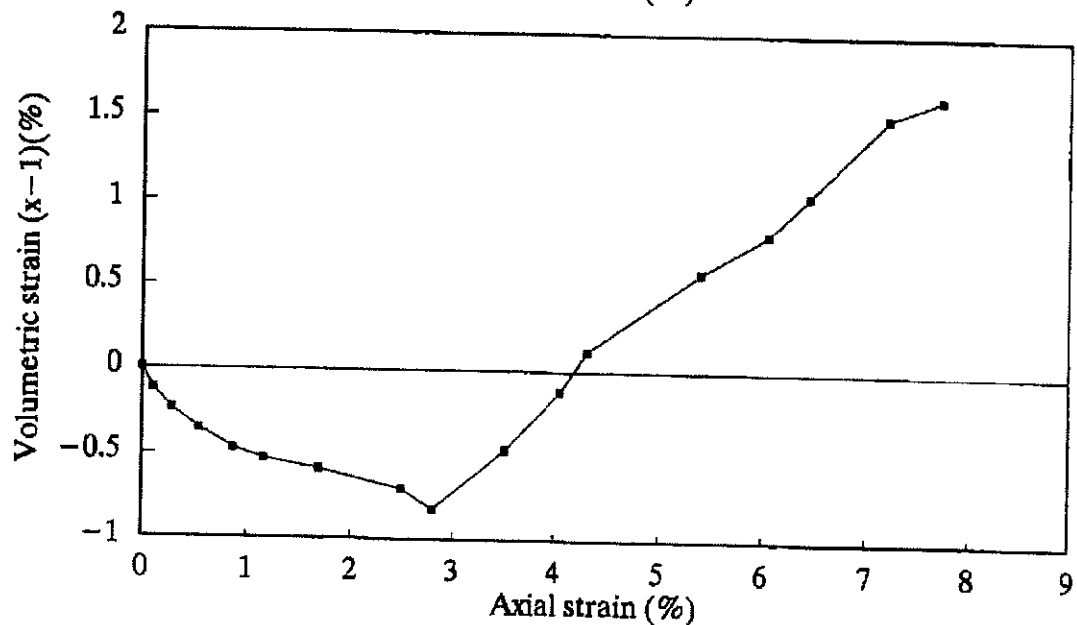
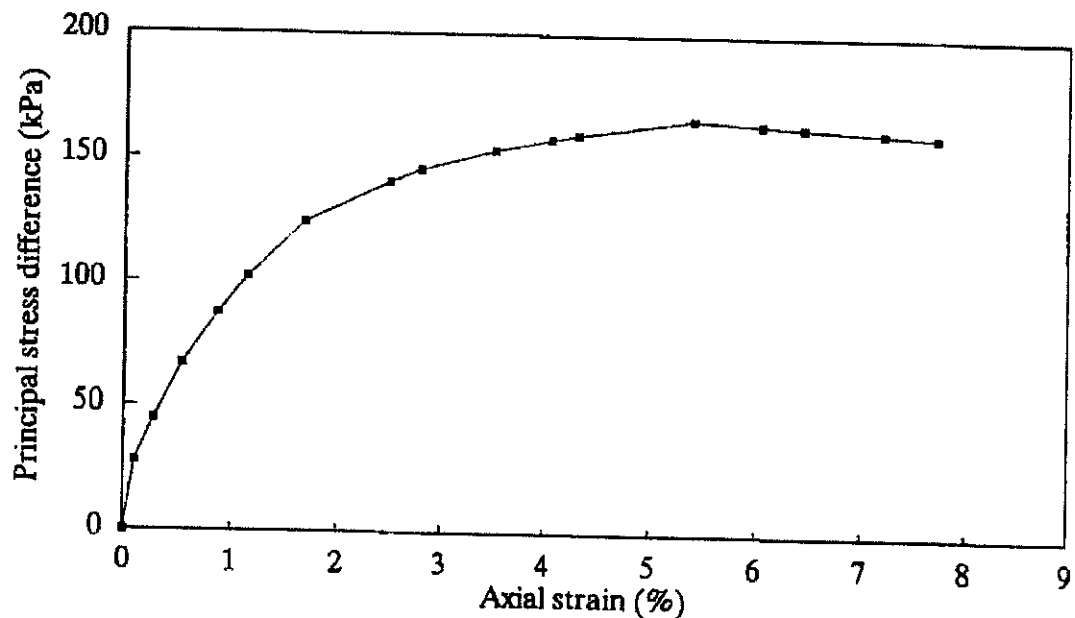
Soil Engineering Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SHEAR STAGE (TEST #1)

machine rate of strain (%/hr):	0.95
cell pressure (kPa):	340
measured max. deviator stress (kPa):	166
membrane + filter drain correction (kPa):	11.1
corrected max. deviator stress (kPa):	155
pore pressure at failure (kPa):	300



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE Sample No:U1
BH Number: 2 Depth (m):4.00

SPECIMEN DETAILS (TEST #2)

description: Firm brown sand with
(visual) pockets of light grey clay
preparation: Undisturbed
orientation within original sample: Vertical
test started: 17/03/2009

TEST 2

INITIAL STAGE
type of side drains: Vertical
membrane thickness (mm): 0.3
particle density (Mg/m³): assumed 2.69
voids ratio: 0.66
degree of saturation (%): 93.9

SATURATION STAGE

method: increments of cell and back pressure
final pore water pressure (kPa): 396
final degree of saturation (%): 100.0

CONSOLIDATION STAGE

effective stress (kPa): 80
initial pore water pressure (kPa): 369
final pore water pressure (kPa): 300
pore pressure dissipation (%): 100.0

SHEAR STAGE

failure criterion: maximum deviator stress (kPa)
cell pressure (kPa): 380
initial pore water pressure (kPa): 300
rate of strain (mm/min): 0.012
strain at failure (%): 5.67
volumetric strain at failure (%): 2.16
eff. major principal stress (kPa): 323
eff. minor principal stress (kPa): 80
time to peak dev. stress (min): 355

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

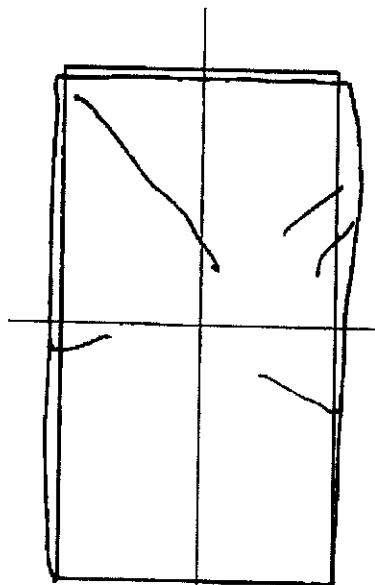
Job name: 41 HIGHGATE Sample No.: U1
BH Number: 2 Depth : 4.00 (m)

SPECIMEN DETAILS

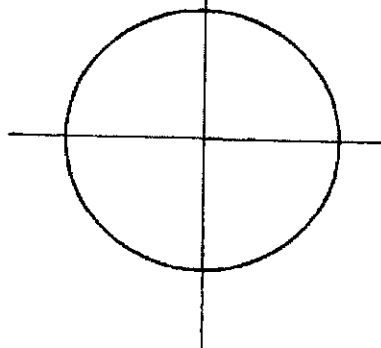
Description : Firm brown sand with
(visual) pockets of light grey clay
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation



Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SPECIMEN DETAILS (TEST #2)

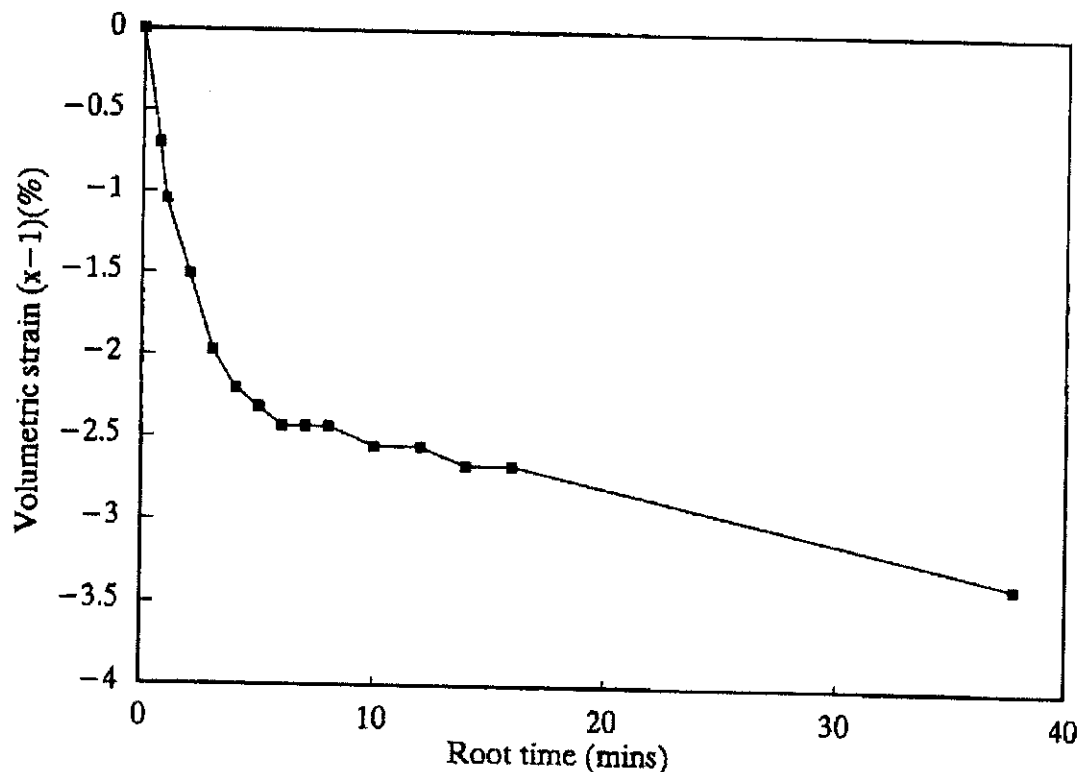
description: Firm brown sand with
(visual) pockets of light grey clay
initial and final m/c (%): 23 23
initial bulk density (Mg/cu.m): 1.99
initial dry density (Mg/cu.m): 1.62
height and diameter (mm): 76 38

SATURATION STAGE

cell and back pressure (kPa): 310 300
B value: 1

CONSOLIDATION STAGE

cell and back pressure (kPa): 380 300
effective consolidation pressure (kPa): 80
base, side, top drainage y y y



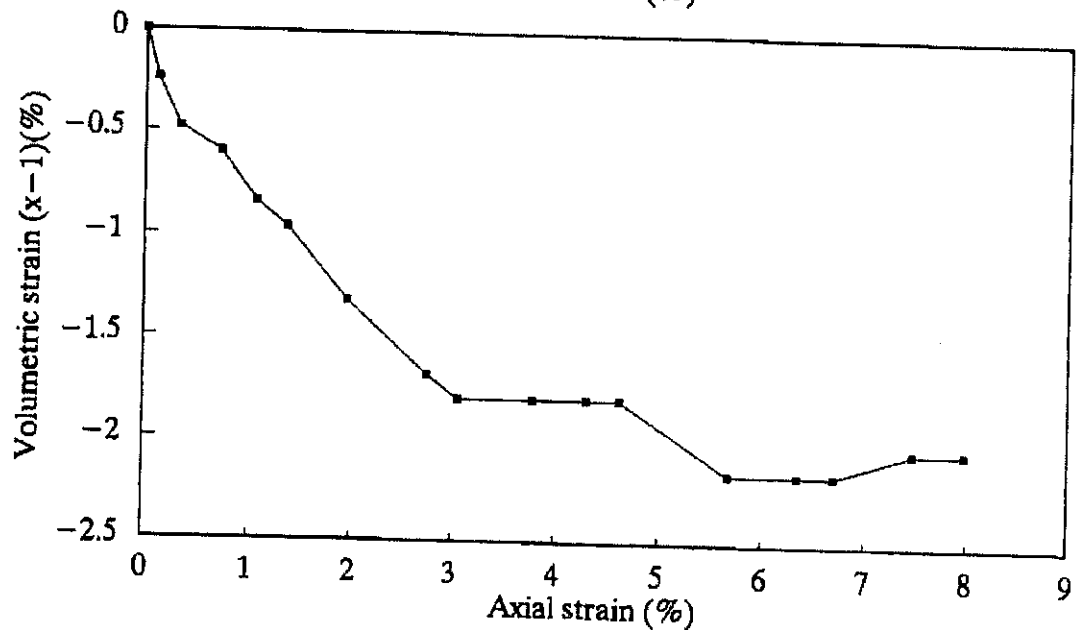
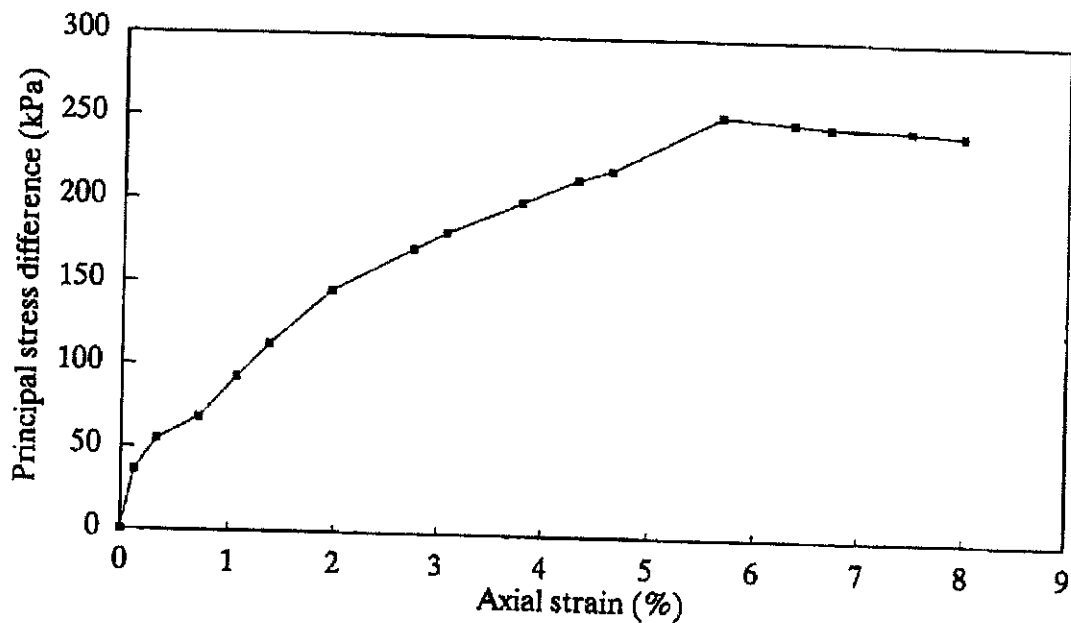
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SHEAR STAGE (TEST #2)

machine rate of strain (%/hr):	0.95
cell pressure (kPa):	380
measured max. deviator stress (kPa):	254
membrane + filter drain correction (kPa)	11.1
corrected max. deviator stress (kPa):	243
pore pressure at failure (kPa):	300



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

Job Name: 41 HIGHGATE Sample No:U1
BH Number: 2 Depth (m):4.00

SPECIMEN DETAILS (TEST #3)

description: Firm brown sand with
(visual) pockets of light grey clay
preparation: Undisturbed
orientation within original sample: Vertical
test started: 17/03/2009

TEST 3

INITIAL STAGE
type of side drains: Vertical
membrane thickness (mm): 0.3
particle density (Mg/m^3): assumed 2.69
voids ratio: 0.64
degree of saturation (%): 96.9

SATURATION STAGE

method: increments of cell and back pressure
final pore water pressure (kPa): 399
final degree of saturation (%): 99.0

CONSOLIDATION STAGE

effective stress (kPa): 160
initial pore water pressure (kPa): 449
final pore water pressure (kPa): 300
pore pressure dissipation (%): 100.0

SHEAR STAGE

failure criterion: maximum deviator stress (kPa)
cell pressure (kPa): 460
initial pore water pressure (kPa): 300
rate of strain (mm/min): 0.012
strain at failure (%): 9.65
volumetric strain at failure (%): 1.45
eff. major principal stress (kPa): 583
eff. minor principal stress (kPa): 160
time to peak dev. stress (min): 603

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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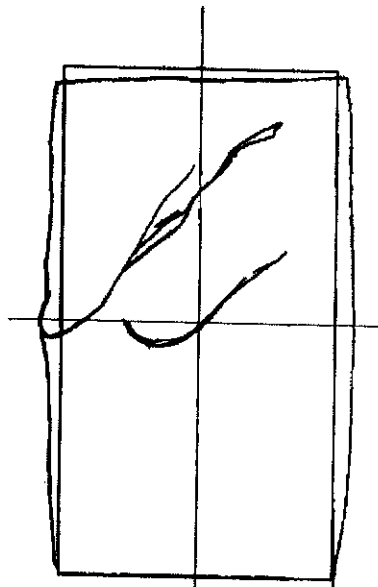
Job name: 41 HIGHGATE Sample No.: U1
BH Number: 2 Depth : 4.00 (m)

SPECIMEN DETAILS

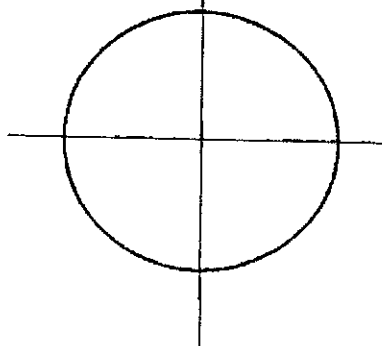
Description : Firm brown sand with
(visual) pockets of light grey clay
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation



Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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Survey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SPECIMEN DETAILS (TEST #3)

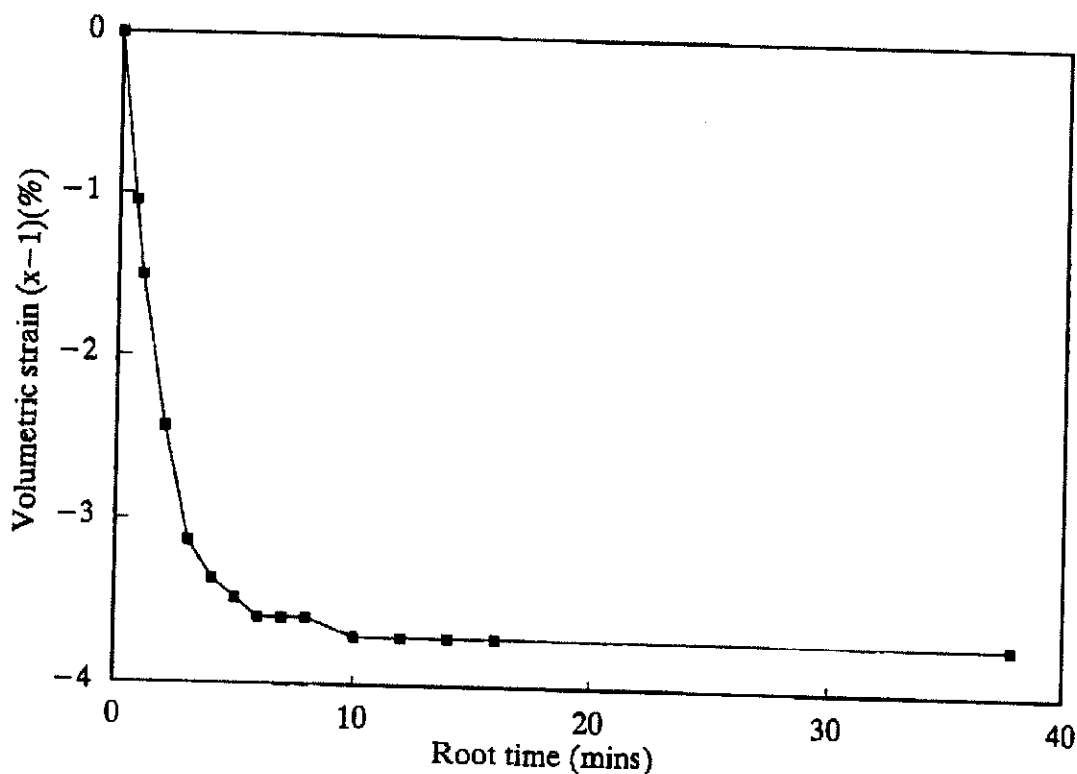
description: Firm brown sand with
(visual) pockets of light grey clay
initial and final m/c (%): 23 22
initial bulk density (Mg/cu.m): 2.02
initial dry density (Mg/cu.m): 1.64
height and diameter (mm): 76 38

SATURATION STAGE

cell and back pressure (kPa): 310 300
B value: 0.99

CONSOLIDATION STAGE

cell and back pressure (kPa): 460 300
effective consolidation pressure (kPa): 160
base, side, top drainage y y y



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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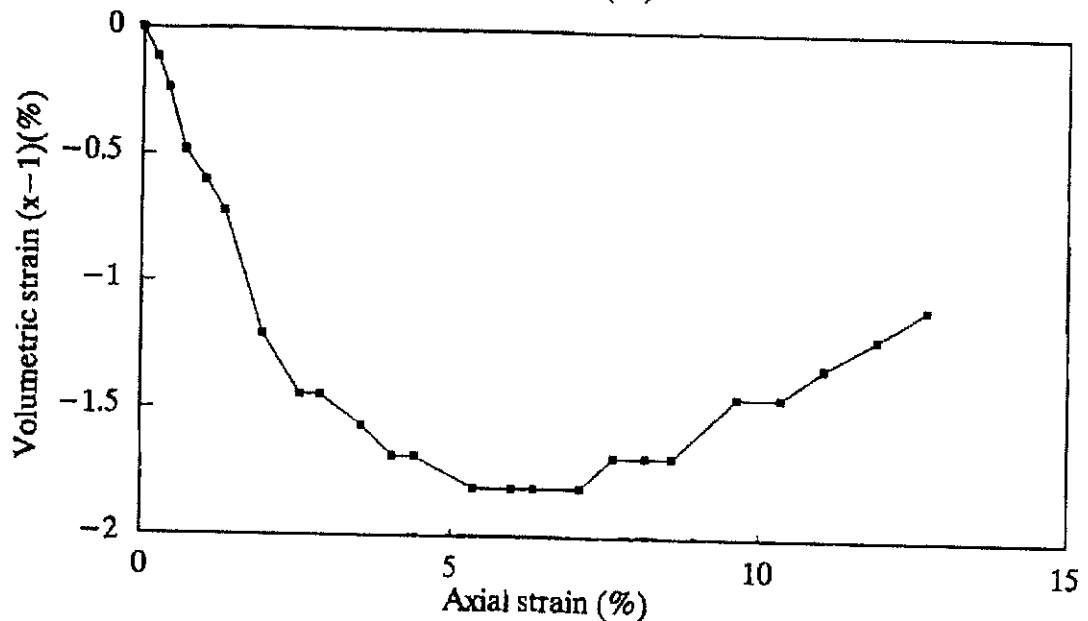
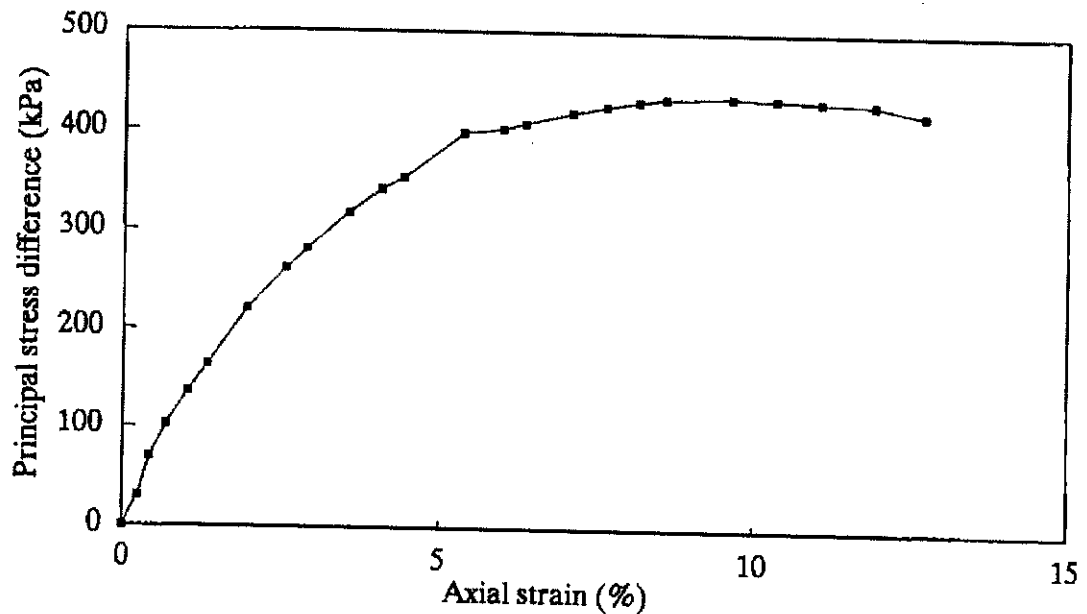
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00

SHEAR STAGE (TEST #3)

machine rate of strain (%/hr):	0.95
cell pressure (kPa):	460
measured max. deviator stress (kPa):	436
membrane + filter drain correction (kPa)	12.2
corrected max. deviator stress (kPa):	423
pore pressure at failure (kPa):	300



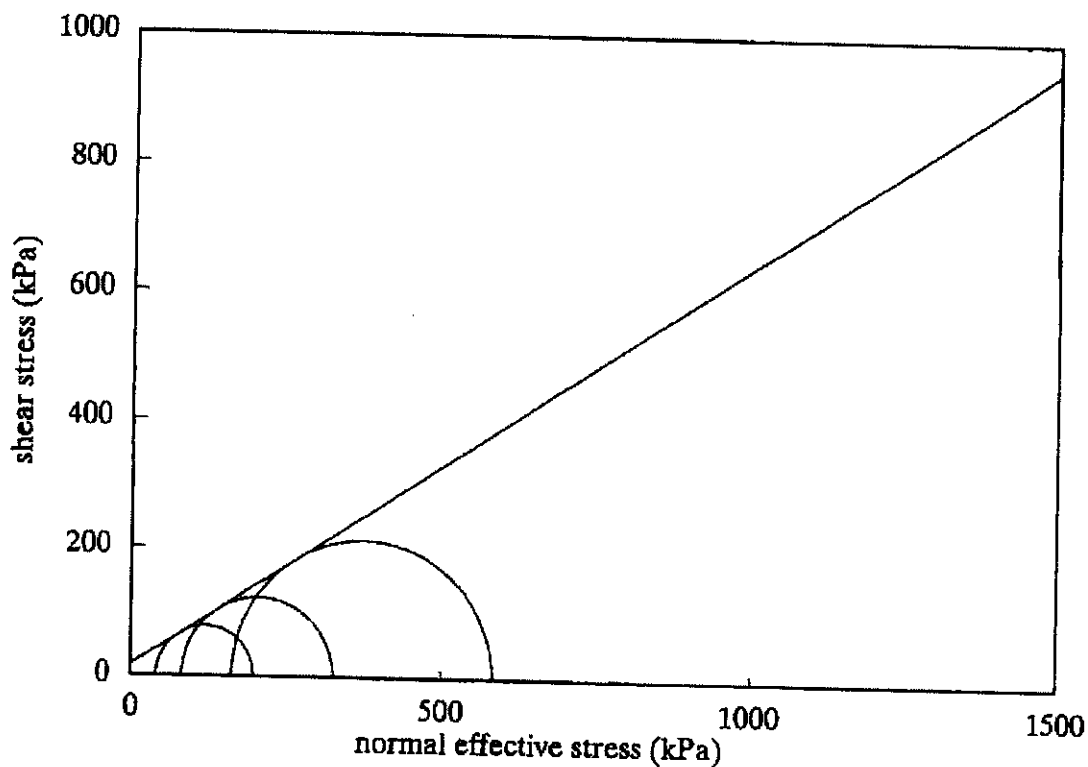
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

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Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00



SUMMARY

At maximum principal stress difference:

	#1	#2	#3
cell pressure (kPa)	340	380	460
deviator stress (kPa)	155	243	423
pore pressure (kPa)	300	300	300

Effective strength parameters:

effective cohesion intercept (kPa)	17.0
effective angle of friction (degrees)	32.0

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT