AGS CHECKING PROCEDURE
&
COMMON MISTAKE IN AGS

24 April 2018

Geological & Underground Projects Department (GUPD)

Content

- Types of AGS Errors
- AGS Checking procedures
- Guidelines on naming of submission files for SI works
- Examples of Common Mistakes

Types of AGS Errors

- Data Format Error (Step 1)
- Data Incompleteness (Step 2, Step 3)
- Data Integrity Error (Step 4)

AGS Checking Procedure

No	Process of AGS checking	Remark
1	Compliance with AGS Format - 25 Rules (Pg A2/1 to A2/5)	By software (AGS checker log) (whether AGS files followed the rules)
2	Data completeness Groups (Pg A1/2 to A1/29)	Visual inspection of data from PDF report and relevant Groups in electronic file AGS. (AGS checker log)
3	Data completeness Headings (Pg A1/2 to A1/29)	Visual inspection of data from PDF report and relevant Headings in electronic file AGS. (AGS checker log)
4	Data validation (Pg A3/1 to A3/38)	By Software (Data type, Units, Lookup Lists) (AGS Data Import log, Lookup List Check Tool log)

Guidelines on naming of submission files for SI works

Building and Construction Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.

Our Ref : BCA SGO 003/2012

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21 January 2013

See **Distribution List**

Dear Sir/Madam

IMPLEMENTATION OF SITE INVESTIGATION DATA IN STANDARDISED ELECTRONIC FORMAT

Presently, it is not common for site investigation (SI) data to be prepared and submitted in electronic format. The BCA's Singapore Geological Office (SGO) has therefore initiated and prepared a standardised electronic format which is based on the needs and practices in Singapore. This is to enable and facilitate the ease and seamless transfer, interchange, storage, retrieval, sharing and use of SI data in a standardised electronic format. Last year, BCA held a series of dialogue sessions with government agencies and site investigation firms on the standardization of SI data in electronic format. SGO is pleased to inform the industry that the '*Guidelines on Electronic Transfer for Site Investigation* Data' which covers Singapore first standardised electronic file format protocol AGS(SG) for the geological, geotechnical, geo-environmental, geophysical field and laboratory testing data is ready and can be downloaded from the BCA website at the following link: http://www.bca.gov.sg/StructuralPlan/others/Electronic_transfer_SI_data.pdf.

2 We wish to inform the industry that the submission of SI data in the AGS(SG) electronic format will be a requirement **with effective from 1st July 2013 for all new projects**. An example on the labelling requirements of the electronic files for the Site Investigation report and data file in AGS(SG) format is shown in Annex A.

3 I would appreciate it if you could disseminate the contents of this letter to your members.

Yours faithfully

YANG KIN SENG
DIRECTOR
BUILDING ENGINEERING DIVISION
for COMMISSIONER OF BUILDING CONTROL
BUILDING AND CONSTRUCTION AUTHORITY

ANNEX A

An example of a submission format for Site Investigation (SI) report:

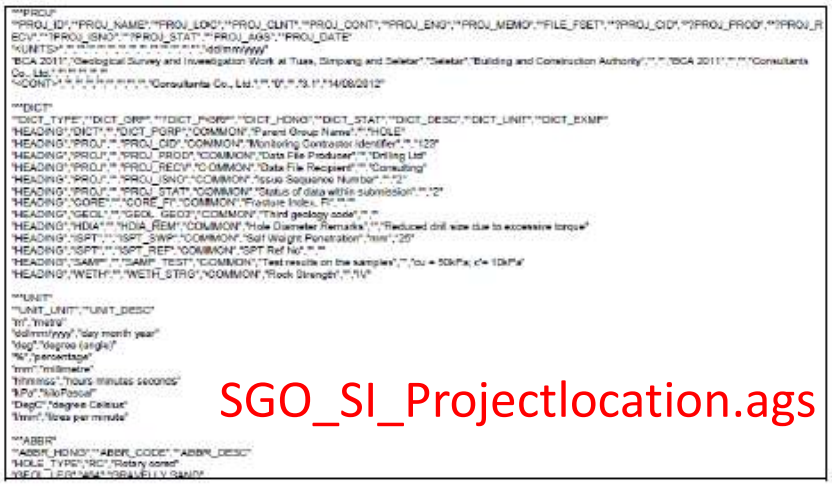
a) Site Investigation report (pdf format)

SI Project Report Cover Page

SGO_SI_Projectlocation.pdf

Example of labelling of SI report file: **SGO_SI_XXXXX.pdf**

b) Site Investigation data in AGS(SG) format
(to be appended as an Annex of SI report)



SGO_SI_Projectlocation.ags

Example of labelling of AGS data file: **SGO_SI_XXXXX.ags**

Note: All SI reports & related documents should be labelled as '*SGO_SI*' in the prefix and XXXXX refer to project name or project site location.

Example of AGS Checker log file

```
gINT V8i SS1 AGS Checker
Version 08.30.03.187 (31/5/2013 4:24:50 PM)

7/8/2017 4:08:57 PM (1 files)
ERROR = Broke a specified AGS rule.
WARNING = Condition that could compromise data quality.
FYI = For Your Information only.
      Unnecessary or redundant data or missing, non-critical, descriptive data.
*****************************************

File:  c:\users\user\desktop\sgo_si_no. 66 woo mon chew road.ags (1 of 1)
Date:  7/8/2017 4:08:53 PM
Size:  14,547 bytes
Number of Lines:  193

File AGS Version: 3.1

SUMMARY:  No problems found in file.
*****************************************
```

Example of completed files of SI reports (PDF, AGS, TXT)

Name	Date modified	Type	Size
SGO_SI_NO. 66 WOO MON CHEW ROAD	29/1/2018 2:34 PM	AGS File	15 KB
SGO_SI_NO. 66 WOO MON CHEW ROAD	29/1/2018 3:08 PM	Adobe Acrobat D...	2,473 KB
sgo_si_no.66 woo mon chew road_ags checker log	29/1/2018 2:34 PM	Text Document	1 KB

- SI firm shall check the AGS files before submission to QP/BCA, by generating a log file of AGS Checker_Projectlocation.txt.
- Output from checker-log files are require to be submitted to QP/BCA. Currently, about 20 % of checker-log files submitted.

Examples of Common Mistakes

Example 1:

Error in CNMT_TYPE Heading

```
"**CNMT"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SP
EC_DPTH","*CNMT_TYPE","*CNMT_TTYP","*CNMT_RESL","*CNMT_UNIT"
"<UNITS>","m","","","","m","","","",""
"BH1","2","U1","U","1","2","PH","SOLID","6.9",""
"BH1","2","U1","U","1","2","CL","SOLID","0.04","g/L"
"BH1","2","U1","U","1","2","SO3","SOLID","<0.01","%"
"BH2","2","U1","U","1","2","OMS","SOLID","<0.1","%"
```

Errors corrected

```
"**CNMT"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SP
EC_DPTH","*CNMT_TYPE","*CNMT_TTYP","*CNMT_RESL","*CNMT_UNIT"
"<UNITS>","m","","","","m","","","",""
"BH1","2","U1","U","1","2","PHS","SOLID","6.9",""
"BH1","2","U1","U","1","2","CL","SOLID","0.04","g/L"
"BH1","2","U1","U","1","2","SO3","SOLID","<0.01","%"
"BH2","2","U1","U","1","2","OMS","SOLID","<0.1","%"
```

Example 2:

Error in PREF_TDEP, POBS_TIME Heading

```
"**POBS"
"*HOLE_ID","*PREF_TDEP","*POBS_DATE","*POBS_TIME","*POBS_DEP","*PO
BS_HEAD"
"<UNITS>","m","dd/mm/yyyy","hhmmss","m","m"
"BH1","11.6m","16/06/2015","30/12/1899","5.2","99.96"
"BH11","11.6m","11/08/2015","30/12/1899","5","100.01"
"BH14","11.6m","13/06/2015","30/12/1899","5","98.91"
```

Errors corrected

```
"**POBS"
"*HOLE_ID","*PREF_TDEP","*POBS_DATE","*POBS_TIME","*POBS_DEP","*PO
BS_HEAD"
"<UNITS>","m","dd/mm/yyyy","hhmmss","m","m"
"BH1","11.6","16/06/2015","083000","5.2","99.96"
"BH11","11.6","11/08/2015"," 083000 ","5","100.01"
"BH14","11.6","13/06/2015"," 083000 ","5","98.91"
```

Example 3:

Misplaced data of HOLE_NATE, HOLE_NATN, HOLE_GL Heading

"**HOLE"
"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*?HOLE_CDL","*HOLE_FDEP","*HOLE_STAR","*HOLE_LOG","*HOLE_REM",
"*HOLE_ETRV","*HOLE_NTRV","*HOLE_LTRV","*HOLE_LETT","*HOLE_LOCX","*HOLE_LOCY","*HOLE_LOCZ","*HOLE_ENDD",
"*HOLE_BACD","*HOLE_CREW","*HOLE_ORNT","*HOLE_INCL","*HOLE_EXC","*HOLE_SHOR","*HOLE_STAB","*HOLE_DIML","*HOLE_DIMW","*HOLE_LOCM","*HOLE_LOCA","*HOLE_CLST","*?HOLE_OFFS","*?HOLE_CNGE","*?HOLE_STAT","*FILE_FSET","*?HOLE_FREC"
"<UNITS>","","m","m","m","m","m","dd/mm/yyyy","","","m","m","m","","m","m","m","dd/mm/yyyy","dd/mm/yyyy","","deg","deg","","","","m","m","","","","m","m","","","",""
"BH-1","W","","","","","28.500","22-12-2015","KK","Water standpipe (9-metre long) installed on 24 Dec 2015","","","","","21514.163","39808.946","125.470","24-12-2015","","Khokon","","","B26","","","","","","","","","","","","","","","",""
"BH-2","W","","","","","33.500","29-12-2015","KK","","","","","","21406.876","39871.620","125.900","02-01-2015","","Khokon","","","B26","","","","","","","","","","","","","","","",""

Errors corrected

"**HOLE"
"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*?HOLE_CDL","*HOLE_FDEP","*HOLE_STAR","*HOLE_LOG","*HOLE_REM",
"*HOLE_ETRV","*HOLE_NTRV","*HOLE_LTRV","*HOLE_LETT","*HOLE_LOCX","*HOLE_LOCY","*HOLE_LOCZ","*HOLE_ENDD",
"*HOLE_BACD","*HOLE_CREW","*HOLE_ORNT","*HOLE_INCL","*HOLE_EXC","*HOLE_SHOR","*HOLE_STAB","*HOLE_DIML","*HOLE_DIMW","*HOLE_LOCM","*HOLE_LOCA","*HOLE_CLST","*?HOLE_OFFS","*?HOLE_CNGE","*?HOLE_STAT","*FILE_FSET","*?HOLE_FREC"
"<UNITS>","","m","m","m","m","m","dd/mm/yyyy","","","m","m","m","","m","m","m","dd/mm/yyyy","dd/mm/yyyy","","deg","deg","","","","m","m","","","","m","m","","","",""
"BH-1","W"," 21514.163 "," 39808.946 "," 125.470 ","","28.500","22-12-2015","KK","Water standpipe (9-metre long) installed on 24 Dec 2015","","","","","21514.163","39808.946","125.470","24-12-2015","","Khokon","","","B26","","","","","","","","","","","","","","","",""
"BH-2","W"," 21406.876 "," 39871.620 "," 125.900 ","","33.500","29-12-2015","KK","","","","","","21406.876","39871.620","125.900","02-01-2015","","Khokon","","","B26","","","","","","","","","","","","","","","",""

Example 4:

Inappropriate label for SAMP_REF Heading

"**CLSS"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*CLSS_NMC","*CLSS_LL",
"*CLSS_PL","*CLSS_BDEN","*CLSS_DDEN","*CLSS_PD","*CLSS_425","*CLSS_PREP","*CLSS_SLIM","*CLSS_LS","*
CLSS_HVP","*CLSS_HVR","*CLSS_PPEN",
"*CLSS_VNPK","*CLSS_VNRM","*?CLSS_REM","*?FILE_FSET"
"<UNITS>","m","","","","m","%","%","%","Mg/m3","Mg/m3","Mg/m3","%","","%","%","kN/m2","kN/m2","kN/m2","kN/m2","k
N/m2","","",""
"BH-1","1.50","UD-1","TW","1","1.75","27","64","29","1.91","1.50","","","","","","","","","","","","","","","","","","
"BH-1","7.50","UD-2","TW","1","7.95","21","47","20","2.00","1.65","","","","","","","","","","","","","","","","","","

Errors corrected

"**CLSS"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*CLSS_NMC","*CLSS_LL",
"*CLSS_PL","*CLSS_BDEN","*CLSS_DDEN","*CLSS_PD","*CLSS_425","*CLSS_PREP","*CLSS_SLIM","*CLSS_LS","*
CLSS_HVP","*CLSS_HVR","*CLSS_PPEN",
"*CLSS_VNPK","*CLSS_VNRM","*?CLSS_REM","*?FILE_FSET"
"<UNITS>","m","","","","m","%","%","%","Mg/m3","Mg/m3","Mg/m3","%","","%","%","kN/m2","kN/m2","kN/m2","kN/m2","k
N/m2","","",""
"BH-1","1.50","TW-1","TW","1","1.75","27","64","29","1.91","1.50","","","","","","","","","","","","","","","","","","
"BH-1","7.50","TW-2","TW","1","7.95","21","47","20","2.00","1.65","","","","","","","","","","","","","","","","","","

Example 5:

Labeling of sample type in SAMP_TYPE Heading

"**ROCK"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*ROCK_PLSI","*ROCK_UCS"
"<UNITS>","m","","","","m","MN/m2","MN/m2"
"BH101","36.5","3","CR","","36.5","2.68",""
"BH101","36.5","3","CR","","36.7","","23.6"

Errors corrected

"**ROCK"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*ROCK_PLSI","*ROCK_UCS"
"<UNITS>","m","","","","m","MN/m2","MN/m2"
"BH101","36.5","CR3","C","3","36.5","2.68",""
"BH101","36.5","CR3","C","3","36.7","","23.6"

Common SAMP_TYPE

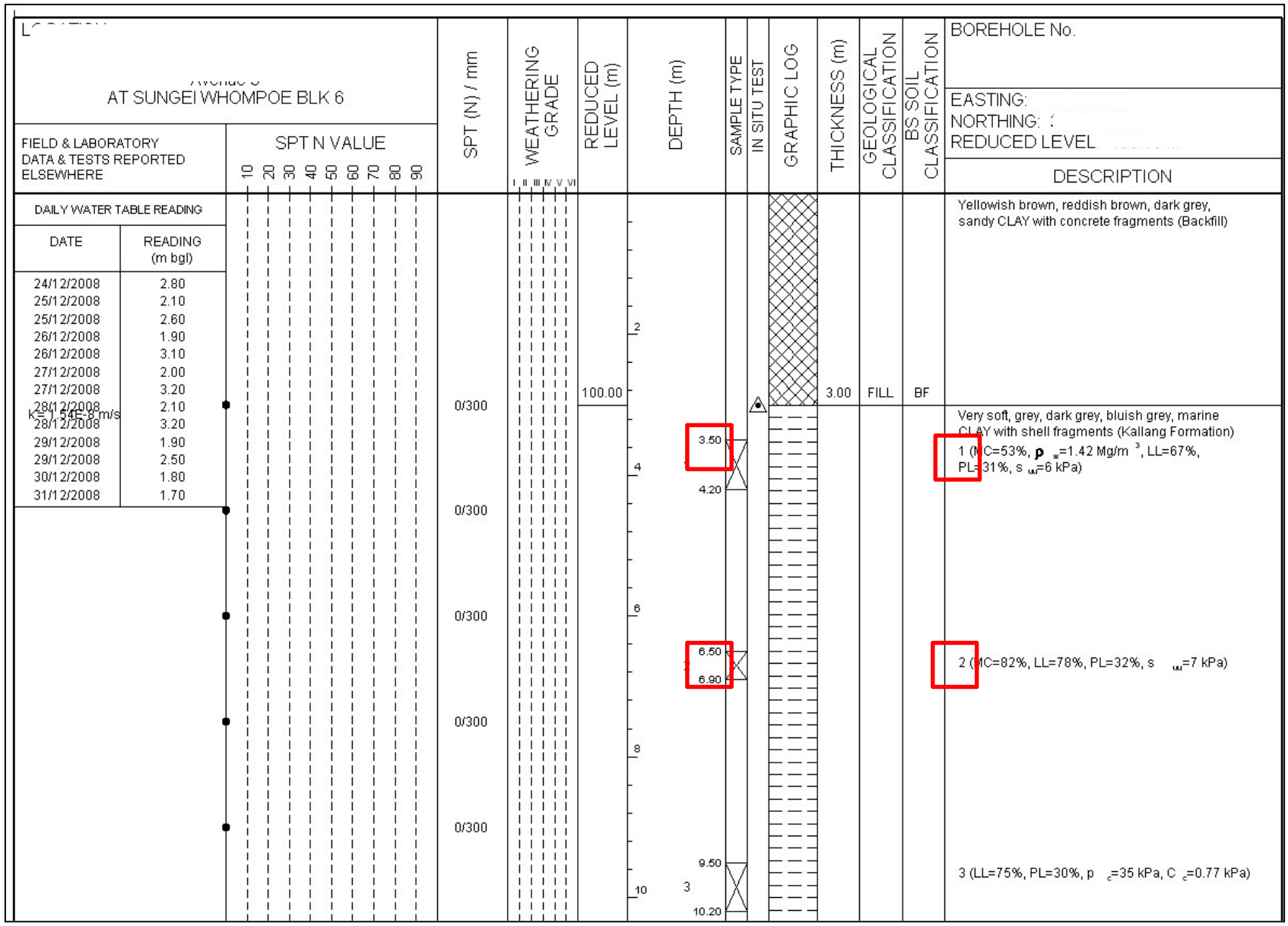
C	Core sample
M	Mazier type sample
P	Piston sample
SPTLS	Standard penetration test liner sample
TW	Thin walled push in sample

Example 6:

Labeling of sample reference in SAMP_REF Heading for SAMP group and other lab test groups

- "**SAMP"
- "*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SAMP_BASE"
- "<UNITS>","m","","","m"
- "BH146","3.5","1","TW",“4.2"
- "BH146","6.5","2","TW","6.9"

- "**CLSS"
- "*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*CLSS_NMC","*CLSS_LL","*CLSS_PL","*CLSS_BDEN","*CLSS_DDEN","*CLSS_PD"
- "<UNITS>","m","","","","m","%","%","%","Mg/m3","Mg/m3",""
- "BH146",“3.5","1","TW","",“3.5",“53",“67",“31","","",“1.42"
- "BH146","6.5","2",“TW","","6.5",“82",“78",“32","","",""


AT SUNGEI WHOMPOE BLK 6
FIELD & LABORATORY DATA & TESTS REPORTED ELSEWHERE
SPT N VALUE
10 20 30 40 50 60 70 80 90
SPT (N) / mm
WEATHERING GRADE
I II III IV V VI
REDUCED LEVEL (m)
DEPTH (m)
SAMPLE TYPE
IN SITU TEST
GRAPHIC LOG
THICKNESS (m)
GEOLOGICAL CLASSIFICATION
BS SOIL CLASSIFICATION
BOREHOLE No.
EASTING:
NORTHING:
REDUCED LEVEL
DESCRIPTION
DAILY WATER TABLE READING
DATE
READING (m bgl)
24/12/2008 2.80
25/12/2008 2.10
25/12/2008 2.60
26/12/2008 1.90
26/12/2008 3.10
27/12/2008 2.00
27/12/2008 3.20
28/12/2008 2.10
28/12/2008 3.20
29/12/2008 1.90
29/12/2008 2.50
30/12/2008 1.80
31/12/2008 1.70
k=1.54E-8 m/s
0/300
0/300
0/300
0/300
0/300
100.00
3.00
FILL
BF
3.50
4.20
6.50
6.90
9.50
10.20
Yellowish brown, reddish brown, dark grey, sandy CLAY with concrete fragments (Backfill)
Very soft, grey, dark grey, bluish grey, marine CLAY with shell fragments (Kallang Formation)
1 (MC=53%, ρ =1.42 Mg/m 3, LL=67%, PL=31%, s =6 kPa)
2 (MC=82%, LL=78%, PL=32%, s =7 kPa)
3 (LL=75%, PL=30%, p =35 kPa, C =0.77 kPa)

Example 6:

Labeling of sample reference in SAMP_REF Heading

Errors corrected

- "**SAMP"
- "*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SAMP_BASE"
- "<UNITS>","m","","","m"
- "BH146","3.5",“TW-1","TW",“4.2"
- "BH146","6.5",“TW-2","TW","6.9"

- "**CLSS"
- "*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*CLSS_NMC","*CLSS_LL","*CLSS_PL","*CLSS_BDEN","*CLSS_DDEN","*CLSS_PD"
- "<UNITS>","m","","","","m","%","%","%","Mg/m3","Mg/m3",""
- "BH146",“3.5",“TW-1","TW","1",“3.5",“53",“67",“31","","",“1.42"
- "BH146","6.5",“TW-2",“TW","2","6.5",“82",“78",“32","","",""

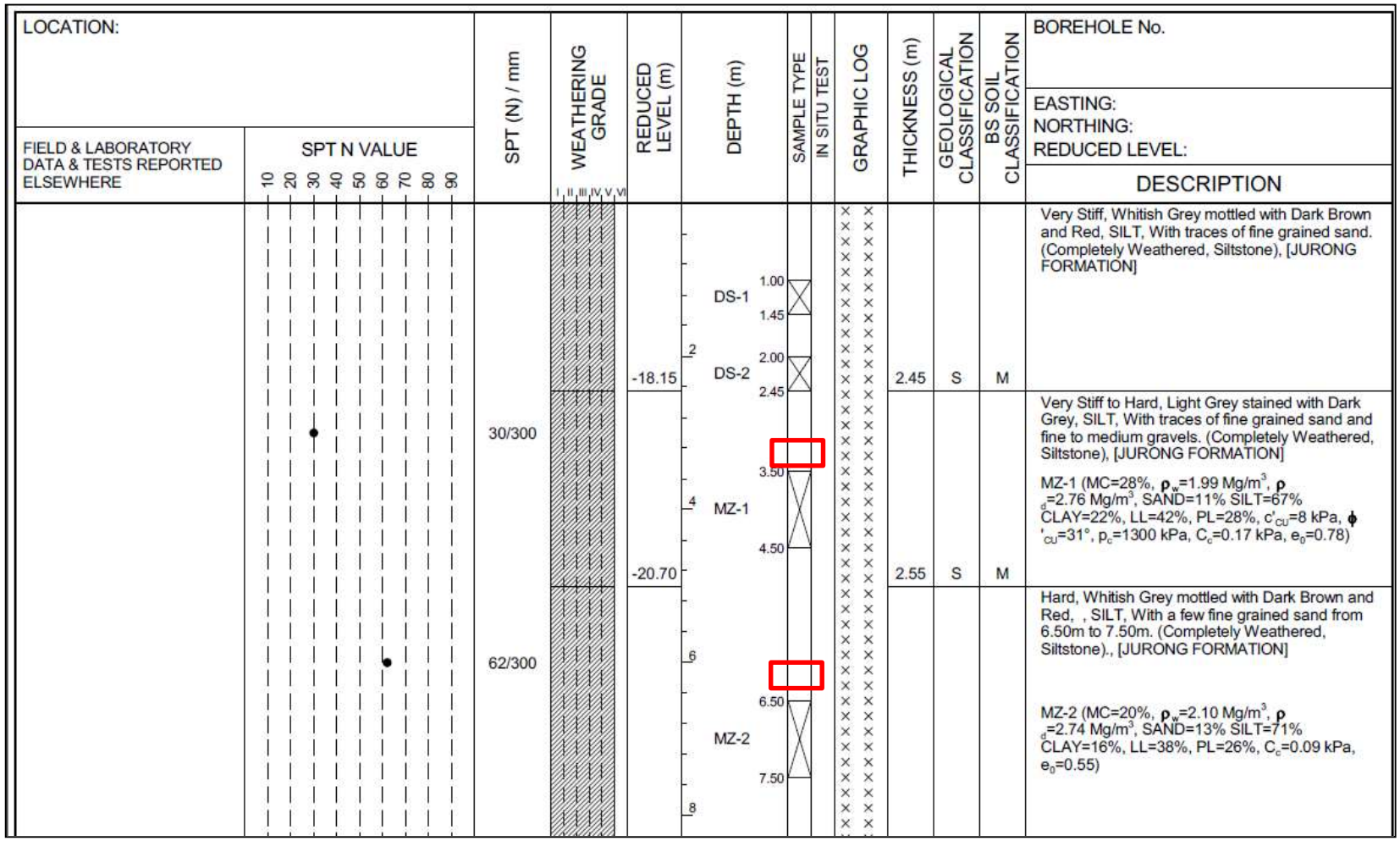
Example 7:

Missing SPT samples in SAMP Group

```
"**ISPT"
"*HOLE_ID","*ISPT_TOP","*ISPT_SEAT","*ISPT_MAIN","*ISPT_NPEN","*ISPT_NVAL","*ISPT_TYPE",
"*ISPT_INC1","*ISPT_INC2","*ISPT_INC3","*ISPT_INC4","*ISPT_INC5","*ISPT_INC6","*ISPT_PEN1",
"*ISPT_PEN2","*ISPT_PEN3","*ISPT_PEN4","*ISPT_PEN5",
"*ISPT_PEN6","*?ISPT_REF"
"<UNITS>","m","","","mm","","","","","","","","","mm","mm","mm","mm","mm","mm",""
"BH-1","3.00","6","30","450","30","S","3","3","6","6","8","10","75","75","75","75","75","75","SPT-1"
"BH-1","6.00","5","62","450","62","S","2","3","8","16","18","20","75","75","75","75","75","75","SPT-2"
```

```
"**SAMP"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SAMP_BASE","*SAMP_REM"
"<UNITS>","m","","","m",""
"BH-1","1.00","DS-1","D","1.45",""
"BH-1","2.00","DS-2","D","2.45",""
"BH-1","3.50","MZ-1","M","4.50","REC=86/100"
"BH-1","6.50","MZ-2","M","7.50","REC=60/100"
```

"BH-1", “3.00", "SPT-1", "SPTLS", “3.45"
"BH-1", “6.00", "SPT-2", "SPTLS", “6.45"


LOCATION:
FIELD & LABORATORY DATA & TESTS REPORTED ELSEWHERE
SPT N VALUE
10 20 30 40 50 60 70 80 90
SPT (N) / mm
WEATHERING GRADE
I II III IV V VI
REDUCED LEVEL (m)
DEPTH (m)
SAMPLE TYPE
IN SITU TEST
GRAPHIC LOG
THICKNESS (m)
GEOLOGICAL CLASSIFICATION
BS SOIL CLASSIFICATION
BOREHOLE No.
EASTING:
NORTHING:
REDUCED LEVEL:
DESCRIPTION
-18.15
-20.70
DS-1
DS-2
MZ-1
MZ-2
1.00
1.45
2.00
2.45
3.50
4.50
6.50
7.50
2
4
6
8
30/300
62/300
2.45
2.55
S
M
Very Stiff, Whitish Grey mottled with Dark Brown and Red, SILT, With traces of fine grained sand. (Completely Weathered, Siltstone), [JURONG FORMATION]
Very Stiff to Hard, Light Grey stained with Dark Grey, SILT, With traces of fine grained sand and fine to medium gravels. (Completely Weathered, Siltstone), [JURONG FORMATION]
MZ-1 (MC=28%, ρw=1.99 Mg/m3, ρd=2.76 Mg/m3, SAND=11% SILT=67% CLAY=22%, LL=42%, PL=28%, c'CU=8 kPa, ϕ'CU=31°, pc=1300 kPa, Cc=0.17 kPa, e0=0.78)
Hard, Whitish Grey mottled with Dark Brown and Red, , SILT, With a few fine grained sand from 6.50m to 7.50m. (Completely Weathered, Siltstone)., [JURONG FORMATION]
MZ-2 (MC=20%, ρw=2.10 Mg/m3, ρd=2.74 Mg/m3, SAND=13% SILT=71% CLAY=16%, LL=38%, PL=26%, Cc=0.09 kPa, e0=0.55)

Example 8:

SPT N values missing in ISPT_NAVL Field for N=100

"**ISPT"
"*HOLE_ID","*ISPT_TOP","*ISPT_SEAT","*ISPT_MAIN","*ISPT_NPEN","*ISPT_NVAL","*ISPT_REP","*ISPT_CAS","*ISPT_WAT","*ISPT_TYPE","*ISPT_REM","*ISPT_INC1","*ISPT_PEN1","*ISPT_INC2","*ISPT_PEN2","*ISPT_INC3","*ISPT_PEN3","*ISPT_INC4","*ISPT_PEN4",
"*ISPT_INC5","*ISPT_PEN5","*ISPT_INC6","*ISPT_PEN6","*?ISPT_SWP"
"<UNITS>","m","","","mm","","","m","m","","","","mm","","mm","","mm","","mm","","mm","","mm","mm"
"BH1C5","102.000","25.0","100","160.0","","100 (25 for 60mm/63,37 for 25mm)","","","S","","25.0","60.0","","","63.0","75.0","37.0","25.0","","","","","",""
"BH1C5","105.000","25.0","100","170.0","","100 (25 for 60mm/55,45 for 35mm)","","","S","","25.0","60.0","","","55.0","75.0","45.0","35.0","","","","","",""
"BH1C5","108.000","25.0","100","150.0","","100 (25 for 60mm/69,31 for 15mm)","","","S","","25.0","60.0","","","69.0","75.0","31.0","15.0","","","","","",""

Errors corrected

"**ISPT"
"*HOLE_ID","*ISPT_TOP","*ISPT_SEAT","*ISPT_MAIN","*ISPT_NPEN","*ISPT_NVAL","*ISPT_REP","*ISPT_CAS","*ISPT_WAT","*ISPT_TYPE","*ISPT_REM","*ISPT_INC1","*ISPT_PEN1","*ISPT_INC2","*ISPT_PEN2","*ISPT_INC3","*ISPT_PEN3","*ISPT_INC4","*ISPT_PEN4",
"*ISPT_INC5","*ISPT_PEN5","*ISPT_INC6","*ISPT_PEN6","*?ISPT_SWP"
"<UNITS>","m","","","mm","","","m","m","","","","mm","","mm","","mm","","mm","","mm","","mm","mm"
"BH1C5","102.000","25.0","100","160.0"“100“,"100 (25 for 60mm/63,37 for 25mm)","","","S","","25.0","60.0","","","63.0","75.0","37.0","25.0","","","","","",""
"BH1C5","105.000","25.0","100","170.0"“100",,"100 (25 for 60mm/55,45 for 35mm)","","","S","","25.0","60.0","","","55.0","75.0","45.0","35.0","","","","","",""
"BH1C5","108.000","25.0","100","150.0"“100",,"100 (25 for 60mm/69,31 for 15mm)","","","S","","25.0","60.0","","","69.0","75.0","31.0","15.0","","","","","",""

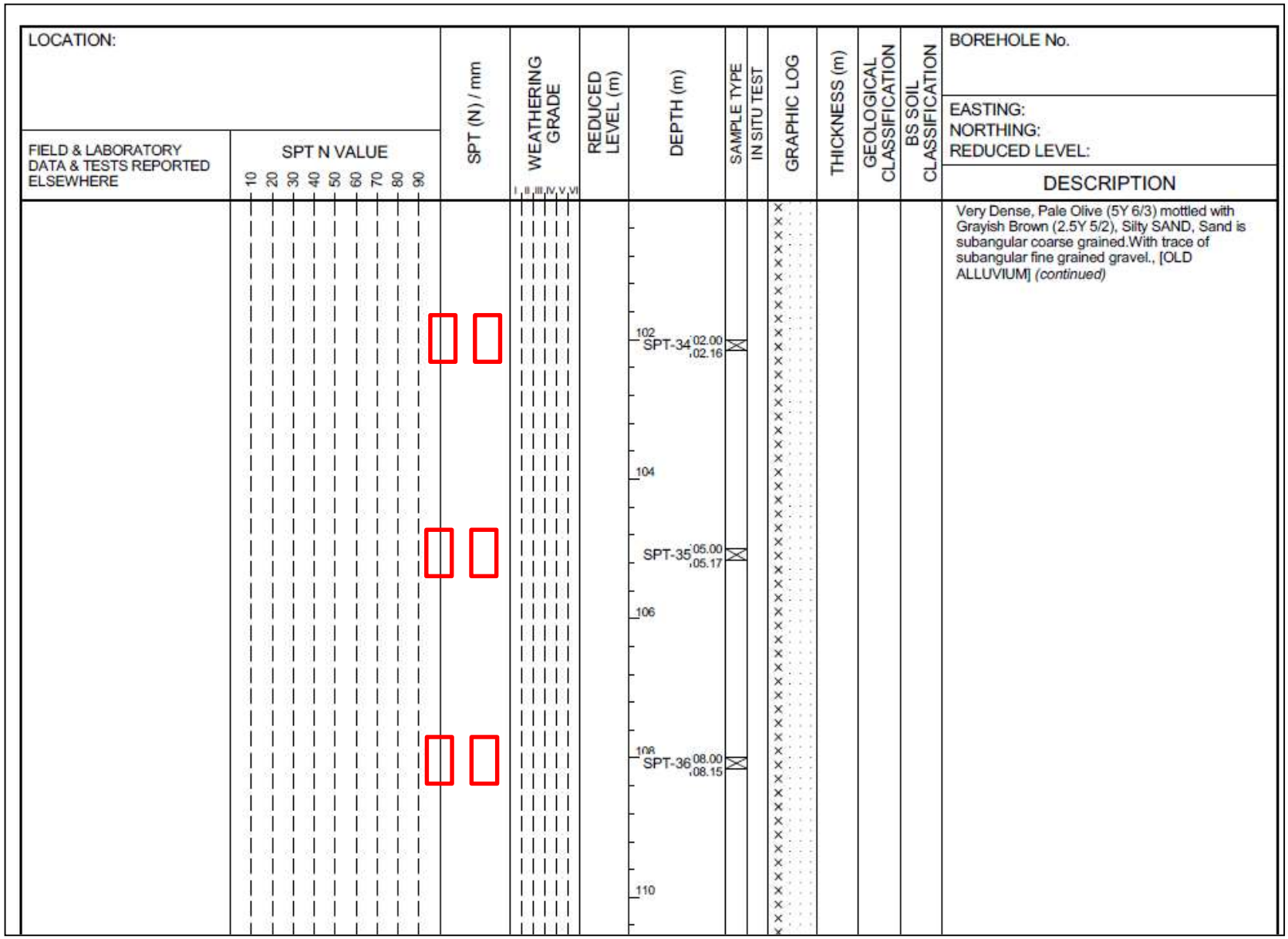
Example 8:

SPT N values missing in ISPT_NAVL Field for N=100

"**ISPT"
"*HOLE_ID","*ISPT_TOP","*ISPT_SEAT","*ISPT_MAIN","*ISPT_NPEN","*ISPT_NVAL","*ISPT_REP","*ISPT_CAS","*ISPT_WAT","*ISPT_TYPE","*ISPT_REM","*ISPT_INC1","*ISPT_PEN1","*ISPT_INC2","*ISPT_PEN2","*ISPT_INC3","*ISPT_PEN3","*ISPT_INC4","*ISPT_PEN4",
"*ISPT_INC5","*ISPT_PEN5","*ISPT_INC6","*ISPT_PEN6","*?ISPT_SWP"
"<UNITS>","m","","","mm","","","m","m","","","","mm","","mm","","mm","","mm","","mm","","mm","mm"
"BH1C5","102.000","25.0","100","160.0","","100 (25 for 60mm/63,37 for 25mm)","","","S","","25.0","60.0","","","63.0","75.0","37.0","25.0","","","","","",""
"BH1C5","105.000","25.0","100","170.0","","100 (25 for 60mm/55,45 for 35mm)","","","S","","25.0","60.0","","","55.0","75.0","45.0","35.0","","","","","",""
"BH1C5","108.000","25.0","100","150.0","","100 (25 for 60mm/69,31 for 15mm)","","","S","","25.0","60.0","","","69.0","75.0","31.0","15.0","","","","","",""

Errors corrected

"**ISPT"
"*HOLE_ID","*ISPT_TOP","*ISPT_SEAT","*ISPT_MAIN","*ISPT_NPEN","*ISPT_NVAL","*ISPT_REP","*ISPT_CAS","*ISPT_WAT","*ISPT_TYPE","*ISPT_REM","*ISPT_INC1","*ISPT_PEN1","*ISPT_INC2","*ISPT_PEN2","*ISPT_INC3","*ISPT_PEN3","*ISPT_INC4","*ISPT_PEN4",
"*ISPT_INC5","*ISPT_PEN5","*ISPT_INC6","*ISPT_PEN6","*?ISPT_SWP"
"<UNITS>","m","","","mm","","","m","m","","","","mm","","mm","","mm","","mm","","mm","","mm","mm"
"BH1C5","102.000","25.0","100","160.0"“100“,"100 (25 for 60mm/63,37 for 25mm)","","","S","","25.0","60.0","","","63.0","75.0","37.0","25.0","","","","","",""
"BH1C5","105.000","25.0","100","170.0"“100",,"100 (25 for 60mm/55,45 for 35mm)","","","S","","25.0","60.0","","","55.0","75.0","45.0","35.0","","","","","",""
"BH1C5","108.000","25.0","100","150.0"“100",,"100 (25 for 60mm/69,31 for 15mm)","","","S","","25.0","60.0","","","69.0","75.0","31.0","15.0","","","","","",""


LOCATION:
FIELD & LABORATORY DATA & TESTS REPORTED ELSEWHERE
SPT N VALUE
10 20 30 40 50 60 70 80 90
SPT (N) / mm
WEATHERING GRADE
I II III IV V VI
REDUCED LEVEL (m)
DEPTH (m)
SAMPLE TYPE
IN SITU TEST
GRAPHIC LOG
THICKNESS (m)
GEOLOGICAL CLASSIFICATION
BS SOIL CLASSIFICATION
BOREHOLE No.
EASTING:
NORTHING:
REDUCED LEVEL:
DESCRIPTION
102
SPT-34 02.00 ,02.16
104
SPT-35 05.00 ,05.17
106
108
SPT-36 08.00 ,08.15
110
Very Dense, Pale Olive (5Y 6/3) mottled with Grayish Brown (2.5Y 5/2), Silty SAND, Sand is subangular coarse grained.With trace of subangular fine grained gravel., [OLD ALLUVIUM] (continued)

Example 9:

- (1) **Simplified Geology code** of GEOL_GEOL according to TR26:2010 (Spring) for **geotechnical logs**
- (2) **Lithology code** (soil and rock material) of GEOL_GEOL2; and
- (3) **Stratigraphic code** of GEOL_GEOL3 comply with *Guidelines for Electronic Transfer of Site Investigation Data* (2013)

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL",
"*GEOL_GEO2","*?GEOL_GEO3"
"<UNITS>","m","m","","","","","",""
"BH-21E23","0.00","2.00","Very soft, greenish grey, fine to coarse sandy CLAY with shell fragments. (KALLANG FORMATION)","203","M","CS","Km"
"BH-21E23","2.00","3.00","Medium stiff to stiff, light grey mottled yellowish brown, fine to coarse sandy SILT (Completely weathered tuff, JURONG FORMATION)","303","S","MS","J"

"BH-21E23","5.10","8.10","Moderately strong to strong, dark grey, moderately weathered SILTSTONE with thickly bedded to thinly laminated with light grey tuff and mudstone. Bedding plane~50°. Two (2) sets of prominent joints: J1=40° and J2=60°~70°, which are very close to closely spaced (JURONG FORMATION). ","802","S","SI","J"

Example 10:

- (1) **Simplified Geology code** of GEOL_GEOL according to TR26:2010 (Spring) for **geotechnical logs**
- (2) **Lithology code** (soil and rock material) of GEOL_GEOL2; and
- (3) **Stratigraphic code** of GEOL_GEOL3 comply with *Guidelines for Electronic Transfer of Site Investigation Data* (2013)

Errors corrected

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL",
"*GEOL_GEO2","*?GEOL_GEO3"
"<UNITS>","m","m","","","","","",""
"BH-21E23","0.00","2.00","Very soft, greenish grey, fine to coarse sandy CLAY with shell fragments. (KALLANG FORMATION)","203","M","CS","Km"
"BH-21E23","2.00","3.00","Medium stiff to stiff, light grey mottled yellowish brown, fine to coarse sandy SILT (Completely weathered tuff, JURONG FORMATION)","303","S(V)","MS","Jac"

"BH-21E23","5.10","8.10","Moderately strong to strong, dark grey, moderately weathered SILTSTONE with thickly bedded to thinly laminated with light grey tuff and mudstone. Bedding plane~50°. Two (2) sets of prominent joints: J1=40° and J2=60°~70°, which are very close to closely spaced (JURONG FORMATION). ","802","S(III)","SI","Jac"

Based on Euro Code, mass weathering grade will be (0 to 5)

Example 11:
Errors in GEOL_GEOL Heading

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2"
"<UNITS>","m","m","","","","“
"BH18","15","18","Dense Reddish brown spotted pink Slightly gravelly slightly Silty SAND (Dinstinctly weathered-OLD ALLUVIUM)","403","O(C)","SM"
"BH18","18","27","Dense Light gray Slightly Silty fine to medium SAND (Dinstinctly weathered-OLD ALLUVIUM)","403","O(C)","SM"
"BH18","27","30","Hard Light reddish orange motted light gray Slightly fine Sandy SILT (Partially weathered-OLD ALLUVIUM)","303","O(B)","MS"
"BH18","30","36.25","Hard Light gray motted brown Slightly fine Sandy SILT (Unweathered-OLD ALLUVIUM)","303","O(A)","MS"

Errors corrected

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2"
"<UNITS>","m","m","","","","“
"BH18","15","18","Dense Reddish brown spotted pink Slightly gravelly slightly Silty SAND (Dinstinctly weathered-OLD ALLUVIUM)","403","O(C)","SM"
"BH18","18","27","Dense Light gray Slightly Silty fine to medium SAND (Dinstinctly weathered-OLD ALLUVIUM)","403","O(C)","SM"
"BH18","27","30","Hard Light reddish orange motted light gray Slightly fine Sandy SILT (Partially weathered-OLD ALLUVIUM)","303","O(B)","MS"
"BH18","30","36.25","Hard Light gray motted brown Slightly fine Sandy SILT (Unweathered-OLD ALLUVIUM)","303","O(A)","MS"

Example 12:
Errors in GEOL_LEG, GEOL_GEOL, GEOL_GEO2 Heading

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2","*GEOL_STAT","*FILE_FSET"
"<UNITS>","m","m","","","","","","","",""
"BH 01","0","0.1","Grey, CONCRETE","CON","","","","",""
"BH 01","0.1","0.2","Dark grey, ASPHALT","AS","","","","",""
"BH 01","0.2","0.6","Loose, fine to coarse grained gravelly SAND with hard cores (Fill)","SG","","","","",""
"BH 01","0.6","2.5","Stiff to very stiff, brown and yellowish brown, sandy SILT with hard cores and debris (Kallang Formation)","MS","","","","",""
"BH 01","2.5","7","Very soft to soft, dark brown, PEATY CLAY with traces of sand and decomposed wood (Kallang Formation)","CPT","","","","",""

Errors corrected

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2","*GEOL_STAT","*FILE_FSET"
"<UNITS>","m","m","","","","","","","",""
"BH 01","0","0.1","Grey, CONCRETE","104","","CON","","",""
"BH 01","0.1","0.2","Dark grey, ASPHALT","103","","AS","","",""
"BH 01","0.2","0.6","Loose, fine to coarse grained gravelly SAND with hard cores (Fill)","404","FILL","SG","","",""
"BH 01","0.6","2.5","Stiff to very stiff, brown and yellowish brown, sandy SILT with hard cores and debris (Kallang Formation)","303","F1","MS","","",""
"BH 01","2.5","7","Very soft to soft, dark brown, PEATY CLAY with traces of sand and decomposed wood (Kallang Formation)","230","E","CPt","","",""

Example 13:

- Permeability data not in correct format

```
"**IPRM"
"*HOLE_ID","*IPRM_TOP","*IPRM_BASE","*IPRM_STG","*IPRM_TYPE","*IPRM_IPRM","*IPRM_R
EM"
"<UNITS>","m","m","","","m/s",""
"BH101","45","48","1","PKT","2.74E-08","PKT”
```

Errors corrected

```
"**IPRM"
"*HOLE_ID","*IPRM_TOP","*IPRM_BASE","*IPRM_STG","*IPRM_TYPE","*IPRM_IPRM","*IPRM_R
EM"
"<UNITS>","m","m","","","m/s",""
"BH101","45","48","1","PKT","0.0000000274","PKT”
```

LOCATION:

BOREHOLE No.

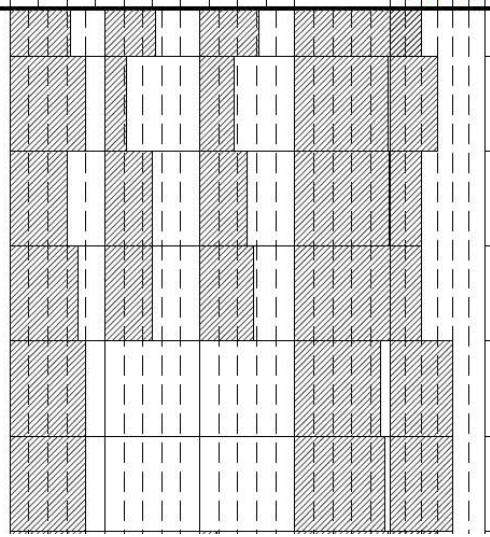
BH101

EASTING:

NORTHING:

REDUCED LEVEL: 112.15 m

FIELD & LABORATORY DATA & TESTS REPORTED ELSEWHERE



SPT (N) / mm	WEATHERING GRADE	REDUCED LEVEL (m)	DEPTH (m)	SAMPLE TYPE	IN SITU TEST	GRAPHIC LOG	THICKNESS (m)	GEOLOGICAL CLASSIFICATION	BS SOIL CLASSIFICATION	DESCRIPTION
	I II III IV V VI	71.65	CR-6 40.50				2.00	S(II)	SA	
		70.65	CR-7 41.50				1.00	S(III)	SA	Moderately strong, bedded, reddish brown, light greenish grey, fine to coarse grained SANDSTONE, moderately weathered, joint 30°,rough,undulating
		69.65	42 CR-8 42.50				1.00	S(II)	SA	Moderately strong, reddish brown, light greenish grey, fine to coarse grained SANDSTONE interbedded with Siltstone (41.8m-42.5m), slightly weathered, joint 45°,closely spaced
		68.65	CR-9 43.50				1.00	S(II)	SA	Moderately strong, bedded, reddish brown, light greenish grey, fine to coarse grained SANDSTONE interbedded with Siltstone (43.20-43.50m), slightly weathered, joint 30°, rough, undulating, wide spaced
		67.65	44 CR-10 44.50				1.00	S(IV)	SI	Moderately weak, bedded, purplish brown, light greenish grey, SILTSTONE (Jurong Formation), highly weathered, highly fracture
		66.65	CR-11 45.50				1.00	S(IV)	SA	Moderately weak,bedded, purplish brown, light greenish grey, fine to coarse grained SANDSTONE, highly weathered,highly fracture

PKT1 45.00-48.00 m
k = 2.74E-8 m/s

- Example 14:
- Weathering grade is not correctly presented
- (two weathering grades described within each drill core interval)

"**WETH"
"*HOLE_ID","*WETH_TOP","*WETH_BASE","*WETH_GRAD","*WETH_REM"
"<UNITS>","m","m","",""
"BH-21E23","2.00","3.00","V","Completely Weathered"
"BH-21E23","3.00","5.10","V","Completely Weathered"
"BH-21E23","5.10","8.10","III to II","Moderately to Slightly Weathered"

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2","*?GEOL_GEO3"
"<UNITS>","m","m","","","","","",""
"BH-21E23","2.00","3.00","Medium stiff to stiff, light grey mottled yellowish brown, fine to coarse sandy SILT with traces of fine gravels (Completely weathered tuff, JURONG FORMATION).","303","S","MS","J"
"BH-21E23","3.00","5.10","Hard, dark grey, fine to coarse sandy SILT (Completely weathered tuff, JURONG FORMATION).","301","S","M","J"
"BH-21E23","5.10","8.10","Moderately strong to strong, dark grey, SILTSTONE, moderately to slightly weathered with thickly bedded to thinly laminated with light grey tuff and mudstone. Bedding plane~50°. Two (2) sets of prominent joints (J1=40° and J2=60°~70°) are very close to closely spaced (JURONG FORMATION).","802","S","SI","J"

Example 14: Weathering grade is not correctly presented (two weathering grades described within each drill core interval)

Errors corrected

"**WETH"
"*HOLE_ID","*WETH_TOP","*WETH_BASE","*WETH_GRAD","*WETH_REM"
"<UNITS>","m","m","",""
"BH-21E23","2.00","3.00","V","Completely Weathered"
"BH-21E23","3.00","5.10","V","Completely Weathered"
"BH-21E23","5.10",“7.10","III","Moderately Weathered"
"BH-21E23",“7.10","8.10","II","Slightly Weathered"

"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG","*GEOL_GEOL","*GEOL_GEO2","*?GEOL_GEO3"
"<UNITS>","m","m","","","","","",""
"BH-21E23","2.00","3.00","Medium stiff to stiff, light grey mottled yellowish brown, fine to coarse sandy SILT with traces of fine gravels (Completely weathered tuff, JURONG FORMATION).","303","S(V)","MS","Jac"
"BH-21E23","3.00","5.10","Hard, dark grey, fine to coarse sandy SILT (Completely weathered tuff, JURONG FORMATION).","301","S(V)","M","Jac"
"BH-21E23","5.10",“7.10","Moderately strong to strong, dark grey, SILTSTONE, moderately weathered with thickly bedded to thinly laminated with light grey tuff and mudstone. Bedding plane~50°. Two (2) sets of prominent joints (J1=40° and J2=60°~70°) are very close to closely spaced (JURONG FORMATION).","802","S(III)","SI","Jac"
"BH-21E23",“7.10","8.10","Moderately strong to strong, dark grey, SILTSTONE, slightly weathered with thickly bedded to thinly laminated with light grey tuff and mudstone. Bedding plane~50°. Two (2) sets of prominent joints (J1=40° and J2=60°~70°) are very close to closely spaced (JURONG FORMATION).","802","S(II)","SI","Jac"

Example 15:

Co-ordinate and Elevation of boreholes to include in AGS. HOLE_FREC also to be included.

"**HOLE"

"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*?HOLE_CDL","*HOLE_FDEP","*HOLE_STAR","*HOLE_LOG","*HOLE_REM","*HOLE_ETRV","*HOLE_NTRV","*HOLE_LTRV","*HOLE_LETT","*HOLE_LOCX","*HOLE_LOCY","*HOLE_LOCZ","*HOLE_ENDD",

"*HOLE_BACD","*HOLE_CREW","*HOLE_ORNT","*HOLE_INCL","*HOLE_EXC","*HOLE_SHOR","*HOLE_STAB","*HOLE_DIML","*HOLE_DIMW","*HOLE_LOCM","*HOLE_LOCA","*HOLE_CLST","*?HOLE_OFFS","*?HOLE_CNGE","*?HOLE_STAT","*FILE_FSET","*?HOLE_FREC"

"<UNITS>","","m","m","m","m","m","dd/mm/yyyy","","","m","m","m","","m","m","m","dd/mm/yyyy","dd/mm/yyyy","","deg","deg","","","","m","m","","","","","","","","","","

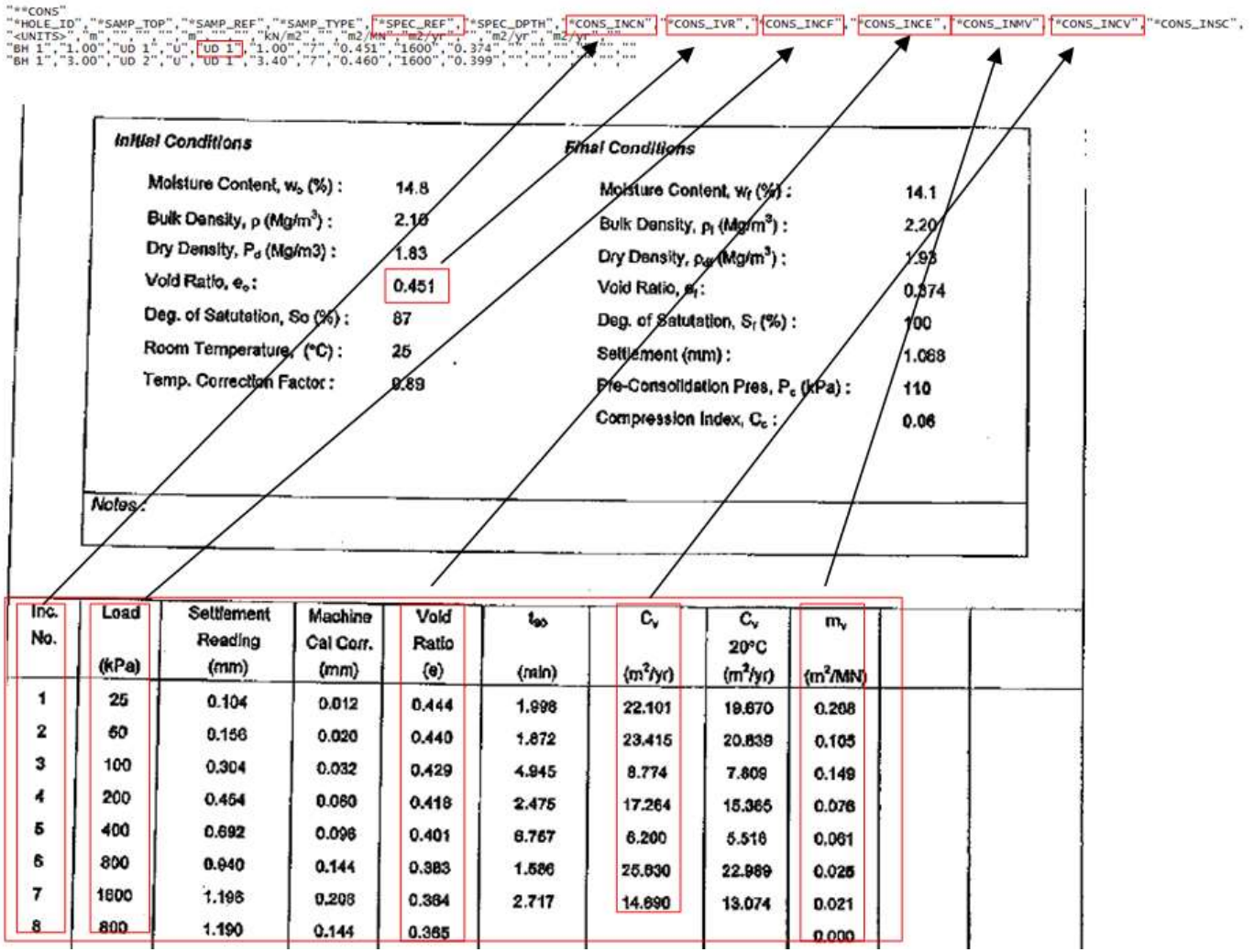
“BH1","RO","","","","","27.270","27/04/2013","","","","","","","","","","","29/04/2013","29/04/2013","THAS","180","","YBM - 2WS","","Stable during excavation","","","","","","","","","","","",""

PROJ_ID/HOLE_ID

Example 16:

Consolidation test data to be presented in AGS

The suggested the consolidation test data of each sample are mentioned in red box and point with black arrow.



```
"**CONS"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*CONS_INCN","*CONS_IVR","*CONS_INCF","*CONS_INCE","*CONS_INMV","*CONS_INCV","*CONS_INSC",
"<UNITS>","m","","","m","m","kN/m2","","m2/MN","m2/yr","","m2/yr","m2/yr","",
"BH 1","1.00","UD 1","U","UD 1","1.00","7","0.451","1600","0.374","","","","",""
"BH 1","3.00","UD 2","U","UD 1","3.40","7","0.460","1600","0.399","","","","",""
```

Initial Conditions		Final Conditions	
Moisture Content, w_o (%) :	14.8	Moisture Content, w_f (%) :	14.1
Bulk Density, ρ (Mg/m^3) :	2.16	Bulk Density, ρ_f (Mg/m^3) :	2.20
Dry Density, P_d (Mg/m3) :	1.83	Dry Density, ρ_{df} (Mg/m^3) :	1.93
Void Ratio, e_o :	0.451	Void Ratio, e_f :	0.374
Deg. of Satutation, So (%) :	87	Deg. of Satutation, S_f (%) :	100
Room Temperature, (°C) :	25	Settlement (mm) :	1.068
Temp. Correction Factor :	0.89	Pre-Consolidation Pres, P_c (kPa) :	110
		Compression Index, C_c :	0.06

Notes :

Inc. No.	Load (kPa)	Settlement Reading (mm)	Machine Cal Corr. (mm)	Void Ratio (e)	t_{90} (min)	C_v (m^2/yr)	C_v 20°C (m^2/yr)	m_v (m^2/MN)
1	25	0.104	0.012	0.444	1.998	22.101	19.670	0.268
2	50	0.156	0.020	0.440	1.872	23.415	20.839	0.105
3	100	0.304	0.032	0.429	4.945	8.774	7.809	0.149
4	200	0.454	0.060	0.416	2.475	17.264	15.365	0.076
5	400	0.692	0.096	0.401	6.757	6.200	5.516	0.061
6	800	0.940	0.144	0.383	1.586	25.630	22.969	0.025
7	1600	1.196	0.208	0.364	2.717	14.690	13.074	0.021
8	800	1.190	0.144	0.365				0.000

Example 17:Triaxial test data to be included in AGS according to the sample tested

"**TRIX"

"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF","*SPEC_DPTH","*TRIX_TESN","*TRIX_SDIA","*TRIX_MC","*TRIX_CELL","*TRIX_DEVF","*TRIX_SLEN","*TRIX_BDEN","*TRIX_DDEN","*TRIX_PWPF","*TRIX_PWPI","*?TRIX_CU","*TRIX_STRN","*TRIX_MODE"

"<UNITS>","m","","","","m","","mm","%","kN/m2","kN/m2","mm","Mg/m3","Mg/m3","kN/m2","kN/m2","kN/m2","%",""

"BH 5","24.00","UD 1","U","1","24.20","2","38.00","32.00","440.00","310.36","76.00","1.960","1.490","0.78","0.78","308.00","19.820","Plastic"

"BH 5","24.00","UD 1","U","1","24.20","1","38.00","33.00","220.00","299.7","76.00","1.940","1.460","","","","11.88","Plastic"

"BH 5","24.00","UD 1","U","2","24.20","2","38.00","32.00","440.00","310.36","76.00","1.960","1.490","","","","19.820","Plastic"

"BH 5","24.00","UD 1","U","3","24.20","3","38.00","33.00","880.00","397.99","76.00","1.940","1.460","","","","8.76","Plastic"

Suggested AGS checker programs

Suggested AGS checker programs (for your reference):

AGS Checker of gINT from Bentley.
https://www.bentley.com/en/resources/software/ags-toolkit

AGS Checker of KeyAGS4 from Keynetix.
https://communities.bentley.com/products/geotechnical1/w/wiki/50417/keyags-free-version

PS:
Web link for AGS(SG) guidelines book published by BCA
https://www1.bca.gov.sg/docs/default-source/docs-corp-regulatory/building-control/electronic_transfer_si_data.pdf?sfvrsn=c2235aea_2