# ELECTRONIC TRANSFER OF GEOTECHNICAL DATA FROM GROUND INVESTIGATIONS

## (2nd EDITION)

AGS ASSOCIATION OF GEOTECHNICAL SPECIALISTS

An Association of Geotechnical Specialists Publication

# Electronic Transfer of Geotechnical Data from Ground Investigations

# (2nd Edition)

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# FOREWORD

The product of all geotechnical investigations is data on which to base decisions on future action and develop safe and efficient designs. The scale and complexity of projects as well as pressures to undertake such work in the shortest possible time has already led to the use of computers for data preparation and analysis, although the roles of the various components of the investigation process have meant significant duplication of effort in transferring data to and from a printed interface.

This document seeks to facilitate electronic transfer and storage of data in the context of many existing but differing computer software systems, but does not aim to displace the status of the printed report. The format has been designed for use in conjunction with other proprietary database or spreadsheet systems to facilitate data transfer and should not be regarded as an independent database. By adopting the conventions which it sets out, the industry should rapidly be able to implement electronic data transfer at minimal extra initial cost and bring long term benefit to itself, its clients and the public at large.

The appearance of a Group or Field name in this document is not intended to imply that this data is required on each project or conversely to imply that more data may not be required. That is the function of the Specification for the project and this document does not replace that role.

The format which was published in 1992 has proved to be very successful in its aims and has been adopted in the recently published specification for ground investigation for use throughout the UK and by bodies in other countries who have been seeking to achieve similar objectives. This Second Edition is issued in order to ensure that it is kept up to date with developments, to embody some two years experience in making use of the format and to include some new groups and fields. The constructive comments which have been made by users of the first edition have been incorporated where considered appropriate.

The format has been shown to be robust and the amendments serve to clarify or amplify it rather than to change any fundamental concepts. This should encourage its widespread confident use throughout the industry worldwide.

Leonard Threadgold
Working Party Chairman

# Contents

## 1 INTRODUCTION

In recent years, computer technology has advanced considerably. This has resulted in computers with better facilities and larger capacities, at a cost which makes them available to even the smallest practitioners in the field of geotechnology. As a consequence, database systems have been adopted by the producers of geotechnical data for the efficient preparation and presentation of reports in printed format. Receivers who wish to make use of their own software for study and analysis of the data have generally re-entered it into their system. Clearly, the transfer of data by electronic means without the need for a printed interface would help to minimise costs, time and the potential for error. It would also encourage better use of the data. To achieve this, however, it is essential that the receiver's software can understand the format used by the producer.

It must be recognised that there has already been a proliferation of systems which differ both in form and purpose even though much of their contents are common. There is therefore an urgent need for the establishment of a common Data Interchange Format which can be accepted by all the components of the industry as being appropriate to preparation, analysis and storage. Recognition of this by the Association of Geotechnical Specialists (AGS) led to the holding of a seminar in June 1991 and subsequently to the setting up of a working party to establish and update such a format. The outcome of this work is embodied in this document.

The format has been designed to ensure that implementation in relation to existing software should require only relatively minor programming work. New systems should embody the format from inception. Once in place each system should be capable of interfacing with any other system using the same format.

In addition to the obvious benefit in relation to data transfer, the common Data Interchange Format allows both producers and receivers to use their own familiar forms and facilities and hence aids the implementation of quality assurance procedures. Storage and access to the data is rendered far more efficient and the establishment of data banks by producers, receivers and national bodies is facilitated.

## 2 SCOPE

The transmission by electronic media of most of the data currently presented in Factual Reports, including Borehole Records, Trial Pit Records, In Situ Test Results and Laboratory Test Summaries, is considered to be a realistic objective but the transmission of all data, particularly from more complex testing, is not covered by this document.

Although the ability to record the descriptive introductory elements of a report on electronic media may be considered desirable in order to provide compact storage, word processor functions such as tabulations, underlining and fonts could not be reproduced without the use of identical word processing packages by both preparer and receiver. The transmission of large bodies of text and drawings, if required, is covered by other means and is not covered by this format.

It must be remembered that the primary aim of this document is to aid the transfer and storage of data and to allow its ready manipulation by software systems. The printed copy remains the definitive document but the data presented on electronic media supplements this in a far more flexible form.

## 3 PRESENTATION

This document presents the geotechnical data interchange format, to be subsequently referred to as the AGS Format, which should be adopted in conjunction with software used for the preparation of geotechnical data, its analysis and storage. It explains the concepts which have been used in preparing the format and the way in which it can be implemented in relation to future projects. The structure of data files is outlined and examples are presented. Management of the system including Specifications, Preliminary and Final data is illustrated together with aspects such as file security and the maintenance of a single contact for the evolution of Data Dictionaries to accommodate additional requirements or new technology.

# 4 CONCEPTS

## 4.1 Base Data

In general, the files which are used should contain basic data such as exploratory hole records and the test data required to be reported by the relevant British Standards and other recognised documents and which would normally be contained within a Factual Report. Any interpreted data can be handled by the particular program being operated but this is a matter for the user rather than for any fundamental database structure.

## 4.2 File Format

The file format is intended to provide the widest possible level of acceptance and in view of this it is considered that the data should be transmissible using ASCII files, MS-DOS version 3.2 and IBM compatibility. The rules for creating Data Files are presented in Appendix 1. They have been drawn up to enable the use of the AGS Format by the simplest existing programs, in particular spreadsheets, as well as more comprehensive database systems.

## 4.3 Data Dictionary

In order to provide maximum flexibility and to allow the file formats to be more easily recognised by the non-specialist, it is considered that the Data Dictionary approach for the various elements of the database should be adopted. Such a Data Dictionary can be compatible with a wide range of existing programs and should aid the structuring of future software.

## 4.4 Groups and Fields

In order to structure the data in a consistent and logical manner it has been divided into Data Groups within which a series of Fields are defined. The Data Groups have been chosen to relate to specific elements of data which are obtained, such as project information, exploratory hole details and strata details. For data of a more complex nature it may be necessary to define two or more Data Groups.

Fields within each Data Group identify specific items such as stratum description, sample depth etc. They have been defined as having the status of **KEY**, **COMMON** and **ADDITIONAL**.

Key Fields are necessary in order to define the data unambiguously. Common and Additional Data Fields are of the same basic type, but whereas it is envisaged that the Common Fields are likely to be required in most investigations, Additional Fields may also be required in particular circumstances. It is envisaged that the Additional Fields required will be specified on a job by job basis. It has also been recognised that complete Data Groups may be defined as "Additional" and these are listed in Appendix 3.

The Additional Fields and Data Groups listed are by no means complete and it is envisaged that the Data Dictionary will expand to incorporate other areas.

An illustration and discussion of the significance of the data file structure and Key, Common and Additional Fields is given in Figure 1.

## 4.5 Units

Details of the default units to be used for each of the Data Fields are given in Appendices 2 and 3. These are the preferred units for each of the data dictionary definitions and should be used wherever possible. They will either be the appropriate SI units or the units defined by the particular British Standard relating to that specific item of data.

It is recognised that situations will occur where neither the SI unit nor the British Standard unit are being used. Provision is made for these non-standard data units to be declared in the data transfer file. Reference should be made to Appendix 1 for the appropriate data format rules relating to non-standard units.

# 5 FILE SECURITY

## 5.1 Labelling

Clear labelling of media and conventions for its security and management are vital to the implementation of a practical system. These aspects are dealt with in Appendix 4.

### 5.2 Virus Protection

The transfer of data between computer systems can render the data vulnerable to attack by a virus. A computer virus is a program that is loaded and executed without the knowledge of the computer user. The virus hinders the operation of the system or damages or destroys program and data files. Many virus programs are able to replicate and spread within a system making them very difficult to eradicate. Most virus programs attach to program files but it is possible for data files to be affected also. The risk of transfer of a virus would be reduced by precluding executable files from the data disk.

The checking of disks for the presence of virus programs is done by proprietary virus scanning programs of which there are a number commonly available. A virus checker should be used by the Producer of the data to scan each data transfer disk prior to despatch and also by the Receiver of the disk before using it.

## 6 PRELIMINARY AND FINAL DATA

The data files are structured in order to allow presentation of preliminary data and up-dating during the course of a project prior to issue of the final data. Preliminary data in electronic format can be useful on major projects where design is undertaken during the period of the geotechnical investigation and this is dealt with in the Specification clauses of this document. However, the need for this facility needs to be very carefully considered by the receivers before including it in their specifications since it will require the imposition of rigorous management procedures. The highlighting of changes in data is considered to pose major problems and hence preliminary data should be replaced by subsequent data and not merely updated by it. Where the highlighting of changes is required, this should be a facility incorporated in the receivers' software. This does not preclude submission of parts of the data on separate discs but the Producer must ensure that the data within all separate issues are compatible, and that updates are carried through all sub-sets of the data. Each issue must be given a unique issue sequence number.

## 7 MANAGEMENT

In order to provide a framework within which the data can be used, it is necessary to have specifications which fall into the following categories:-

National Specification
General Specification
Particular Specification

The National Specification identifies the requirement for digital data whilst examples of General Specification clauses and Particular Specification clauses are presented in Appendix 5.

## 8 HARDWARE

The data interchange format has been selected to maximise flexibility in the choice of hardware which may be used by the various parties in the data-handling process. It is expected that in most cases, however, use will be made of stand-alone PC's but compatibility between the providers, receivers and storers is an essential element. A review of Interchange Facilities is presented in Appendix 6.

## 9 UPDATING

It is recognised that with the rapid development of technology and the concepts of how the data dictionary approach may be used, it will be necessary to establish a means of updating this document in coming years. Aspects such as the addition of further Data Groups or Fields or the introduction of computer technology such as scanning and drawing systems and improvements in the hardware available will need to be accommodated. A Register of users will be maintained by the Association of Geotechnical Specialists in order that they may be kept up to date with developments. The Registration Form included in Appendix 7 should be sent to the AGS to facilitate this.

Any problems in the use of this format which may arise from time to time should be brought to the attention of the AGS. Problems with proprietary software, however, should be directed to the suppliers.

Extensions to the Format will become necessary from time to time but any modification cannot be considered to comply with the AGS format until it has been approved by the AGS.

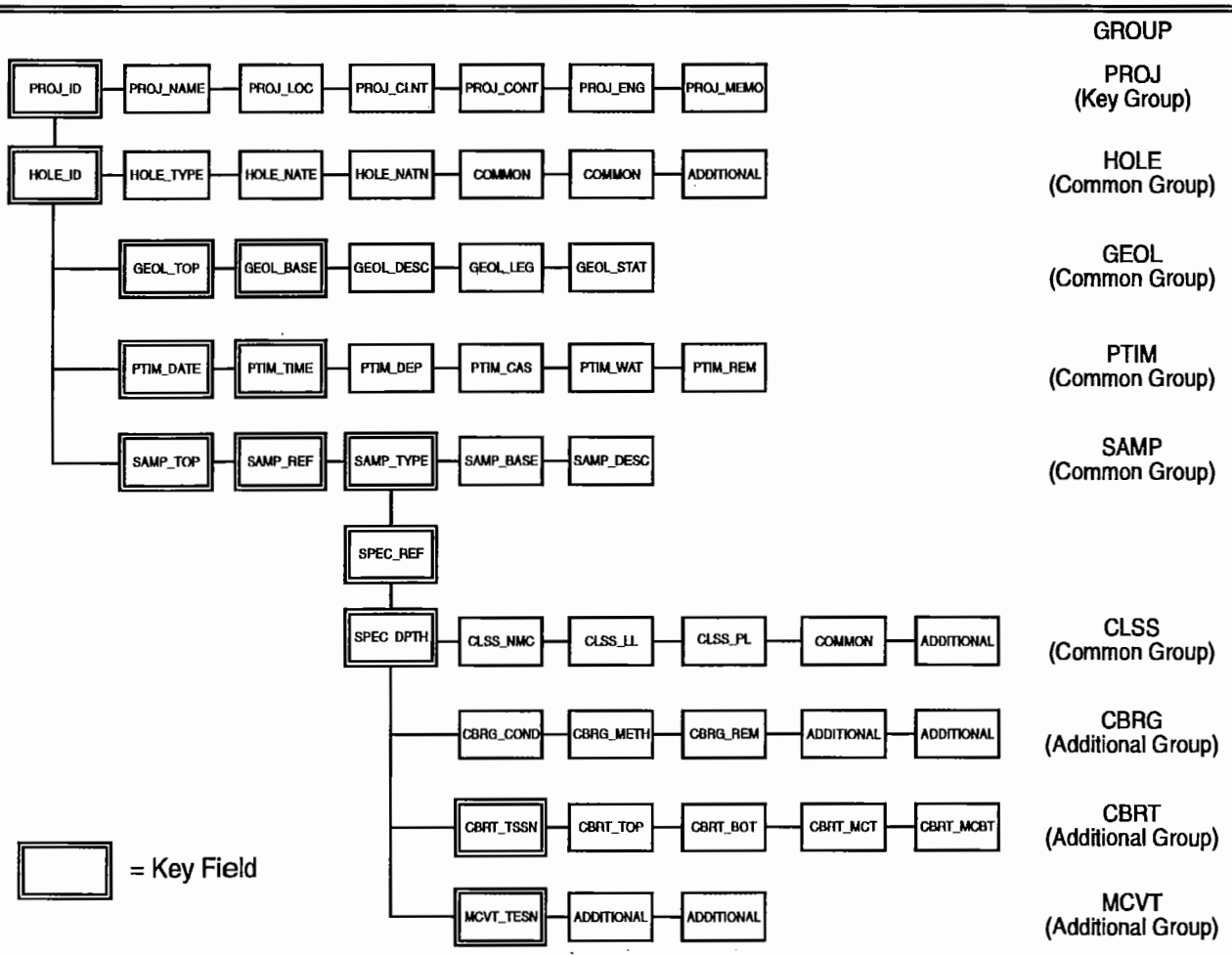
## 10 EXAMPLE FORMAT AND BENCHMARK FILE

To provide guidance on the formulation of the data interchange format, an example of a series of typical data groups is given in Appendix 6.

A disk containing a full Data Dictionary listing, together with a benchmark file for use when evaluating system compatibility, is available at extra cost from the Association of Geotechnical Specialists.

# FIGURE

## 1. Data File Structure




This Figure illustrates part of the data file showing its structure, the significance of the data Groups and the Key, Common and Additional Fields within them.

For example, to uniquely convey the information CLSS_PL (Plastic Limit) in Group CLSS (Classification Tests) it is necessary to include the project identification, the hole number, the sample reference, sample type and specimen reference (PROJ_ID, HOLE_ID, SAMP_TOP, SAMP_REF, SAMP_TYPE, SPEC_REF and SPEC_DPTH). The Key Field SPEC_REF is required to cover the situation where more than one test of a single type is undertaken on a sample.

Similarly, to uniquely convey the stratum description GEOL_DESC in Group GEOL, it is necessary to include also the project identification, and hole number and the top and base of the stratum.

An exception to this general rule is that, as all data on a single disk relates to the same project, the Key Field PROJ-ID need only be included in the Group PROJ.

Some tests are covered by two groups where one group contains general test data and the other contains data appropriate to various stages of the test. This is illustrated in relation to the CBR test (Groups CBRG and CBRT).

The Group GRAD is an example of a group where the test results consist of more than one number (ie. percentage passing for each sieve size). An example data file for this group is included in Appendix 6.

## FIGURE 1
## DATA FILE STRUCTURE

# APPENDIX 1

## Rules for creating data Files

# THE RULES FRAMEWORK

## Introduction

This Appendix sets out the Rules that define the Association of Geotechnical Specialists Format (AGS Format). The Rules have been the subject of much discussion and these notes seek to explain the overall framework within which they have been formulated.

A fundamental consideration has been that potential users of the Format should be able to use standard software tools to produce the data files.

The spreadsheet is the most basic tool for the task, readily allowing data "tables" to be created and ASCII data files to be produced. Likewise, data files produced according to the Rules can be read directly by spreadsheet software.

Although the Rules make it possible for users to manipulate AGS data files using spreadsheets alone, it is to be expected that more specific software will become available to automate the reading and writing of the data files. These software systems may range from simple data entry and edit programs through to complete database systems with data translation modules for AGS Format files.

Another fundamental point to bear in mind when assessing these Rules is that the resulting data file has been designed to be easy for the computer to read. The data files do not replace the printed reports which they accompany. However the layout does allow data items to be readily identified should the need arise.

The following notes explain some points of detail in the Rules.

## NOTES

### N1 ASCII 'CSV' Files

The Rules define ASCII data files of a type commonly referred to as CSV (Comma Separated Value). This type of file is readily produced and read by many spreadsheet (and other) systems. The data items are separated by commas and are surrounded by quotes (").

### N2 Numeric and Character Data - Delimiters

The Rules permit any data field to contain text, since this allows characters in numeric fields and caters for those countries which use the comma in place of the decimal point. For these reasons ALL data fields must be surrounded by quotes. When inputting data to a spreadsheet, prefix all numeric entries with a quote. In this way all the data fields will be stored as text and CSV output will produce quotes around all items.

Note that most spreadsheet and database systems provide a VALUE( ) function (or similar) to convert text data to numeric data. This function can be used where calculations need to be carried out on data imported from AGS Format files.

## N3 Key, Common & Additional Fields

The data fields defined by the Format fall into one of three categories:

KEY fields must be included every time a data group appears in a data file.

COMMON fields are those which are expected to be used in most data files.

ADDITIONAL fields are those which are expected to be used less frequently.

## N4 Continuation Lines

The Rules define a scheme for producing continuation lines where there are long data fields.

Although the scheme may seem complex at first sight, it is the system automatically produced by spreadsheets if the long data items are continued on additional rows IN THE SAME DATA COLUMN. Similarly, these data files will read into spreadsheets and preserve the long data items in their correct column order, for any length of data.

The special <CONT> symbol must appear in the HOLE_ID field, and thus <CONT> should never be used as a HOLE_ID.

## N5 Units

Details of the default units to be used for each of the Data Fields are given in Appendices 2, 3 and 8. These are the preferred units for each of the data dictionary definitions and should be used wherever possible. They will either be the appropriate SI units or the unit defined by the particular British Standard relating to that specific item of data.

It is recognised that situations will occur where neither the SI unit nor the British Standard unit are being used. Provision is made for these non-standard data units to be declared in the data transfer file.

## RULES FOR CREATING DATA FILES

The following rules must be used when creating a data interchange file.

1. The data file shall be entirely composed of ASCII characters. The extended character set may be used.

2. Each data file shall contain one or more data GROUPs. Each data GROUP contains related data.

3. Within each GROUP, data items are contained in data FIELDs. Each data FIELD contains a single data VARIABLE. Each line of the data interchange file can contain several data FIELDs.

4. The order of data FIELDs on each line within a GROUP is defined at the head of each GROUP by a set of data HEADINGs.

5. Data HEADINGs and GROUP names must be taken from the approved Data Dictionary.

6. The data HEADINGs fall into one of 3 categories:

   KEY/COMMON/ADDITIONAL

   KEY fields must appear in each GROUP, but may contain null data (see rule 15). These are necessary to uniquely define the data. *HOLE_ID should always be the first field except in the "**PROJ" GROUP, where "*PROJ_ID" should be the first field.

7. All data VARIABLEs can contain any alphanumeric data (ie. both text and numbers). Numerical data should be in numerals. Eg. 10 not TEN. (See also Note N2). Note that all numerals must be presented as a text field.

8. Data GROUP names, data field HEADINGs and data VARIABLEs must be enclosed in double quotes ("..."). eg. for inches or seconds (") must not appear as part of the data variable.

9. The data field HEADINGs and data VARIABLEs on each line of the data file should be separated by a comma (,).

10. Each GROUP name shall be preceded by 2 asterisks (**).

    Eg. "**HOLE"

11. HEADINGs shall be preceded by 1 asterisk (*).

    Eg. "*HOLE_ID"

12. No line of data HEADINGs or data VARIABLEs shall exceed 240 characters. The character count should include delimiting quotes and commas.

    Eg. "*HOLE_ID","*HOLE_NATE" = 23 characters

13. A line of data HEADINGs exceeding 240 characters can be continued on immediately following lines. A data HEADING must not itself be split between lines. A comma must be placed at the end of a HEADINGs line that is to be continued.

    Eg. "*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SPEC_REF",
    "*CLSS_LL","*CLSS_PL","*CLSS_BDEN"

14. A line of data VARIABLEs exceeding 240 characters must be continued on immediately following lines. Data VARIABLEs can be split between lines.

    A VARIABLE continuation line shall begin with the special name "<CONT>" in place of the first data VARIABLE. (PROJ_ID or HOLE_ID)

    The continued data is then placed in the correct field order by inserting the appropriate number of Null data VARIABLEs before it.

    Note that each line of data in a GROUP should contain the same number of VARIABLEs.

    Eg. "**GEOL"
    "*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_LEG"
    "501","1.2","2.4","Very stiff brown CLAY with",""
    "<CONT>","","","extremely closely spaced fissures","CLAY"

    (See also Note N4)

15. Null data VARIABLEs must be included as 2 consecutive double quotes ("").

    Eg. ,"",

    (See also Note N2)

16. Data GROUPs can be repeated within a file with different HEADINGs.

17. The number of data HEADINGs per GROUP shall not exceed 60.

18. If non-standard units are to be used for any data VARIABLES in a group then a UNITS line must be placed immediately after the HEADINGS line.

    An entry must be made for each data VARIABLE. Null entries ("") must be used for data VARIABLES that are in standard units.

    The non-standard units must be entered between " ".

    The line must begin with the special name <UNITS> in place of the first data variable. (PROJ_ID or HOLE_ID)

    Eg. "**GEOL"
    "*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC"
    "<UNITS>","FEET","FATHOMS",""

    (See also Note N5)

19. Each data file shall contain the "**PROJ" GROUP.

# APPENDIX 2

# Data Dictionary - Key and Common Data Groups

# DATA DICTIONARY - KEY AND COMMON DATA GROUPS

## Data Sets

This Appendix defines the data dictionary entries for the Key and Common data Groups with their associated data Fields.

The status of the individual data fields is shown by

| Status | Symbol |
|---|---|
| **KEY** | * |
| **COMMON** | |
| ADDITIONAL | A |

## Units of Measurement

The units of measurement shall be those given in the appropriate British Standard pertaining to that particular item of data unless separately defined in a UNITS line. The unit of measurement shall not be included in the ASCII data field.

## Examples

Typical examples are given against most of the data fields to indicate the type of information which may be expected. They are not intended to be representative of any one soil and hence may not be mutually compatible.

## Notes

The following conventions are suggested for abbreviations for certain types of data, but they are not an exhaustive list. Other abbreviations may be used as required.

1. **Exploratory Hole Type** (Group HOLE, heading HOLE_TYPE)

| | |
|---|---|
| CP | Cable Percussion (shell and auger) |
| RC | Rotary Cored |
| RO | Rotary Open hole |
| W | Wash boring |
| IP | Inspection Pit |
| TP | Trial Pit/trench |
| OP | Observation Pit/trench |
| SCP | Static Cone Penetrometer |
| DCP | Dynamic Cone Penetrometer |
| DP | Dynamic Probe sampling |
| IP+CP+RC | Combined hole type, as appropriate |
| INST | Instrument |

2. **Sample Type** (Group SAMP and others, heading SAMP_TYPE)

| | |
|---|---|
| U | Undisturbed sample - Open drive |
| P | Piston sample |
| TW | Thin Walled push in sample |
| BLK | Block sample |
| CBR | CBR mould sample |
| D | Small Disturbed sample |
| B | Bulk disturbed sample |
| LB | Large Bulk disturbed sample (for earthworks testing) |
| C | Core sample |
| W | Water sample |
| G | Gas sample |
| IRES* | In situ Resistivity |
| ICBR* | In situ CBR test |
| IDEN* | In situ Density test |
| IRDX* | In situ Redox test |
| IVAN* | In situ penetration Vane test |
| * | where these tests are not carried out in an exploratory hole, an associated group HOLE must be created (for example HOLE_ID - IRES) |

3. **Standard Penetration Test Type** (Group ISPT, heading ISPT_TYPE)

| | |
|---|---|
| S | Split Spoon |
| C | Cone |

4. **Soil Strength Test Type** (Group TRIG, heading TRIG_TYPE)

| | |
|---|---|
| UU | Unconsolidated quick Undrained (single specimen) |
| UUM | Unconsolidated quick Undrained (Multi-stage) |
| CD | Consolidated Drained |
| CDM | Consolidated Drained (Multi-stage) |
| CU | Consolidated Undrained with pwp measurement |
| CUM | Consolidated Undrained with pwp measurement (Multi-stage) |
| OTHR | Other eg. anisotropic consolidation, consolidated quick undrained |

5. **Grading Analysis Test Type** (Group GRAD, heading GRAD_TYPE)

| | |
|---|---|
| WS | Wet Sieve |
| DS | Dry Sieve |
| PP | Pipette |
| HY | Hydrometer |

## KEY GROUP

Project Data

| Group Name : PROJ | - | Project Information | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **PROJ_ID** | | Project identifier | 6421/A |
| | **PROJ_NAME** | | Project title | Acme Gas Works |
| | **PROJ_LOC** | | Location of site | London Road, Croydon |
| | **PROJ_CLNT** | | Client name | Acme Enterprises |
| | **PROJ_CONT** | | Contractors name | Acme Drilling Ltd |
| | **PROJ_ENG** | | Project Engineer | Acme Consulting |
| | **PROJ_MEMO** | | General project comments | |
| ↑ | **PROJ_DATE** | dd/mm/yyyy | Date of production of data | 01/12/1994 |
| ↓ | **PROJ_AGS** | | AGS Issue Number | 07/94 |

# COMMON GROUPS

## Exploratory Hole Data

| Group Name : **HOLE** | | | - Hole Information | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 327/16A |
| | **HOLE_TYPE** | | Type of exploratory hole | CP Note 1 |
| | **HOLE_NATE** | | O.S. National Grid six figure Easting | 523145 |
| | **HOLE_NATN** | | O.S. National Grid six figure Northing | 178456 |
| | **HOLE_GL** | m | Ground level relative to Ordnance Datum | 16.23 |
| | **HOLE_FDEP** | m | Final depth of hole | 32.60 |
| | **HOLE_STAR** | dd/mm/yyyy | Date of start of excavation | 18/03/1991 |
| | **HOLE_LOG** | | The **definitive** person responsible for logging the hole | DPG |
| | **HOLE_REM** | | General remarks on hole | Chiselled 1 - 1.5m |
| A | HOLE_LETT | | Ordnance Survey letter grid reference | TQ 123 456 |
| A | HOLE_LOCX | m | Local grid x co-ordinate | 565 |
| A | HOLE_LOCY | m | Local grid y co-ordinate | 421 |
| A | HOLE_LOCZ | m | Level to local datum | +106.6 |
| A | HOLE_DIAM | | **Deleted** | |
| A | HOLE_CASG | | **Deleted** | |
| A | HOLE_ENDD | dd/mm/yyyy | Hole end date | 22/03/1991 |
| A | HOLE_BACD | dd/mm/yyyy | Hole backfill date | 22/03/1991 |
| A | HOLE_CREW | | Name of driller | A.B. Driller |
| A | HOLE_ORNT | deg | Orientation of hole (degrees from north) | 50 |
| A | HOLE_INCL | deg | Inclination of hole (measured positively down from horizontal) | 90 |
| A | HOLE_EXC | | Plant used | JCB - 3CX or Hand |
| A | HOLE_SHOR | | Shoring/support used | None |
| A | HOLE_STAB | | Stability | Stable during excavation |
| A | HOLE_DIMW | m | Trial pit width | 0.9 |
| A | HOLE_DIML | m | Trial pit length | 2.5 |

| Group Name : HDIA | - | Hole Diameter by Depth | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6421/A |
| * | **HDIA_HDEP** | m | Depth achieved at HDIA_HOLE | 18.0 |
| | **HDIA_HOLE** | mm | Borehole diameter | 200 |
| | **HDIA_CASG** | mm | Casing diameter | 200 |
| | **HDIA_CDEP** | m | Depth to which HDIA_CASG taken | 18.0 |

| Group Name : DREM | - | Depth Related Remarks | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **DREM_DPTH** | m | Depth of DREM_REM | 12.50 |
| | **DREM_REM** | | Depth related remark | Driving boulder ahead of casing from 12.50 to 13.80 |

| Group Name : PTIM | - | Hole Progress by Time | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **PTIM_DATE** | dd/mm/yyyy | Date of progress reading | 20/03/1991 |
| * | **PTIM_TIME** | hhmm | Time of progress reading | 1435 |
| | **PTIM_DEP** | m | Hole depth at PTIM_TIME | 22.13 |
| | **PTIM_CAS** | m | Depth of casing at PTIM_TIME | 20.50 |
| | **PTIM_WAT** | m | Depth to water at PTIM_TIME | 16.56 |
| | **PTIM_REM** | | Remarks at PTIM_TIME | Stopped drilling on client's instruction |

| Group Name : WSTK | | | - Water Strike Details | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **WSTK_DEP** | m | Depth to water strike | 17.20 |
| | **WSTK_CAS** | m | Casing depth at time of water strike | 15.70 |
| | **WSTK_DATE** | dd/mm/yyyy | Date of water strike | 19/03/1991 |
| | **WSTK_TIME** | hhmm | Time of water strike | 1640 |
| | **WSTK_POST** | m | Depth to water after WSTK_NMIN minutes | 10.23 |
| * | **WSTK_NMIN** | min | Minutes after strike | 20 |
| | **WSTK_FLOW** | | Flow rate remarks | Steady flow of water into hole |
| | **WSTK_SEAL** | m | Depth at which water strike sealed by casing | 19.10 |

| Group Name : SAMP | | | - Sample Reference Information | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **SAMP_TOP** | m | Depth to TOP of sample | 24.55 |
| * | **SAMP_REF** | | Sample reference number | 24 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| | **SAMP_DIA** | mm | Sample diameter | 100 |
| | **SAMP_BASE** | m | Depth to BASE of sample | 25.00 |
| | **SAMP_DESC** | | Sample description | Stiff brown very silty CLAY |
| | **SAMP_UBLO** | | Number of blows required to drive sampler | 35 |
| | **SAMP_REM** | | Sample remarks | 60% recovery |
| A | GEOL_STAT | | Stratum code (for use with trial pits) | Band 1 |

| Group Name : GEOL | | | - Stratum Descriptions | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **GEOL_TOP** | m | Depth to the TOP of stratum | 16.21 |
| * | **GEOL_BASE** | m | Depth to the BASE of description | 17.25 |
| | **GEOL_DESC** | | General description of stratum | Stiff grey silty CLAY |
| | **GEOL_LEG** | | Legend code | 4A |
| | **GEOL_GEOL** | | Geology Code | LC |
| A | GEOL_STAT | | Stratum code (for use with trial pits) | Band 1 |

| Group Name : DETL | - | Stratum Detail Descriptions | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **DETL_TOP** | m | Depth to TOP of detail description | 3.46 |
| * | **DETL_BASE** | m | Depth to BASE of detail description | 3.76 |
| | **DETL_DESC** | | Detail description | Claystone |

| Group Name : FRAC | - | Fracture Spacing | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6423/A |
| * | **FRAC_TOP** | m | Depth to top of Fracture Index zone | 31.20 |
| * | **FRAC_BASE** | m | Depth to bottom of Fracture Index zone | 33.65 |
| | **FRAC_FI** | | Fracture Index over zone | 22 |
| | **FRAC_IMIN** | | Minimum Index over zone | NI |
| | **FRAC_IAVE** | | Average Index over zone | 22 |
| | **FRAC_IMAX** | | Maximum Index over zone | 35 |

| Group Name : CORE | - | Rotary Core Information | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6423/A |
| * | **CORE_TOP** | m | Depth to TOP of core run | 2.54 |
| * | **CORE_BOT** | m | Depth to BOTTOM of core run | 3.54 |
| | **CORE_PREC** | % | Percentage of core recovered in core run (TCR) | 32 |
| | **CORE_SREC** | % | Percentage of solid core recovered in core run (SCR) | 23 |
| | **CORE_RQD** | % | Rock Quality Designation for core run (RQD) | 24 |
| | **CORE_REM** | | Rotary remarks | Foam flush used |
| | **CORE_DIAM** | mm | Core diameter | 75 |

## In Situ Test Data

| Group Name : ISPT | | | - Standard Penetration Test Results | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **ISPT_TOP** | m | Depth to top of test | 13.50 |
| | **ISPT_SEAT** | | Number of blows for seating drive | 14 |
| | **ISPT_MAIN** | | Number of blows for main test drive | 35 |
| | **ISPT_NPEN** | mm | Total penetration for test | 450 |
| | **ISPT_NVAL** | | SPT 'N' value | 35 |
| | **ISPT_CAS** | m | Casing depth at time of test | 12.00 |
| | **ISPT_WAT** | m | Depth to water at time of test | 2.50 |
| | **ISPT_TYPE** | | Type of SPT test | S Note 3 |
| | **ISPT_REM** | | Remarks relating to the test | |
| A | ISPT_INC1 | | Number of blows for 1st 75mm | 6 |
| A | ISPT_PEN1 | mm | Penetration | 75 |
| A | ISPT_INC2 | | Number of blows for 2nd 75mm | 8 |
| A | ISPT_PEN2 | mm | Penetration | 75 |
| A | ISPT_INC3 | | Number of blows for 3rd 75mm | 8 |
| A | ISPT_PEN3 | mm | Penetration | 75 |
| A | ISPT_INC4 | | Number of blows for 4th 75mm | 9 |
| A | ISPT_PEN4 | mm | Penetration | 75 |
| A | ISPT_INC5 | | Number of blows for 5th 75mm | 9 |
| A | ISPT_PEN5 | mm | Penetration | 75 |
| A | ISPT_INC6 | | Number of blows for 6th 75mm | 9 |
| A | ISPT_PEN6 | mm | Penetration | 75 |

| Group Name : PREF | | | - Piezometer Installation Details | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **PREF_TDEP** | m | Depth to reference level of piezometer tip | 7.25 |
| | **PREF_DATE** | dd/mm/yyyy | Piezometer installation date | 22/03/1991 |
| | **PREF_TYPE** | | Piezometer type | Pneumatic |
| | **PREF_TRPS** | m | Depth to top of response zone | 6.50 |
| | **PREF_BRPS** | m | Depth to base of response zone | 7.50 |
| | **PREF_REM** | | Details of type and depths of grouting and readout arrangements/locations | |

| Group Name : POBS | | | - Piezometer Readings | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **PREF_TDEP** | m | Depth to reference level of piezometer tip | 7.25 |
| * | **POBS_DATE** | dd/mm/yyyy | Date of piezometer reading | 26/03/1991 |
| * | **POBS_TIME** | hhmmss | Time of piezometer reading | 164000 |
| | **POBS_DEP** | m | Depth to water below ground surface | 6.40 |
| | **POBS_HEAD** | m | Head of water above piezometer tip | 0.85 |
| | **POBS_REM** | | Remarks | Reading taken during heavy rain |

## Laboratory Testing Data

| Group Name : CLSS | - Classification Tests | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 1 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.60 |
| | **CLSS_NMC** | % | Natural moisture content | 57 |
| | **CLSS_LL** | % | Liquid limit | 62 |
| | **CLSS_PL** | % | Plastic limit | 38 or NP |
| | **CLSS_PI** | | DELETED | |
| | **CLSS_DDEN** | Mg/m3 | Dry density | 1.06 |
| | **CLSS_BDEN** | Mg/m3 | Bulk density | 1.66 |
| | **CLSS_PD** | | Particle density | 2.65 |
| | **CLSS_425** | % | Percentage passing 425 $\mu$m sieve | 12 |
| | **CLSS_PREP** | | Method of preparation | Wet sieve etc |
| A | CLSS_SLIM | % | Shrinkage limit | 17 |
| A | CLSS_LS | % | Linear shrinkage | 11 |
| A | CLSS_HVP | kN/m2 | Hand vane undrained shear strength (peak) | 40 |
| A | CLSS_HVR | kN/m2 | Hand vane undrained shear strength (remoulded) | 15 |
| A | CLSS_PPEN | kN/m2 | Pocket penetrometer undrained shear strength | 40 |

| Group Name : GRAD | - Particle Size Distribution Analysis Data | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.60 |
| * | **GRAD_SIZE** | mm | Sieve or particle size | 3.35 |
| | **GRAD_PERP** | % | Percentage passing/finer | 25 |
| | **GRAD_TYPE** | | Grading analysis test type | WS Note 5 |

| Group Name : CHEM | | | - Chemical Tests | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | ii) |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.60 |
| | **CHEM_TSUL** | % | Total soil or rock sulphate content | 0.06 |
| | **CHEM_ASUL** | g/l | Sulphate aqueous extract 2:1 soil/water | 0.17 |
| | **CHEM_WSUL** | g/l | Water sulphate content | 0.01 |
| | **CHEM_TSUD** | % | Total soil or rock sulphur content | 0.04 |
| | **CHEM_PH** | | Soil/water pH value | 7.2 |
| | **CHEM_REM** | | Remarks | |
| A | CHEM_ORGM | | Method of organic test | Dichromate |
| A | CHEM_ORG | % | Organic matter content | 12 |
| A | CHEM_Ø2Ø | % | Percentage passing 2mm sieve | 80 |
| A | CHEM_LOI | % | Mass loss on ignition | 26 |
| A | CHEM_CO2M | | Method of oarbonate test | |
| A | CHEM_CO2 | % | Carbonate content (as $CO_2$) | 15 |
| A | CHEM_ACL | % | Percentage of acid soluble chloride ions | 0.1 |
| A | CHEM_WCL | % | Percentage of water soluble chloride ions | 0.05 |
| A | CHEM_DCL | mg/l | Dissolved chloride ions | 70 |
| A | CHEM_CLN | | Notes on chloride test | |
| A | CHEM_TDSM | | Total dissolved solids. Test method and notes | |
| A | CHEM_TDS | % | Total dissolved solids in water | 1.0 |
| A | CHEM_RESM | | Resistivity test method | |
| A | CHEM_RES | ohm | Resistivity of soil sample corrected to 20°C | 2000 |
| A | CHEM_REMC | % | Moisture content of sample for resistivity | 11.0 |
| A | CHEM_REBD | Mg/m3 | Bulk density of sample for resistivity | 2.10 |
| A | CHEM_RDXM | | Redox test information | |
| A | CHEM_RDX | | Redox potential | 400 |
| A | CHEM_RDPH | | pH of redox sample | 7.0 |

| Group Name : TRIG | | | - Triaxial Test - General | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 3 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.80 |
| | **TRIG_TYPE** | | Test type | UU Note 4 |
| | **TRIG_COND** | | Sample condition | Undisturbed |
| | **TRIG_REM** | | Test method and additional information, failure criteria etc. | |
| | **TRIG_CU** | kN/m2 | Value of undrained shear strength | 75 |
| A | TRIG_COH | kN/m2 | Cohesion intercept associated with TRIG_PHI | 2 |
| A | TRIG_PHI | deg | Angle of friction for effective shear strength triaxial test | 32 |

| Group Name : TRIX | | | - Triaxial Test | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 3 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.80 |
| * | **TRIX_TESN** | | Triaxial test/stage number | 1 |
| | **TRIX_SDIA** | mm | Specimen diameter | 38 |
| | **TRIX_MC** | % | Specimen initial moisture content | 15 |
| | **TRIX_CELL** | kN/m | Total cell pressure | 100 |
| | **TRIX_DEVF** | kN/m | Deviator stress at failure | 360 |
| A | TRIX_SLEN | mm | Sample length | 76 |
| A | TRIX_BDEN | Mg/m3 | Initial bulk density | 2.12 |
| A | TRIX_DDEN | Mg/m3 | Initial dry density | 1.84 |
| A | TRIX_PWPI | kN/m | Porewater pressure at start of shear stage | 50 |
| A | TRIX_PWPF | kN/m | Porewater pressure at failure | 60 |
| A | TRIX_STRN | % | Strain at failure | 9 |
| A | TRIX_MODE | | Mode of failure | Brittle, plastic |

| Group Name : CONG | | | - Consolidation Test - General | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 4 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.90 |
| | **CONG_TYPE** | | Oedometer or Rowe, primary or secondary consolidation | Oed, Rowe |
| | **CONG_COND** | | Sample condition | Undisturbed, remoulded etc |
| | **CONG_REM** | | Test details including method statement | Log time method, temperature 21°C, sample from base of U100 sample, axis vertical |
| A | CONG_INCM | m2/MN | Coefficient of volume compressibility over CONG_INCD | 0.36 |
| A | CONG_INCD | kN/m2 | Defined stress range | p´o to p´o + 100 |
| A | CONG_DIA | mm | Test specimen diameter | 75 |
| A | CONG_HIGT | mm | Test specimen height | 19 |
| A | CONG_MCI | % | Initial moisture content | 21 |
| A | CONG_MCF | % | Final moisture content | 18 |
| A | CONG_BDEN | Mg/m3 | Initial bulk density | 2.12 |
| A | CONG_DDEN | Mg/m3 | Initial dry density | 1.75 |
| A | CONG_PDEN | | Particle density (BS 1377) with # if assumed | #2.65 |
| A | CONG_SATR | % | Initial degree of saturation | 98 |
| A | CONG_SPRS | kN/m2 | Swelling pressure | 100 |
| A | CONG_SATH | % | Height change of specimen on saturation as percentage of original height | +1.1 |

| Group Name : CONS | | | - Consolidation Test | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 4 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.90 |
| * | **CONS_INCN** | | Oedometer stress increment number | 3 |
| | **CONS_IVR** | | Initial voids ratio | 0.80 |
| | **CONS_INCF** | kN/m2 | Stress at end of stress increment/decrement | 400 |
| | **CONS_INCE** | | Voids ratio at end of stress increment | 0.62 |
| | **CONS_INMV** | m2/MN | Coefficient of volume compressibility over stress increment | 0.32 |
| | **CONS_INCV** | m2/yr | Coefficient of consolidation over stress increment | 4.12 |
| A | CONS_INSC | | Coefficient of secondary compression over stress increment | 0.12 |

| Group Name : ROCK - Rock Testing | | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6423/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 2.54 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | C Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen depth | 2.70 |
| | **ROCK_PLS** | MN/m2 | Uncorrected point load ($I_s$) | 2.3 |
| | **ROCK_PLSI** | MN/m2 | Size corrected point load index ($I_s$ 50) | 2.5 |
| | **ROCK_PLTF** | | Point load test type (A, D, L or P) | A |
| | **ROCK_UCS** | MN/m2 | Uniaxial compressive strength (size corrected) | 16.8 |
| | **ROCK_REM** | | Remarks | |
| A | ROCK_PREM | | Details additional to ROCK_PLTF | |
| A | ROCK_UREM | | Notes on uniaxial compressive strength test, including sample dimensions | |
| A | ROCK_E | MN/m2 | Elastic modulus | 220 |
| A | ROCK_MU | | Poisson's ratio | 0.3 |
| A | ROCK_BRAZ | MN/m2 | Tensile strength by the Brazilian method | 50 |
| A | ROCK_BREM | | Notes on Brazilian tensile strength test including sample dimensions | |
| A | ROCK_SDI | % | Slake durability | 23 |
| A | ROCK_SREM | | Notes on slake durability test | |
| A | ROCK_PORO | % | Rock porosity | 17 |
| A | ROCK_PORE | | Notes on type of porosity test | |
| A | ROCK_MC | % | Natural moisture content | 18 |
| A | ROCK_BDEN | MN/m3 | Rock bulk density | 2.22 |
| A | ROCK_DDEN | MN/m3 | Rock dry density | 1.88 |
| A | ROCK_SOUN | % | Soundness Test | 5.4 |
| A | ROCK_MREM | % | Solution used for ROCK_SOUN, sieves, cycles | Magnesium sulphate |
| A | ROCK_DESC | | Specimen description | Mudstone |
| A | ROCK_SHOR | | Shore hardness | 29.7 |
| A | ROCK_PWAV | m/s | P-wave velocity | 3000 |
| A | ROCK_SWAV | m/s | S-wave velocity | 1800 |
| A | ROCK_EMOD | GPa | Elastic Modulus | 20 |
| A | ROCK_SG | GPa | Shear modulus derived from ROCK_SWAV | 8 |

# APPENDIX 3

# Data Dictionary - Additional Data Groups

# DATA DICTIONARY - ADDITIONAL DATA GROUPS

## Data Sets

This Appendix defines the data dictionary entries for the Additional data Groups with their associated data Fields. Groups should be selected as appropriate to the project.

The following conventions are suggested for abbreviations for certain types of data, but they are not an exhaustive list. Other abbreviations may be used as required.

## Notes

1. **Static Cone Penetrometer Type** (Group STCN, heading STCN_TYP)

| | |
|---|---|
| EC | Electric Cone |
| PC | Piezocone |
| MC | Mechanical Cone |

2. **Sample Type** (Group CMPG and others, heading SAMP_TYPE)

| | |
|---|---|
| U | Open drive Undisturbed sample |
| P | Piston sample |
| TW | Thin Walled push in sample |
| BLK | Block sample |
| CBR | CBR mould sample |
| D | Small Disturbed sample |
| B | Bulk disturbed sample |
| LB | Large Bulk disturbed sample (for earthworks testing) |
| C | Core sample |
| W | Water sample |
| G | Gas sample |

3. **Instrumentation Type** (Group INST and PROF, heading INST_TYPE and PROF_TYPE)

| | | | |
|---|---|---|---|
| SPIE | Standpipe piezometer | | |
| HPIE | Hydraulic piezometer | | |
| PPIE | Pneumatic piezometer | | |
| EPIE | Electronic piezometer | | |
| HSET | Hydraulic settlement cell/gauges | | |
| PSET | Pneumatic settlement cell/gauges | | |
| ESET | Electronic settlement cell/gauges | | |
| MSET | Levelling point or plate | | |
| XSET | Extensometer settlement point | | |
| PPCx | Push-in pressure cell | (where x is | H - Hydraulic |
| IPCx | Interface pressure cell | | P - Pneumatic |
| EPCx | Embedment pressure cell | | E - Electronic) |
| SLIP | Slip Indicator | | |
| INCL | Inclinometer | | |

| Group Name: **STCN** - **Static Cone Penetration Test** | | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6421/A |
| * | **STCN_DPTH** | m | Depth of result for static cone test | 12.10 |
| A | STCN_FORC | kN | Axial force (Qc) | |
| A | STCN_FRIC | kN | Frictional force on sleeve (Qs) | |
| A | STCN_RES | MN/m2 | Cone resistance | 20 |
| A | STCN_FRES | kN/m2 | Local unit side friction resistance | 1000 |
| A | STCN_PWP1 | kN/m2 | Porewater pressure | 15.0 |
| A | STCN_PWP2 | kN/m2 | Second porewater pressure | 15.0 |
| A | STCN_PWP3 | kN/m2 | Third porewater pressure | 15.0 |
| A | STCN_TYP | | Cone test type | PC Note 1 |
| A | STCN_REF | | Cone identification reference | PQ47 |
| A | STCN_INC | | DELETED | |
| A | STCN_CON | $\mu$S/cm | Conductivity | 0.01 |
| A | STCN_TEMP | °C | Temperature | 10 |

| Group Name: **CONC** deleted |
|---|

| Group Name: **DPRB** - **Dynamic Probe Test** | | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6451/A |
| * | **DPRB_DPTH** | m | Depth to start of dynamic probe increment | 2.50 |
| A | DPRB_TYPE | | Dynamic probe type | Macintosh |
| A | DPRB_BLOW | | Dynamic probe blows for increment DPRB_INC | 7 |
| A | DPRB_INC | mm | Dynamic probe increment | 100 |
| A | DPRB_REM | | Details of weight, drop height, and probe | |

| Group Name: IDEN | - | In Situ Density Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name, number (or location) | 6461/A or DEN 7 |
| * | **IDEN_DPTH** | m | Depth of in situ density test | 1.25 |
| A | IDEN_REM | | Details of in situ density test | Nuclear probe |
| A | IDEN_IDEN | Mg/m3 | In situ bulk density | 1.86 |
| A | IDEN_MC | % | Moisture content relating to in situ test | 18 |

| Group Name: ICBR | - | In Situ CBR Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name, number (or location) | 6421/A or CBR 6 |
| * | **ICBR_DPTH** | m | Depth to top of CBR test | 0.50 |
| A | ICBR_REM | | Details of apparatus and surcharge | 10kg surcharge |
| A | ICBR_ICBR | % | CBR value | 1.2 |
| A | ICBR_MC | % | Moisture content relating to test | 25 |

| Group Name: IVAN | - | In Situ Vane Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name, number (or location) | 6421/A |
| * | **IVAN_DPTH** | m | Depth of vane test | 13.50 |
| A | IVAN_REM | | Details of vane test, vane size, vane type | |
| A | IVAN_IVAN | kN/m2 | Vane test result | 60 |
| A | IVAN_IVAR | kN/m2 | Vane test remoulded result | 45 |

| Group Name: IRES - | | In Situ Resistivity Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name, number (or location) | 6421/A or RES/12 |
| * | **IRES_DPTH** | m | Depth range to which in situ resistivity test relates | 0 to 10 |
| A | IRES_TYPE | | Type of resistivity test | |
| A | IRES_IRES | ohm cm | Result | 2000 |
| A | IRES_REM | | Details of test eg. electrode spacing and configuration | |

| Group Name: IRDX | - | In Situ Redox Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name, number (or location) | 6421/A or RDX 2 |
| * | **IRDX_DPTH** | m | Depth of redox test | 1.0 |
| A | IRDX_REM | | Details of redox test and probe type | |
| A | IRDX_PH | | pH | 7.0 |
| A | IRDX_IRDX | mV | Redox potential | 400 |

| Group Name: IPRM | - | In Situ Permeability Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6471/A |
| * | **IPRM_BASE** | m | Depth to base of test zone | 12.95 |
| A | IPRM_TOP | m | Depth to top of test zone | 12.20 |
| A | IPRM_TYPE | | Type of test | Rising, Falling, Constant Head |
| A | IPRM_PRWL | m | Depth to water in borehole or piezometer immediately prior to test | 10.60 |
| A | IPRM_SWAL | m | Depth to water at start of test | 5.40 |
| A | IPRM_TDIA | m | Diameter of test zone | 0.150 |
| A | IPRM_SDIA | m | Diameter of standpipe or casing | 0.019 |
| A | IPRM_IPRM | m/s | Permeability | $5 \times 10^{-9}$ |
| A | IPRM_REM | | Test remarks | |
| A | IPRM_STG | | Stage number of multistage packer test | 1 |
| A | IPRM_FLOW | l/s | Average flow during packer test stage | 2.3 |
| A | IPRM_AWL | m | Depth to assumed standing water level | 10.0 |
| A | IPRM_HEAD | m | Applied total head of water during test stage at centre of packer test zone | 20.5 |

| Group Name: PUMP | - | Pumping Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **PUMP_TIME** | hhmmss | Time of reading | 143500 |
| A | PUMP_DATE | dd/mm/yyyy | Date of reading | 16/03/1991 |
| A | PUMP_DPTH | m | Depth to water below ground | 12.5 |
| A | PUMP_QUAT | l/s | Pumping rate from hole | 0.8 |
| A | PUMP_REM | | Remarks | Double packer |

| Group Name: PRTD | - | Pressuremeter Test Data | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **PRTD_TREF** | | Reference number of test | 1 |
| * | **PRTD_DPTH** | m | Depth of test | 2.70 |
| * | **PRTD_SEQ** | | Sequence number | 1 |
| A | PRTD_DATE | dd/mm/yyyy | Date of test | 22/12/1993 |
| A | PRTD_TYPE | | Pressuremeter type (eg. SBP, HPD) | SBP |
| A | PRTD_DIA | mm | Uninflated diameter of pressuremeter | 82.9 |
| A | PRTD_ARM1 | mm | Arm (pair) 1 displacement | 1.0 |
| A | PRTD_ARM2 | mm | Arm (pair) 2 displacement | 1.0 |
| A | PRTD_ARM3 | mm | Arm (pair) 3 displacement | 1.0 |
| A | PRTD_TPC1 | kN/m2 | Total pressure/arm (pair) 1 | 54.40 |
| A | PRTD_TPC2 | kN/m2 | Total pressure/arm (pair) 2 | 54.40 |
| A | PRTD_TPC3 | kN/m2 | Total pressure/arm (pair) 3 | 54.40 |
| A | PRTD_PPA | kN/m2 | Pore pressure cell A | 2.90 |
| A | PRTD_PPB | kN/m2 | Pore pressure cell B | 2.90 |
| A | PRTD_REM | kN/m2 | Remarks | |

| Group Name: PRTG - Pressuremeter Test Results, General | | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **PRTD_TREF** | | Reference number of test | 1 |
| * | **PRTD_DPTH** | m | Depth of test | 2.70 |
| A | PRTD_DATE | dd/mm/yyyy | Date of test | 22/12/1993 |
| A | PRTD_TYPE | | Pressuremeter type (eg. SBP, HPD) | SBP |
| A | PRTD_DIA | mm | Uninflated diameter of pressuremeter | 82.9 |
| A | PRTG_HA1 | kN/m2 | Estimated horizontal stress, arm (pair) 1 | 700 |
| A | PRTG_HA2 | kN/m2 | Estimated horizontal stress, arm (pair) 2 | 700 |
| A | PRTG_HA3 | kN/m2 | Estimated horizontal stress, arm (pair) 3 | 700 |
| A | PRTG_HAA | kN/m2 | Estimated horizontal stress, average | 700 |
| A | PRTG_GIA1 | MN/m2 | Initial shear modulus, arm (pair) 1 | 70 |
| A | PRTG_GIA2 | MN/m2 | Initial shear modulus, arm (pair) 2 | 70 |
| A | PRTG_GIA3 | MN/m2 | Initial shear modulus, arm (pair) 3 | 70 |
| A | PRTG_GIAA | MN/m2 | Initial shear modulus, average | 70 |
| A | PRTG_CUA1 | MN/m2 | Undrained shear strength, arm (pair) 1 | 420 |
| A | PRTG_CUA2 | MN/m2 | Undrained shear strength, arm (pair) 2 | 420 |
| A | PRTG_CUA3 | MN/m2 | Undrained shear strength, arm (pair) 3 | 420 |
| A | PRTG_CUAA | MN/m2 | Undrained shear strength, average | 420 |
| A | PRTG_PLA1 | MN/m2 | Limit pressure, arm (pair) 1 | 3400 |
| A | PRTG_PLA2 | MN/m2 | Limit pressure, arm (pair) 2 | 3400 |
| A | PRTG_PLA3 | MN/m2 | Limit pressure, arm (pair) 3 | 3400 |
| A | PRTG_PLAA | MN/m2 | Limit pressure, average | 3400 |
| A | PRTG_AFA1 | deg | Angle of friction, arm (pair) 1 | 39 |
| A | PRTG_AFA2 | deg | Angle of friction, arm (pair) 2 | 39 |
| A | PRTG_AFA3 | deg | Angle of friction, arm (pair) 3 | 39 |
| A | PRTG_AFAA | deg | Angle of friction, average | 39 |
| A | PRTG_ADA1 | deg | Angle of dilation, arm (pair) 1 | 10 |
| A | PRTG_ADA2 | deg | Angle of dilation, arm (pair) 2 | 10 |
| A | PRTG_ADA3 | deg | Angle of dilation, arm (pair) 3 | 10 |
| A | PRTG_ADAA | deg | Angle of dilation, average | 10 |
| A | PRTG_AFCV | deg | Angle of friction at constant volume ($\phi_{cv}$) used | 35 |
| A | PRTG_REM | | Remarks | |

| Group Name: PRTL | - | Pressuremeter Test Results, Individual Loops | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **PRTD_TREF** | | Reference number of test | 1 |
| * | **PRTD_DPTH** | m | Depth of test | 2.70 |
| * | **PRTL_LNO** | | Unload/Reload loop number | 1 |
| A | PRTD_DATE | dd/mm/yyyy | Date of test | 22/12/1993 |
| A | PRTD_TYPE | | Pressuremeter type (eg. SBP, HPD) | SBP |
| A | PRTD_DIA | mm | Uninflated diameter of pressuremeter | 82.9 |
| A | PRTL_GA1 | | Unload/reload shear modulus, arm (pair) 1 | 70 |
| A | PRTL_GA2 | | Unload/reload shear modulus, arm (pair) 2 | 70 |
| A | PRTL_GA3 | | Unload/reload shear modulus, arm (pair) 3 | 70 |
| A | PRTL_GAA | | Unload/reload shear modulus, average | 70 |

| Group Name: RELD | - | Relative Density Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 8.50 |
| * | **SAMP_REF** | | Sample reference number | 16 |
| * | **SAMP_TYPE** | | Sample type | LB Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen depth | 8.50 |
| A | RELD_REM | | Method of test | |
| A | RELD_DMAX | Mg/m3 | Maximum dry density as BS 1377 part 4 cl 4 | 2.15 |
| A | RELD_375 | % | Weight percent of sample retained on 37.5mm sieve | 7.0 |
| A | RELD_Ø63 | % | Weight percent of sample retained on 6.3mm sieve | 10 |
| A | RELD_Ø2Ø | % | Weight percent of sample retained on 2mm sieve | 5.0 |
| A | RELD_DMIN | Mg/m3 | Minimum dry density as BS 1377 part 4 cl 4 | 1.65 |

| Group Name: INST | - | Single Point Instrument Installation Details | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6421/A |
| * | **INST_TDEP** | m | Depth to reference level of instrument from HOLE_GL or HOLE_LOCX | 7.25 |
| * | **INST_ID** | | Instrument reference number | A2345 |
| A | INST_TYPE | | Instrument type | PPIE Note 3 |
| A | INST_DATE | dd/mm/yyyy | Instrument installation date | 22/03/1994 |
| A | INST_TRPS | m | Depth to top of response zone from HOLE_GL or HOLE_LOCX | 6.50 |
| A | INST_BRPS | m | Depth to base of response zone from HOLE_GL or HOLE_LOCX | 7.50 |
| A | INST_DIP | Deg | Inclination of instrument (measured positively down from horizontal) | 90 |
| A | INST_DIR | Deg | Direction of INST_DIP (degrees from north) | 270 |
| A | INST_INTZ | kN/m2 | Pressure reading at zero applied pressure | 15 |
| A | INST_REM | | Remarks | |

| Group Name: IOBS | - | Single Point Instrument Readings | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6421/A |
| * | **INST_TDEP** | m | Depth to reference level of instrument from HOLE_GL or HOLE_LOCX | 7.25 |
| * | **INST_ID** | | Instrument reference number | A2345 |
| * | **IOBS_DATE** | dd/mm/yyyy | Date of reading | 26/03/1994 |
| * | **IOBS_TIME** | hhmmss | Time of reading | 164000 |
| A | IOBS_DEP | m | Depth to water from HOLE_GL or HOLE_LOCX | 2.25 |
| A | IOBS_HEAD | m | Head of water above INST_DEP | 5.00 |
| A | IOBS_PRES | kN/m2 | Reading of pressure | 80 |
| A | IOBS_LEVL | m | Level of settlement point relative to datum | 11.56 |
| A | IOBS_REM | | Remarks | Reading taken during heavy rain |

| Group Name: PROF | - | Profiling Instrument Installation Details | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6422/A |
| * | **PROF_ID** | | Instrument reference number | B2345 |
| A | PROF_DATE | dd/mm/yyyy | Installation date | 22/03/1994 |
| A | PROF_TYPE | | Profiling instrument type | INCL |
| A | PROF_TRPS | m | Depth to top of response zone from HOLE_GL or HOLE_LOCX | 0.00 |
| A | PROF_BRPS | m | Depth to base of response zone from HOLE_GL or HOLE_LOCX | 7.50 |
| A | PROF_DIRA | Deg | Orientation of primary keyway (degrees from north) | 120 |
| A | PROF_REM | | Remarks | Primary keyway (A) orientated downslope, secondary direction (C) across slope to left looking down |

| Group Name: PROB | - | Profiling Instrument Readings | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6422/A |
| * | **PROF_ID** | | Instrument reference number | B2345 |
| * | **PROB_DATE** | dd/mm/yyyy | Date of reading | 26/03/1994 |
| * | **PROB_TIME** | hhmmss | Time of reading | 164000 |
| * | **PROB_DEP** | m | Depth of reading from HOLE_GL or HOLE_LOCX | 6.50 |
| A | PROB_GAUG | | Rod or inclinometer gauge length | 0.50 |
| A | PROB_TDEP | m | Depth to top of slip obstruction from HOLE_GL or HOLE_LOCX for slip indicator | 3.20 |
| A | PROB_BDEP | m | Depth to base of slip obstruction from HOLE_GL or HOLE_LOCX for slip indicator | 4.00 |
| A | PROB_A | mm | Primary keyway displacement direction A | 3 |
| A | PROB_B | mm | Displacement direction B | -3 |
| A | PROB_C | mm | Displacement direction C | 2 |
| A | PROB_D | mm | Displacement direction D | -2 |
| A | PROB_REM | | Details for instrument reference, probe logger, serial numbers | |

| Group Name: SUCT | - | Suction Tests | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 1 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.60 |
| A | SUCT_METH | | Test method | Chandler |
| A | SUCT_VAL | kN/m2 | Suction value | 50 |

| Group Name: HPGI | - | Horizontal Profile Gauge Installation Details | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6423/A |
| * | **HPGI_ID** | | Instrument reference number | H2345 |
| A | HPGI_DATE | dd/mm/yyyy | Installation date | 22/03/1994 |
| A | HPGI_DLN | m | Level of datum point relative to HOLE_GL or HOLE_LOCX | 0.30 |
| A | HPGI_FDIS | m | Distance to furthest reference point from datum point | 20 |
| A | HPGI_NDS | m | Distance to nearest reference point from datum point | 2.00 |
| A | HPGI_DIRH | Deg | Direction of HPG from datum point (degrees from north) | 142 |
| A | HPGI_REM | | Remarks, details of instrument | |

| Group Name: HPGO | - | Horizontal Profile Gauge Observations | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6423/A |
| * | **HPGI_ID** | | Instrument reference number | H2345 |
| * | **HPGO_DATE** | dd/mm/yyyy | Date of reading | 26/03/1994 |
| * | **HPGO_TIME** | hhmmss | Time of reading | 164000 |
| A | HPGO_DIS | m | Distance from datum point to reading point | 15 |
| A | HPGO_RLEV | m | Level of reading point relative to datum point | 0.73 |
| A | HPGO_REM | | Remarks | Embankment at 2.00m |

| Group Name: CMPG | - | Compaction Tests - General | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 7.50 |
| * | **SAMP_REF** | | Sample reference number | 15 |
| * | **SAMP_TYPE** | | Sample type | LB [Note 2] |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 7.50 |
| A | CMPG_TYPE | | Compaction test type | 2.5kg, 4.5kg or vibro |
| A | CMPG_MOLD | | Compaction mould type | Standard or CBR |
| A | CMPG_375 | % | Weight percent of material retained on 37.5mm sieve | 7 |
| A | CMPG_2ØØ | % | Weight percent of material retained on 20mm sieve | 15 |
| A | CMPG_PDEN | | Particle density measured or assumed (#) | #2.65 |
| A | CMPG_MAXD | Mg/m3 | Maximum dry density | 2.06 |
| A | CMPG_MCOP | % | Moisture content at maximum dry density | 14 |
| A | CMPG_REM | | Notes on compaction test required under BS 1377 : 1990 | |

| Group Name: CMPT | - | Compaction Tests | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 7.50 |
| * | **SAMP_REF** | | Sample reference number | 15 |
| * | **SAMP_TYPE** | | Sample type | LB [Note 2] |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 7.50 |
| * | **CMPT_TESN** | | Compaction point number | 1 |
| A | CMPT_MC | % | Moisture content | 7.8 |
| A | CMPT_DDEN | Mg/m3 | Dry density at CMPT_MC moisture content | 1.85 |

| Group Name: MCVG | - | MCV Test - General | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6481/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 18 |
| * | **SAMP_TYPE** | | Sample type | LB Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| A | MCVG_REM | | Notes on MCV test as BS 1377 Part 4 Cl. 5.4, and 5.5. Test report items a) and c) | |
| A | MCVG_2ØØ | % | Weight percent of material retained on 20mm sieve | 15 |
| A | MCVG_NMC | % | Natural moisture content | 21 |
| A | MCVG_PRCL | | MCV precalibrated value as BS 1377 Part 4 and whether higher or lower. | >10 |

| Group Name: MCVT | - | MCV Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6481/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 18 |
| * | **SAMP_TYPE** | | Sample type | LB Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| * | **MCVT_TESN** | | MCV test number | 1 |
| A | MCVT_MC | % | Moisture content | 17 |
| A | MCVT_RELK | | MCV value at MCVT_MC moisture content | 12.3 |
| A | MCVT_BDEN | Mg/m3 | Bulk density related to the MCVT_RELK MCV | 2.0 |

| Group Name: CBRG | - | CBR Test - General | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6491/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 22 |
| * | **SAMP_TYPE** | | Sample type | LB [Note 2] |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| A | CBRG_COND | | Sample condition | Undisturbed, Remoulded etc |
| A | CBRG_METH | | Method of remoulding | Heavy compaction |
| A | CBRG_REM | | Notes on CBR test | Natural, soaked, duration of soaking, 10kN/m² surcharge |
| A | CBRG_NMC | % | Natural moisture content | 20 |
| A | CBRG_2ØØ | % | Weight percent retained on 20mm sieve | 10 |
| A | CBRG_SWEL | mm | Amount of swell recorded | 3.0 |

| Group Name: CBRT | - | CBR Test | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6491/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 22 |
| * | **SAMP_TYPE** | | Sample type | LB [Note 2] |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| * | **CBRT_TESN** | | CBR test number | 1 |
| A | CBRT_TOP | % | CBR at top | 6.4 |
| A | CBRT_BOT | % | CBR at bottom | 5.2 |
| A | CBRT_MCT | % | Moisture content at top | 15 |
| A | CBRT_MCBT | % | Moisture content at bottom | 14 |
| A | CBRT_BDEN | Mg/m3 | Bulk density | 1.82 |
| A | CBRT_DDEN | Mg/m3 | Dry density | 1.60 |

| Group Name: PTST - Laboratory Permeability Tests | | | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6411/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| * | **PTST_TESN** | | Permeability test number | 2 |
| A | PTST_REM | | Permeability test method | Constant head permeability test |
| A | PTST_COND | | Sample condition | undisturbed (undist), remoulded (rem) etc. |
| A | PTST_SZUN | mm | Size cut off of material too coarse for testing | 5 |
| A | PTST_UNS | % | Proportion of material too coarse for testing - BS 1377 Part 5 cl 5.7 | 36 |
| A | PTST_DIA | mm | Diameter of test sample | 102 |
| A | PTST_LEN | mm | Length of test sample | 200 |
| A | PTST_MC | % | Initial moisture content of test sample | 20 |
| A | PTST_BDEN | Mg/m3 | Initial bulk density of test sample | 2.24 |
| A | PTST_DDEN | Mg/m3 | Dry density of test sample | 1.87 |
| A | PTST_VOID | | Voids ratio of test sample | 0.37 |
| A | PTST_K | m/s | Coefficient of permeability | 0.000004 |
| A | PTST_TSTR | kN/m2 | Mean effective stress at which permeability measured (when measured in triaxial cell). | 112 |
| A | PTST_ISAT | % | Initial degree of saturation | 72 |
| A | PTST_FSAT | % | Final degree of saturation | 98 |
| A | PTST_PDENS | | Particle density, measured or (#) assumed | 2.65 |

| Group Name: SHBG | - | Shear Box Testing - General | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6331/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| A | SHBG_TYPE | | Test type eg. small shear box, large shear box, ring shear | Small shear box |
| A | SHBG_REM | | Test notes eg. undisturbed, pre-existing shear, recompacted, rock joint, cut plane | Undisturbed |
| A | SHBG_PCOH | kN/m2 | Peak cohesion intercept | 5 |
| A | SHBG_PHI | deg | Peak angle of friction | 26.5 |
| A | SHBG_RCOH | kN/m2 | Residual cohesion intercept | 1 |
| A | SHBG_RPHI | deg | Residual angle of friction | 13.0 |

| Group Name: SHBT | - | Shear Box Testing | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6331/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| * | **SHBT_TESN** | | Shear box stage number | 1 |
| A | SHBT_MC | % | Specimen initial moisture content | 20 |
| A | SHBT_BDEN | Mg/m3 | Bulk density | 1.96 |
| A | SHBT_DDEN | Mg/m3 | Dry density | 1.63 |
| A | SHBT_NORM | kN/m2 | Shear box normal stress | 100 |
| A | SHBT_DISP | mm/s | Displacement rate | |
| A | SHBT_PEAK | kN/m2 | Shear box peak shear stress | 65.5 |
| A | SHBT_RES | % | Shear box residual shear stress | 47.2 |
| A | SHBT_PDIS | mm | Displacement at peak shear strength | 2.35 |
| A | SHBT_RDIS | mm | Displacement at residual shear strength | 12.41 |
| A | SHBT_PDEN | | Particle density. measured or, (#) assumed | 2.65 |
| A | SHBT_IVR | | Initial voids ratio | 0.5 |
| A | SHBT_MCI | % | Initial moisture content | 20 |
| A | SHBT_MCF | % | Final moisture content | 18 |

| Group Name: TNPC | - | Ten Per Cent Fines | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6321/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 25 |
| * | **SAMP_TYPE** | | Sample type | B Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 6.50 |
| A | TNPC_TESN | | Ten per cent fines test number | 1 |
| A | TNPC_REM | | Notes on testing as per BS 812 | |
| A | TNPC_DRY | kN/m2 | 10% fines values on dry aggregate | 70 |
| A | TNPC_WET | kN/m2 | 10% fines value on wet aggregate | 60 |

| Group Name: FRST | - | Frost Susceptibility | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6341/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 11 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.50 |
| A | FRST_COND | | Sample condition | Undisturbed (undist), remoulded (rem), etc. |
| A | FRST_REM | | Notes on frost susceptibility testing as per TRRL SR 829 | |
| A | FRST_DDEN | Mg/m3 | Dry density | 1.96 |
| A | FRST_MC | % | Moisture content | 24 |
| A | FRST_HVE1 | % | Frost heave, first specimen | 3.0 |
| A | FRST_HVE2 | % | Frost heave, second specimen | 4.5 |
| A | FRST_HVE3 | % | Frost heave, third specimen | 3.5 |
| A | FRST_HVE | % | Mean heave of 3 specimens | 3.67 |

| Group Name: CHLK | - | Chalk Tests | | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6131/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 2.50 |
| * | **SAMP_REF** | | Sample reference number | 10 |
| * | **SAMP_TYPE** | | Sample type | LB Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 2 |
| * | **SPEC_DPTH** | m | Specimen Depth | 2.50 |
| * | **CHLK_TESN** | | Chalk crushing test number | 1 |
| A | CHLK_CCV | | Chalk crushing value as BS 1377 Part 4 Cl 6 | 3.5 |
| A | CHLK_MC | % | Chalk natural moisture content | 20 |
| A | CHLK_SMC | % | Chalk saturated moisture content | 25 |
| A | CHLK_Ø1Ø | % | Weight percent of material retained on 10mm sieve | |
| A | CHLK_REM | | Remarks | |
| A | CHLK_CARB | % | Chalk calcium carbonate content | 42 |

**Group Name: TOXA deleted (See group CNMT)**

**Group Name: TOXB deleted (See group CNMT)**

**Group Name: TOWA deleted (See group CNMT)**

**Group Name: TOWB deleted (See group CNMT)**

| **Group Name : CNMT** | | | - **Contaminant and Chemical Testing** | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/ number | 6431/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 12 |
| * | **SAMP_TYPE** | | Sample type | U Note 2 |
| * | **SPEC_REF** | | Specimen reference number | 4 |
| * | **SPEC_DPTH** | m | Specimen depth | 6.90 |
| * | **CNMT_TYPE** | | Determinand | CHLOS (See Appendix 8) |
| A | CNMT_RESL | | Test result | |
| A | CNMT_UNIT | | Test result units | (See Appendix 8) |
| A | CNMT_METH | | Test method | |
| A | CNMT_REM | | Comments on test | |
| A | CNMT_LIM | | Detection Limit | |

| Group Name: GAST | | | - Gas Constituents | |
|---|---|---|---|---|
| **Status** | **Heading** | **Unit** | **Description** | **Example** |
| * | **HOLE_ID** | | Exploratory hole name/number | 6151/A |
| * | **SAMP_TOP** | m | Depth to TOP of test sample | 6.50 |
| * | **SAMP_REF** | | Sample reference number | 6 |
| * | **SAMP_TYPE** | | Sample type | G Note 2 |
| * | **SPEC_REF** | | Specimen reference number | ii) |
| * | **SPEC_DPTH** | m | Specimen Depth | 8.50 |
| * | **GAST_DATE** | dd/mm/yyyy | Date of sampling | 26/03/1991 |
| * | **GAST_TIME** | hhmmss | Time of sampling | 092800 |
| A | GAST_REM | | Remarks | |
| A | GAST_TEMP | °C | Temperature of gas at time of sampling | 8 |
| A | GAST_OX | % vol | Oxygen | 0.16 |
| A | GAST_NIT | % vol | Nitrogen | 2.4 |
| A | GAST_CARD | % vol | Carbon Dioxide | 33.6 |
| A | GAST_METH | % vol | Methane | 63.8 |
| A | GAST_HYDS | % vol | Hydrogen Sulphide | 0.00002 |
| A | GAST_ETHA | % vol | Ethane | 0.005 |
| A | GAST_PROP | % vol | Propane | 0.002 |
| A | GAST_HYD | % vol | Hydrogen | 0.05 |
| A | GAST_HEL | % vol | Helium | 0.0000005 |
| A | GAST_HIGA | % vol | Higher Alkanes | 0.1 |
| A | GAST_CARM | % vol | Carbon Monoxide | 0.001 |
| A | GAST_ETHE | % vol | Ethene | 0.018 |
| A | GAST_ACET | % vol | Acetaldehyde | 0.005 |
| A | GAST_ISOB | % vol | Isobutane | 0.002 |
| A | GAST_NBUT | % vol | n - butane | 0.001 |
| A | GAST_SATH | % vol | Saturated Hydrocarbons other than Methane, Ethane, Propane, Butane | 0.005 |
| A | GAST_UNSH | % vol | Unsaturated Hydrocarbons other than Ethene | 0.009 |
| A | GAST_HALO | % vol | Halogenated Compounds | 0.00002 |
| A | GAST_ORGS | % vol | Organosulphur Compounds | 0.00001 |
| A | GAST_ALCO | % vol | Alcohols | 0.00001 |
| A | GAST_HYDC | % vol | Hydrogen Cyanide | 0.00001 |
| A | GAST_DIES | % vol | Diethyl Sulphide | 0.0000005 |
| A | GAST_RAD | $Bqm^{-3}$ | Radon | 200 |
| A | GAST_OTHR | % vol | Other Types | 0.023 |
| A | GAST_OTH | | Definition of GAST_OTHR | |

# APPENDIX 4

## File Security

Security of Magnetic Media
Magnetic Media Labelling Formats
Magnetic Media Index Record

# SECURITY OF MAGNETIC MEDIA

## Backup copies of media

The Producer will make two identical copies of each disk containing ASCII data.

The first copy will remain the property of the Producer and will be kept by him until the expiry of the contract maintenance period.

The second copy will be given to the Receiver who will be responsible for its long term retention. The Receiver will make a backup copy of the disk for security purposes immediately on receipt.

## Media labelling

All magnetic media will be securely labelled and clearly marked with

The title 'AGS Format ASCII Data'
The project identification (PROJ_ID)
The data of issue to the Receiver
The name of the Producer
The name of the Receiver
The unique issue sequence number

An example of the form of label is included.

## Media index

The Producer will maintain an index detailing for each issue of data

The heading 'AGS Format ASCII Data'
The title 'Media Index Record'
The project identification (PROJ_ID)
The unique issue sequence number
The date of issue to the Receiver
The name of the Producer
The name of the Receivers representative to whom the media was given
A general description of the data transferred

In addition the index will detail for each ASCII file

The file name including the extension ".AGS"
The date of file creation
The time of file creation
The file size in bytes
A general description of the data contained in each file

An index sheet should be prepared each time a disk is issued. The Producer should retain one copy of the index sheet and give a copy to the Receiver when the disk is handed over. An example of the form of index to be adopted is included.

The files shall contain ".AGS" files only. The disks shall contain no executable files and shall be checked for viruses before issue.

## Magnetic Media Labelling Formats

| AGS Format ASCII data |
|---|
| 7507/49 Road Improvement |
| Date: 16/08/1994 |
| From: A Contractor Co Ltd |
| To: A N Engineer Seq : 2.10 |

Format for 5.25" disk label

| AGS Format ASCII data |
|---|
| 7507/49 Road Improvement |
| Data : 16/08/1994 |
| From: A Contractor Co Ltd |
| To: A N Engineer |
| |
| Seq: 2.10 |

Format for 3.5" disk label

## Format for a Media Index Record Sheet

AGS Format ASCII Data

Media Index Record

| | |
|---|---|
| Project Identification | |
| Client | |
| From | |

| Issue Sequence Number | Date of Issue | Issued To | General Notes |
|---|---|---|---|
| | | | |

| File Name | Creation Date | Creation Time | File Size in Bytes | General Description of data transferred |
|---|---|---|---|---|
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This sheet may be copied

# APPENDIX 5

## Examples of General and Particular Specification Clauses with Associated Notes for Guidance

# EXAMPLES OF GENERAL AND PARTICULAR SPECIFICATION CLAUSES WITH ASSOCIATED NOTES FOR GUIDANCE

In order to assist in the drafting of ground investigation specifications, examples of the type of clauses and associated notes for guidance for implementing digital data are given in this Appendix. Not all of these clauses are likely to be required in all contracts but the intention is to provide the appropriate clauses for most scales of ground investigation.

# SPECIFICATION FOR DIGITAL DATA

## General

1 Unless otherwise required in the Contract, the Contractor is to provide field and laboratory data in digital form, as well as in paper form.

2 The definitive copy of the field and laboratory data shall be the paper copy.

## Format

3 The data shall be provided in ASCII format, on disks or other transmission media as agreed by the Engineer, and formatted to be compatible with MS-DOS Version 3.2. The files shall not be compressed.

4 The format of the digital data files shall comply with Appendix 1 of the Association of Geotechnical Specialists (AGS) publication 'Electronic transfer of geotechnical data from ground investigations' (2nd Edition). The key data groups and, where recorded, common data groups, shall be included in accordance with Appendix 2 of the above AGS publication.

5 Additional data groups or fields required for the data specified in the Contract shall be included in accordance with Appendices 2 and 3 of the AGS publication 'Electronic transfer of geotechnical data from ground investigations' (2nd Edition). Any new, amended or additional groups or fields in the Contract shall only be created with the Engineer's approval.

## Security

6 All disks, or other agreed transmission media, shall be securely labelled and clearly marked with:

The title 'AGS Format ASCII Data'
The project identification (PROJ-ID)
The date of issue to the Engineer
The name of the Contractor
The name of the Engineer
The unique issue sequence number

If more than one disk, or other agreed transmission medium, is required, then each shall be clearly labelled to indicate the order in which the Engineer should read the data. The split of the data into separate files shall be decided by the Contractor. The unique sequence number shall run sequentially from the start of the contract. Where more than one disk is required for a particular issue of digital data, this fact shall be clearly identified on the labels in that issue.

7 Until the completion of the maintenance period, the Contractor shall keep an index detailing:

The heading 'AGS Format ASCII Data'
The title 'Media Index Record'
The project identification (PROJ_ID)
The unique issue sequence number
The date of Issue to the Engineer
The name of the Contractor issuing the transmission media
The name of the Engineer to whom the transmission media was issued
A general description of the data transferred

For each data file, the index will detail:

The file name including the extension, ".AGS".
The date the file was created
The time the file was created
The file size in bytes
A general description of the data contained in each file

The Contractor shall retain one copy of the index sheet and shall issue to the Engineer a copy of the completed index sheet with the disk(s), or other agreed transmission medium.

## Preliminary Data

8 The Contractor shall issue digital copies of all preliminary data whenever required by the Engineer.

9 The preliminary data may be subject to update as necessary in the light of laboratory testing and the further examination of samples and cores. When available, laboratory data shall be input.

10 In addition to the labelling given in Clause 6, the disks shall be labelled 'PRELIM' and a unique sequence number given to the disk for each issue of digital data to the Engineer.

11 A list of data items not included in the digital data but included in the paper copy shall be provided.

12 All preliminary data in digital form shall be able to be presented in the same form as it is to be used for the Factual Report.

## Factual Report

13 In addition to the labelling given in Clause 6 of this specification, the disk(s), or other agreed transmission media, submitted with the Factual Report shall be labelled 'FINAL'.

14 The digital data provided by the Contractor with the Factual Report is required to be complete and a total replacement of any previous preliminary data.

15 In addition to the paper copies of the Factual Report, the Contractor shall provide a Report with a digital copy of those field and laboratory data specified in the Contract to be in digital form. This report shall consist of a paper copy of the descriptive account from the Factual Report, a disk(s), or other agreed transmission medium, containing the digital data, paper copies of any data not included in digital form, and the Contract Drawings. The report shall be firmly bound within stiff covers.

## Dummy Set of Data

16 Prior to the start of work on the Contract the Contractor shall submit to the Engineer a dummy set of data in the required format for the approval of the Engineer.

## Submitting Data

17 Updated disks, or other agreed media, shall be provided as required by the Engineer as work proceeds. The Contractor shall make two identical copies of each disk, whether preliminary or final. The first copy shall be retained by the Contractor until the expiry of the contract maintenance period. The second copy will be issued to the Engineer.

## Units of Measurement

**18** The units of measurement shall be those given in Appendices 2, 3 and 8 of AGS publication 'Electronic transfer of geotechnical data from ground investigations' (2nd edition) unless other units of measurement for digital data are given in the Contract.

# NOTES FOR GUIDANCE ON THE SPECIFICATION FOR DIGITAL DATA

## General

**NG 1** A copy of the digital data may in some circumstances accompany every issue of the paper copies and the data shall be subject to the same timing and submission requirements. However, the Engineer may, depending on the contract, prefer to receive digital data only after a significant amount of data has been collected.

**NG 2** The paper copy is definitive.

## Format

**NG 3** The acceptable media for the transmission of data should be given on a site specific basis.

**NG 4** The data dictionary defining these headings is given in the AGS publication 'Electronic transfer of geotechnical data from ground investigations'.

**NG 5** The Engineer is responsible for contacting the AGS to ensure that any digital data proposed to be used, and which are not included in the AGS publication mentioned in NG 4, have not already been assigned a heading. By following this procedure, new standard headings can be issued.

## Security

**NG 6** It is critical that disks, or other agreed transmission media, are properly labelled to ensure easy identification. The AGS publication mentioned in NG 4 gives an example of the form of label which can be adopted for 3.5 inch and 5.25 inch disks.

**NG 7** The index is also critical to the proper management of disks, or other agreed transmission media. The AGS publication mentioned in NG 4 gives an example of the form of index which can be adopted.

## Preliminary Data

**NG 8** Only the preliminary data or Factual Report may be required in digital form for some contracts. The timing of submission of the digital data may also require specifying.

**NG 9** The Engineer and the Contractor must be aware of the problems posed by the presence of small sets of data in a series of files and the potential for and the presence of errors in the data sets. These become very important if the data is being transferred to a data base where incoming data is added to existing data. The organisation of the data prior to issue is the responsibility of the Contractor. The Contractor's system must ensure that data originating from different sources within the Contractor's organisation is compatible.

**NG 10** The sequential numbering of data issues must be rigorously adhered to so that no data versions are issued out of sequence. When errors or inconsistencies are noted in the data, by either the Engineer or Contractor, they should be corrected by the Contractor and a corrected data set issued. When a change or addition is made to data within an issue, a complete data group

should be reissued, not just the changed fields. This may not require complete replacement of the whole data set which includes other previous issues.

**NG 11** The requirement for identification of data items, which are not included in the preliminary data set ensures that no information is left out when each digital data record is issued.

## Factual Report

**NG 15** The requirements given for the Report containing the digital data are to ensure that the bound volume is as complete as the full paper copy. The transmission of the descriptive account as a print file is not considered appropriate as some features can be lost in transfer. The requirement for data items, which are not included in the digital data, to be given ensures that no information is left out when the digital data is issued.

## Dummy Set of Data

**NG 16** This requirement ensures that the Contractor is using the standard headings and that the digital data can be accurately transferred.

## Submitting Data

**NG 17** The second copy will be given to the Engineer who should, immediately on receipt, make a backup copy for security purposes.

The Engineer is likely to be receiving information from a number of sources within the Contractor's organisation, eg field data and laboratory data. The Contractor's data management system must ensure that all issues are compatible and numbered in the correct sequential order. The Engineer must be prepared to manage the data as it arrives. Any file transmitted during the Contract may contain all or part of the data available at that time. It may contain borehole log data, laboratory data or both.

## Units of Measurement

**NG 18** It is necessary for the Engineer to be certain exactly what the units of measurement are for the data being received. It is recognised that units may be specified elsewhere in the contract. Any units different to those in the AGS publication mentioned in NG 4 must, however, be specified for the digital data in order to ensure an understanding of transferred data.

# APPENDIX 6

## Interchange Facilities and Example Data Interchange File

# INTERCHANGE FACILITIES

There are a number of methods for transferring electronic data between microcomputers, namely:

(i) Portable Transfer

- "Floppy" Disks
- Magnetic Tape
- Optical Disks
- Removable Hard Disk Cartridges

(ii) Hard-wire Transfer

- Modem to Modem (telephone line)
- Local and Wide area Networks

In principle any of these methods could be used to transfer the ASCII data files. However, it is anticipated that in most practical cases "Floppy" Disks will be used.

## DISKS

There are four principal types of floppy disk in use on IBM-PC and compatible microcomputers. Only disks compatible with MS-DOS version 3.2 format will be used.

| Physical Size | Storage Capacity (MS-DOS formatted) |
|---|---|
| 5¼" | 360 kb |
| 5¼" | 1.2 Mb |
| 3½" | 720 kb |
| 3½" | 1.44 Mb |

The 3½" disks are more robust than 5¼" disks and can generally be sent by post in normal envelopes without requiring special protection. They are light and a single disk can be sent at the lowest "letter post" rate. Also a majority of new computers are now supplied with 3½" disk drives. For these reasons 3½" disks are preferred.

It is important to establish that the data RECEIVER has the same disk size (3½"/ 5¼") and the same (or larger) capacity as the PRODUCER. The larger capacity drives can read lower capacity disks but not vice versa.

## EXAMPLE OF DATA INTERCHANGE FILE

```
"**PROJ"
"*PROJ_ID","*PROJ_NAME","*PROJ_CLNT"
"123/abc","Towy Valley Cyder Company","A. Client & Partners"


"**HOLE"
"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL",
"*HOLE_FDEP","*HOLE_STAR","*HOLE_LOG"
"501","","554293","221884","91.90","30.6","","T.A."
"504","CP","554291","221880","90.00","9.2","12/01/1990","FHS"


"**GEOL"
"*HOLE_ID","*GEOL_TOP","*GEOL_BASE","*GEOL_DESC","*GEOL_GEOL"
"501","0.0","10.8","Stiff becoming very stiff grey slightly sandy ",""
"<CONT>","","","CLAY with a little fine to medium chalk and occasion",""
"<CONT>","","","al flint gravel.   (BOULDER CLAY)","BC"
"501","10.8","30.6","Very stiff brown CLAY with extremely closely ",""
"<CONT>","","","spaced fissures. Occasional silt dustings on fissure",""
"<CONT>","","","s.   (LONDON CLAY) ","LC"
"504","0.0",".2","Loose FILL with ash and brick",""
"504","0.2","1.4","Soft grey CLAY",""
"504","1.4","1.9","Brown SILT",""
"504","1.9","2.6","Soft grey CLAY",""
"504","2.6","3.8","Laminated blue grey CLAY",""
"504","3.8","5.2","Hard brown to grey SILTSTONE",""
"504","5.2","7","Fresh DOLOMITE",""
"504","7","9.2","DOLOMITE",""


"**DETL"
"*HOLE_ID","*DETL_TOP","*DETL_BASE","*DETL_DESC"
"501","1.7","1.9","brown grey mottled grey"
"501","3.8","4.0","occasional coarse gravel"
"501","4.8","5.1","occasional black mudstone gravel"
"501","5.2","5.5","sandy clay"
"501","10","10.3","dark brown"
"501","10.8","10.9","dark brown"
"501","13.4","13.8","Foreman notes claystone band"
"501","29","30.1","white trace fossils"


"**SAMP"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SAMP_BASE",
"*SAMP_DIA"
"501","1.0","","D","1.2",""
"501","1.80","5","U","2.25",""
"501","3.60","","W","",""
"501","4.50","10","W","",""
"501","5.00","11","B","5.4",""
"501","5.70","13","W","",""
"501","7.10","16","D","7.6",""
"501","8.60","20","W","",""
"501","9.00","19","B","9.45",""
```

```
"**CLSS"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF",
"*SPEC_DPTH","*CLSS_NMC","*CLSS_LL","*CLSS_PL","*CLSS_DDEN",
"*CLSS_BDEN","*CLSS_PD"
"501","1.80","5","U","a","2.00","19.0","","","","",""
"501","5.00","11","B","","","20.0","","","","",""
"501","7.10","16","D","","","77.0","89.0","60.0","","",""
"501","9.00","19","B","2","","14.0","35.0","21.0","2.37","2.70",""


"**GRAD"
"*HOLE_ID","*SAMP_TOP","*SAMP_REF","*SAMP_TYPE","*SPEC_REF",
"*SPEC_DPTH","*GRAD_SIZE","*GRAD_PERP","*GRAD_TYPE"
"501","1.80","5","U","b","2.10","37.5","100","WS"
"501","1.80","5","U","b","2.10","9.5","92","WS"
"501","1.80","5","U","b","2.10","4.75","75","WS"
```

# APPENDIX 7

# Registration

# Electronic Transfer of Geotechnical Data from Ground Investigations

| Registration No. (To be Allocated) |
|---|
| |

## REGISTRATION

| | | | |
|---|---|---|---|
| Business Name<br><br>Address<br><br><br>Post Code<br>Country | | | |
| Telephone No. | | Contact Name | |
| Facsimile No. | | Signature | |
| Issue No.<br>Purchase Date<br>Submission Date | | | |

| For Office Use | |
|---|---|
| Date Received<br>Date Registered | |

| COMMUNICATION RECORD | |
|---|---|
| Date | Description |
| | |
| | |
| | |
| | |
| | |
| | |

Notes:
1) This form should be sent to the following address for registration:
**Association of Geotechnical Specialists,**
**PO Box 250,**
**Camberley,**
**Surrey.GU15 1UD**
**United Kingdom**
2) A copy of this form is not acceptable for registration but you may wish to take a copy for your own records.
3) An acknowledgement of your registration and registration number will be sent to your business address.
4) Registration will enable document holders to be advised when changes are made.
5) Any changes to the registration details should be notified to the Association of Geotechnical Specialists.

# APPENDIX 8

## Chemical Determinand Codes and Units

This appendix provides a listing of test determinand codes to be used in conjunction with group CNMT. Associated preferred units are also given. It is not intended that the list be exhaustive and other determinand codes may be added by agreement between data producers and receivers. To enable third party access to the data, however, additional codes must be ratified by the AGS for them to be considered part of the AGS format.

The listing is configured to provide the more common solid and water determinands first, followed by more specialised determinands.

***Solid Determinands***

| Description | Code | Units |
|---|---|---|
| Antimony (Total) | ANTS | mg/kg |
| Aromatic Hydrocarbons | HYDRS | mg/kg |
| Arsenic (Total) | ASTS | mg/kg |
| Asbestos (Presence of) | ASBPS | Y/N |
| Asbestos fibre count | ASBCS | |
| Barium (Total) | BAS | mg/kg |
| Beryllium (Total) | BES | mg/kg |
| Boron (Available) | BORAS | mg/kg |
| Boron (Total) | BORTS | mg/kg |
| Cadmium (Total) | CATS | mg/kg |
| Calorific Value | CALOS | kJ/kg |
| Chloride (percent of dry weight) | CHLOS | % |
| Chlorinated hydrocarbons | CLHYS | mg/kg |
| Chromium (Hexavalent) | CHROS | mg/kg |
| Chromium (Total) | CHRTS | mg/kg |
| Coal tar derivatives | COALS | mg/kg |
| Cobalt (Total) | COTA | mg/kg |
| Combustibility | COMBS | kJ/kg |
| Copper (Total) | CUTS | mg/kg |
| Copper (Available) | CUAS | mg/kg |
| Cyanide (Total) | CNTS | mg/kg |
| Cyanide (Complex) | CNCS | mg/kg |
| Cyanide (Free) | CNFS | mg/kg |
| Cyclohexane extract | CYCLS | mg/kg |
| Electrical conductivity at 20° C | ELCOS | $\mu$s/cm |
| Elemental Sulphur | SULES | mg/kg |
| Ferricyanide | FERCS | mg/kg |
| Ferro-ferricyanide | FERFS | mg/kg |
| Hydrocarbons (Total) | HDTS | mg/kg |
| Fluoride | FLS | mg/kg |
| Iron (Soluble) | FESS | mg/kg |

| Description | Code | Units |
|---|---|---|
| Iron (Total) | FETS | mg/kg |
| Kjeldahl Nitrogen (Total) | NITRS | mg/kg |
| Lead (Available) | PBAS | mg/kg |
| Lead (Total) | PBTS | mg/kg |
| Loss on ignition @ 440°C | IGNIS | % of dry weight |
| Magnesium (Total) | MGTS | mg/kg |
| Manganese (Total) | MNGS | mg/kg |
| Mercury (Total) | HGTS | mg/kg |
| Mineral Oil | MOILS | mg/kg |
| Molybdenum (Total) | MOTS | mg/kg |
| Nickel (Total) | NITS | mg/kg |
| Nickel (Available) | NIAS | mg/kg |
| Organic Chlorine | OCHLS | µg/kg |
| Orthophosphate | ORTHS | mg/kg |
| pH | PHS | |
| Phenol (Monohydric) | PHEMS | mg/kg |
| Phenol (Total) | PHETS | mg/kg |
| Phosphorous (Total) | PHOTS | mg/kg |
| Polychlorinated biphenyls - presence of (<50mg/kg or >50mg/kg) | PCBPS | |
| Polychlorinated Biphenyls | PCBS | µg/kg |
| Polynuclear Aromatic Hydrocarbons (Total) | HCARS | µg/kg |
| Selenium (Total) | SES | mg/kg |
| Solvent Extractable Matter | SOLVS | mg/kg |
| Sulphate (Total) (percent of dry weight) | SULTS | % |
| Sulphate (2:1 Soil/Water extract) | SULWS | g/l |
| Sulphide | SULIS | mg/kg |
| Sulphide (Free) | SULFS | mg/kg |
| Sulphur (Total) | SULPS | mg/kg |
| Thiocyanate | THIOS | mg/kg |
| Tin (Total) | SNS | mg/kg |
| Vanadium (Total) | VNS | mg/kg |
| Zinc (Total) | ZNTS | mg/kg |
| Zinc (Available) | ZNAS | mg/kg |

# *Water Determinands*

| Description | Code | Units |
|---|---|---|
| Acidity/Alkalinity | ACALW | |
| Ammonia | AMMOW | mg/l |
| Ammoniacal Nitrogen | AMMNW | mg/l |
| Antimony | ANTW | mg/l |
| Arsenic | ASW | mg/l |
| Barium | BAW | mg/l |
| Beryllium | BERW | mg/l |
| Bicarbonate | BICAW | mg/l |
| Biochemical Oxygen Demand (5 Day) | BIOXW | mg/l |
| Boron | BOW | mg/l |
| Cadmium | CDW | mg/l |
| Calcium | CAW | mg/l |
| Chemical Oxygen Demand (Soluble) | CHOXW | mg/l |
| Chloride | CHLRW | mg/l |
| Chlorinated hydrocarbons | CHHYW | µg/l |
| Chlorine (Organic) | CHLOW | mg/l |
| Chromium | CHROW | mg/l |
| Cobalt | COW | mg/l |
| Copper | CUW | mg/l |
| Cyanide (Free & Simple) | CNFW | mg/l |
| Cyanide (Total) | CNTW | mg/l |
| Cyanide (Complex) | CNCW | mg/l |
| Electrical Conductivity | CONDW | µs/cm |
| Ferro-ferricyanide | FECNW | mg/l |
| Fluoride | FLW | mg/l |
| Hexavalent Chromium | CHRH | mg/l |
| Hydrocarbons (Total) | HDW | mg/l |
| Iron | FEW | mg/l |
| Kjeldahl Nitrogen (Total) | NITRW | mg/l |
| Lead | PBW | mg/l |
| Magnesium | MGW | mg/l |
| Manganese | MNW | mg/l |
| Mercury | HGW | mg/l |
| Mineral Oils | MOILW | mg/l |

| Description | Code | Units |
|---|---|---|
| Molybdenum | MOW | mg/l |
| Nickel | NIW | mg/l |
| Nitrate | NITAW | mg/l |
| Nitrite | NITIW | mg/l |
| Orthophosphate (Total) | ORTHW | mg/l |
| Oxygen (Dissolved) | OXYDW | mg/l |
| Petroleum Ether Extractable Matter | PETRW | mg/l |
| pH | PHS | |
| Phenol (Monohydric) | PHEMW | mg/l |
| Phenol (Total) | PHETW | mg/l |
| Phosphate (Total) | PHOTW | mg/l |
| Phosphorous (Total) | PHPTW | mg/l |
| Polychlorinated Biphenyls | PCBW | $\mu$g/l |
| Polychlorinated Biphenyls - presence of ($<50\mu gl^{-1}$ or $>50\mu gl^{-1}$) | PLBPW | |
| Polynuclear Aromatic Hydrocarbons | HCARW | mg/l |
| Potassium | POTW | mg/l |
| Redox Potential | REPTW | mV |
| Selenium | SEW | mg/l |
| Sodium | NAW | mg/l |
| Sulphate | SULAW | g/l |
| Sulphide | SULIW | mg/l |
| Sulphur (Elemental) | ESULW | mg/l |
| Thiocyanate | THIOW | mg/l |
| Tin | SNW | mg/l |
| Total Dissolved Solids | DISS | mg/l |
| Total Suspended Solids | SUSP | mg/l |
| Total Organic Carbon | ORGCW | mg/l |
| Total Oxidised Nitrogen | TONIW | mg/l |
| Vanadium | VNW | mg/l |
| Volatile Fatty Acids | VFATW | mg/l |
| Volatile Suspended Solids | VSOLW | mg/l |
| Zinc | ZNW | mg/l |

## *Solid Determinands, Additional*

| Description | Code | Units |
|---|---|---|
| Acid Insoluble Matter | AIMS | mg/kg |
| Aluminium (Available) | ALAS | mg/kg |
| Aluminium (Total) | ALTS | mg/kg |
| Ammoniacal Nitrogen | AMMNS | mg/kg |
| Anthrax (Presence of) | ANTHS | (Y/N) |
| Antimony (Available) | ANAS | mg/kg |
| Arsenic (Available) | ASAS | mg/kg |
| Barium (Available) | BAAS | mg/kg |
| Beryllium (Available) | BEAS | mg/kg |
| Bicarbonate | BICS | mg/kg |
| Cadmium (Available) | CDAS | mg/kg |
| Calcium carbonate | CACOS | mg/kg |
| Calcium | CAS | mg/kg |
| Carbonate | COS | mg/kg |
| Cation exchange | CATIS | mg/kg |
| Cobalt (Available) | COAS | mg/kg |
| Iron (Available) | FEAS | mg/kg |
| Magnesium (Available) | MGAS | mg/kg |
| Magnesium (Dry weight) | MGDS | mg/kg |
| Manganese (Available) | MNAS | mg/kg |
| Manganese (Dry weight) | MNDS | mg/kg |
| Mercury (Available) | HGAS | mg/kg |
| Mercury (Dry weight) | HGDS | mg/kg |
| Molybdenum (Available) | MOAS | mg/kg |
| Molybdenum (Dry weight) | MODS | mg/kg |
| Nickel (Dry weight) | NIDS | mg/kg |
| Nitrate | NIRS | mg/kg |
| Nitrite | NIIS | mg/kg |
| Organic Matter | OMS | mg/kg |
| Organo Lead | PBLS | mg/kg |
| Organo Tin | TIOS | mg/kg |
| Phosphate | PHOS | mg/kg |
| Potassium (Available) | POAS | mg/kg |
| Potassium (Total) | POTS | mg/kg |

| Description | Code | Units |
|---|---|---|
| Selenium (Available) | SEAS | mg/kg |
| Silver (Available) | SIAS | mg/kg |
| Silver (Total) | SITS | mg/kg |
| Strontium | STROA | mg/kg |
| Sulphur (Free) | SUFS | mg/kg |
| Tin (Available) | SNAS | mg/kg |
| Vanadium (Available) | VNAS | mg/kg |

## *BTEX to Eicosane*

| Description | Code | Units |
|---|---|---|
| Benzene | BENZ | mg/kg |
| Toluene | TOL | mg/kg |
| Ethylbenzene | ETHYL | mg/kg |
| *m & p* - Xylene | MPXYL | mg/kg |
| *o* - Xylene | OXYL | mg/kg |
| Heptane | HEPTA | mg/kg |
| Octane | OCTA | mg/kg |
| Nonane | NONA | mg/kg |
| Decane | DECA | mg/kg |
| Undecane | UND | mg/kg |
| Dodecane | DOD | mg/kg |
| Tridecane | TRID | mg/kg |
| Tetradecane | TETRD | mg/kg |
| Pentadecane | PENTD | mg/kg |
| Hexadecane | HEXD | mg/kg |
| Heptadecane | HEPD | mg/kg |
| Octadecane | OCTD | mg/kg |
| Nonadecane | NOND | mg/kg |
| Eicosane | EICO | mg/kg |

## *Speciated PAH's (16 EPA)*

| Description | Code | Units |
|---|---|---|
| Napthalene | NAPTHH | mg/kg |
| Acenaphthylene | ACNAP | mg/kg |
| Acenaphthene | ACNEN | mg/kg |
| Fluorene | FLN | mg/kg |
| Phenanthrene | PPENN | mg/kg |
| Anthracene | ANTHN | mg/kg |
| Fluoranthene | FLNN | mg/kg |
| Pyrene | PYRN | mg/kg |
| Benzo (a) anthracene | BENA | mg/kg |
| Chrysene | CRYN | mg/kg |
| Benzo (b) fluoranthene | BENB | mg/kg |
| Benzo (k) fluoranthene | BENK | mg/kg |
| Benzo (a) pyrene | BENAP | mg/kg |
| Indeno (1,2,3-cd) pyrene | INDP | mg/kg |
| Dibenzo (ab) anthracene | DIABN | mg/kg |
| Benzo (ghi) perylene | BENGI | mg/kg |

## *PCBs*

| Description | Code | Units |
|---|---|---|
| Monochlorobiphenyl | MONPB | mg/kg |
| Bichlorobiphenyl | BICPB | mg/kg |
| Trichlorobiphenyl | TRICPB | mg/kg |
| Tetrachlorobiphenyl | TETPB | mg/kg |
| Pentachlorobiphenyl | PENPB | mg/kg |
| Hexachlorobiphenyl | HEXPB | mg/kg |
| Heptachlorobiphenyl | HEPPB | mg/kg |
| Octachlorobiphenyl | OCTPB | mg/kg |
| Nonachlorobiphenyl | NONPB | mg/kg |
| Decachlorobiphenyl | DECPB | mg/kg |

## *Phenols*

| Description | Code | Units |
|---|---|---|
| 4 - chloro - 3 - methylphenol | 4C3MP | mg/kg |
| 2 - chlorophenol | 2CP | mg/kg |
| *o* - cresol | OCP | mg/kg |
| *p* - cresol | PCP | mg/kg |
| 2,4 - Dichlorophenol | 24DCP | mg/kg |
| 2,6 - Dichlorophenol | 26DCP | mg/kg |
| 2,4 - Dimethylphenol | 24DMP | mg/kg |
| 2,4 - Dinitrophenol | 24DNP | mg/kg |
| 2 - Methyl - 4,6 - Dinitrophenol | 2M46DNP | mg/kg |
| 2 - nitrophenol | 2NP | mg/kg |
| 4 - nitrophenol | 4NP | mg/kg |
| Pentachlorophenol | PNCP | mg/kg |
| 2,3,4,6 - Trichlorophenol | 2346TCP | mg/kg |
| 2,4,5 - Trichlorophenol | 245TCP | mg/kg |
| 2,4,6 - Trichlorophenol | 246TCP | mg/kg |

## *Halocarbons*

| Description | Code | Units |
|---|---|---|
| Bromodichloromethane | BROMO | mg/kg |
| Bromoform | BROMF | mg/kg |
| Bromomethane | BROMM | mg/kg |
| Carbon Tetrachloride | CTET | mg/kg |
| Chlorobenzene | CBENZ | mg/kg |
| Chloroethane | CETH | mg/kg |
| Chloroform | CFM | mg/kg |
| Chloromethane | CMN | mg/kg |
| Dibromochloromethane | DIBM | mg/kg |
| 1,2 - Dichlorobenzene | 12DB | mg/kg |
| 1,3 - Dichlorobenzene | 13DB | mg/kg |
| 1,4 - Dichlorobenzene | 14DB | mg/kg |
| Dichlorodifluormethane | DCFM | mg/kg |
| 1,1 - Dichloroethane | 11DEA | mg/kg |
| 1,2 - Dichloroethane | 12DEA | mg/kg |
| 1,1 - Dichloroethene | 11DEE | mg/kg |
| Trans - 1,2 - Dichloroethene | T12DE | mg/kg |
| 1,2 - Dichloropropane | 12DP | mg/kg |
| CIS - 1,3 - Dichloropropane | C13DP | mg/kg |
| Trans - 1,3 - Dichloropropene | T13DP | mg/kg |
| Methylene chloride | MCHLO | mg/kg |
| 1,1,2,2 - Tetrachloroethane | 1122TCE | mg/kg |
| Tetrachloroethane | TCE | mg/kg |
| 1,1,1 - Trichloroethane | 111TCE | mg/kg |
| 1,1,2 - Trichloroethane | 112TCE | mg/kg |
| Trichloroethene | TRCE | mg/kg |
| Trichlorofluoromethane | TCFE | mg/kg |
| Vinyl chloride | VCHL | mg/kg |

## *Pesticides*

| Description | Code | Units |
|---|---|---|
| $\alpha$ - BHC | ABHC | mg/kg |
| $\beta$ - BHC | BBHC | mg/kg |
| $\delta$ - BHC | DBHC | mg/kg |
| g - BHC | GBHC | mg/kg |
| Heptachlor | HEPC | mg/kg |
| Aldrin | ALD | mg/kg |
| Heptachlor epoxide | HEPEPO | mg/kg |
| Endosulfan I | ENDOI | mg/kg |
| 4,4 DDE | 44DDE | mg/kg |
| Dieldrin | DIEL | mg/kg |
| Endrin | ENDR | mg/kg |
| Endosulfan II | ENDOII | mg/kg |
| 4,4 DDD | 44DDD | mg/kg |
| Endrin aldehyde | ENDALD | mg/kg |
| Endosulfan sulphate | ENDSUL | mg/kg |
| 4,4 DDT | 44DDT | mg/kg |

## *Bacteriological Determinands*

| Description | Code | Units |
|---|---|---|
| Escherichia Coli | ESCC | MPN/100ml |
| Faecal Coliforms | FCOL | MPN/100ml |
| Faecal Streptococci | FSTP | MPN/100ml |
| Gram Positive Spore | GPS | MPN/100ml |
| Salmonellae excluding S typhi | SALM | MPN/l |
| Total Coliform Count | TCC | MPN/100ml |
| Total Plate Count | TPC | CFU/ml |

NB. MPN - Most Probable Number
CFU - Colony Forming Units