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User Manual for the British Columbia Soil Information System

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USER MANUAL FOR THE BRITISH COLUMBIA SOIL INFORMATION SYSTEM

(BCSIS Volume 1)

by
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OVERVIEW OF THE BRITISH COLUMBIA SOIL INFORMATION SYSTEM (BCSIS)

BCSIS is a computer based soil information system incorporating site, morphological, and laboratory data. The main objectives of the system are: to increase accessibility and reliability of soils information; to increase accuracy, volume, speed of response, and sophistication of interpretations; to increase speed of legend development; to increase ability to integrate soils data with other resource data. The system includes a number of easy to use functions related to data control, data management, and report generation. For data analysis, BCSIS is designed to be used in conjunction with the commercially available Statistical Analysis System (SAS). BCSIS resides on the Victoria mainframe computer but is accessible as well in other cities through the DATAPAC and SNA communications networks.

An extension of BCSIS is the Soil Laboratory System (SLS). SLS is an interactive, PDP 11/24 based minicomputer system designed to capture physical and chemical soils data determined in the soils laboratory in Kelowna. The main objectives of the system are: to increase the volume of samples which the lab can process, by eliminating or reducing the need to maintain lab notebooks and paper administrative records; to allow quick and accurate entry of the data into BCSIS files, by providing for the transference of final results to the mainframe in Victoria over the DATAPAC network. Raw data are entered into a number of video terminals located in the lab. Virtually all calculated results are performed automatically by the computer, provided that the raw data required by the calculations have already been entered. Reports on the laboratory analyses are printed and sent to the soil scientist requesting the analyses. The data may also be accessed and manipulated through BCSIS and SAS.

This document is one of a series describing BCSIS. These documents are written primarily for the professional soil scientist or ecologist, as opposed to the computer specialist. The titles within the series are as follows:

User Manual for the British Columbia Soil Information System (BCSIS Volume 1).
Data Entry Procedures for Ecosystem Description Forms (BCSIS Volume 2).
Data Entry Procedures for Soil Laboratory Forms (BCSIS Volume 3).
British Columbia Soil Information System Validation Procedures (BCSIS Volume 4).
Manipulation of Soils Data Using the British Columbia Soil Information System (BCSIS Volume 5).

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Mark Sondheim

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INTRODUCTION

Purpose

The purpose of this document is to provide the soil scientist or ecologist with an understanding of how to use the British Columbia Soil Information System. The user should first read the Introduction and System Description which follow and then turn to the sections of particular interest.

Who May Use BCSIS

Use and operation of the system are under the authority of the BCSIS Manager, Surveys and Resource Mapping Branch, 777 Broughton Street, Victoria, B.C. V8V 1X5. All those wishing to use BCSIS should contact the System Manager. Many of the system procedures are designed to be run directly by the user; those wishing to do this should be familiar with Wylbur and JCL and will have to obtain the appropriate BCSIS access codes from the System Manager. Alternatively, the user may ask that specific jobs be run for him. Though BCSIS has been designed specifically to meet the needs of those natural resource scientists working for the provincial government, others are encouraged to inquire about use. A one to two day course on the operation of BCSIS will be given regularly by the Data Services group within the Surveys and Resource Mapping Branch. Please contact the System Manager for details.

Bugs in the System

Though BCSIS is easy to use, internally it is a large and complex system. Before it went into full operation in September, 1982, a thorough test of all functions was made. Nevertheless, it is likely that some bugs may still exist. If you uncover errors with any of the procedures, please document them in writing. This documentation and the relevant output should be sent promptly to the System Manager, so that the problems may be resolved as quickly as possible.

SYSTEM DESCRIPTION

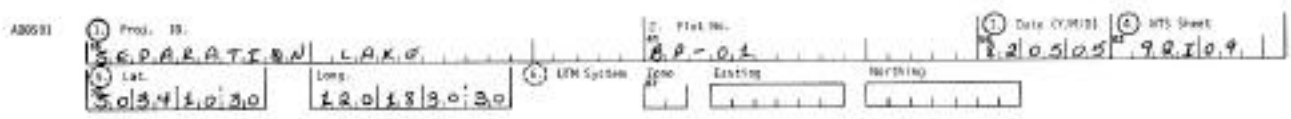
Flow of Data Into BCSIS

There exist three types of data in BCSIS, site data, soil data, and laboratory data. The site and soil data are colleced on waterproof field forms by the surveyor (Appendix 1). These forms, described in BCSIS Volume 2, are sent to Data Control in Victoria. Data Control has them key entered onto tape, has the tape mounted on the computer, and then runs a program which transfers the data into BCSIS. When in the field, the surveyor may also collect soil samples for physical and chemical laboratory analysis. If the analyses are performed by the Ministry of Environment Kelowna laboratory, the analytical results will be entered into the computerized Soil Laboratory System, residing within the Kelowna laboratory. On a frequent and periodic basis the data are transferred electronically into BCSIS in Victoria. The surveyor may have his analyses performed by another laboratory, or in the case of historic data, the analyses may have been performed before the Soil Laboratory System was implemented (July, 1982). In such cases the analytical results may be entered onto manual laboratory data entry forms and then forwarded to data control in Victoria for entry onto tape and then into BCSIS. Use of the forms associated with laboratory data (Appendix 1) is described in BCSIS Volume 3.

Structure of the Data when Input

Site

All of the data entered into BCSIS are contained on a series of transactions. A transaction is a line or record of data which begins with a six character code, called a transaction identifier; this identifier informs the computer of the type of data, whether the data are being added to the system, and what the format of the data is. Following the identifier is a seven character unique code, the series and form number (or simply form number). This number is then followed by the values of the items contained on the transaction. An example of a transaction is the ADDS01 transaction depicted on the Site Description Form (Appendix 1) and shown below.



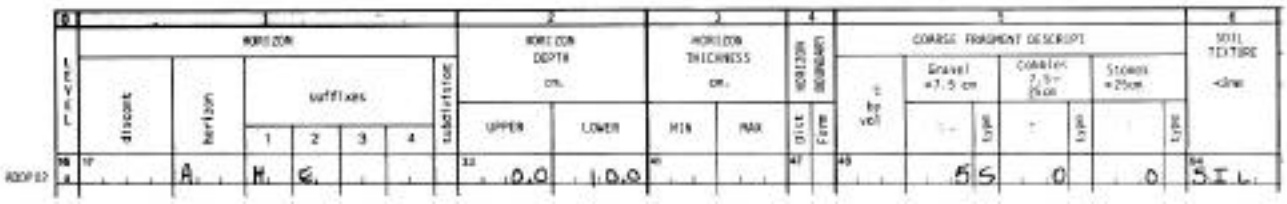
The transaction, as transcribed by key entry, appears as follows when entering the system.

ADDS01 8203175SEPARATION LAKE BP-01 820505 92I09 50341030120183030

ADDS01 occupies the first six spaces and is the transaction identifier. The letters ADD signify that data are being entered into the system. The S signifies that the data are site data, and the 01 indicates that site format number 1 is to be used to read the data. This format corresponds to items 1 through 6 on the Site Description Form. Spaces seven and eight on the transaction are left blank. spaces 9 through 15 contain the form number, 8203175 in the example. This number is inserted by key entry in these spaces for each and every transaction on the form. Project ID. begins in space 16. Because of the six characters occupied by the transaction identifier, the two blanks, and the seven digits occupied by the form number, the actual data items for all site transactions always being in space 16. If a site or soil transaction is longer than 100 characters, any additional data is wrapped around, and appears on the line beneath the first 100 characters of the transaction.

Soil

The input transactions for soil are similar to those for site; instead of an S for Site, a P is used to designate pedon or soil. A more complicated difference concerns those transactions showing data collected on a depth or horizon basis. Items 1 through 24 on the Soil Description Form (Appendix 1) fall into this category and are contained on transactions ADDP02, ADDP03, and ADDP04. On these transactions the form number is followed by a letter indicating the Level. The first horizon described is arbitrarily termed Level A; the second horizon described is arbitrarily termed Level B, etc. The Level value allows the system to keep track of all of the depth related data for a given horizon. It has no connotative significance beyond this function. Note that where used, Level occupies space 16 and the actual data begin in space 17. An example of the ADDP02 transaction as it looks on the form is as follows.



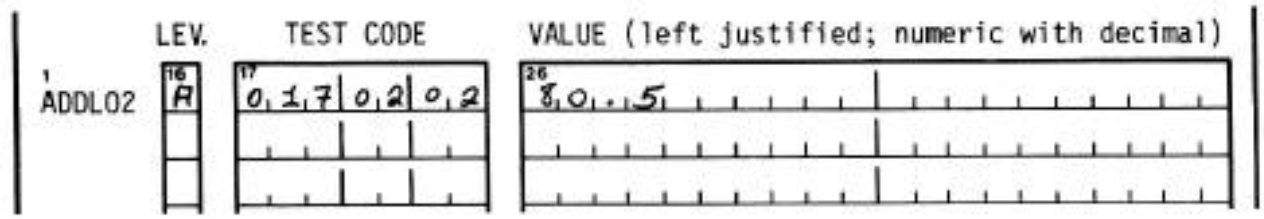
The actual input transaction has this appearance:

ADDP02 8203175A A H K 00 220 5 5S SIL

As the examples show, regardless of how the field forms are completed, all data enter into the system as upper case.

Laboratory

The laboratory data always refer to specific horizons or depth intervals in the soil. Thus each datum relates to a specific form number and Level value. All laboratory parameters, preparations, and methods of analysis are referenced by a seven digit number, the test code. For example, the test code for the parameter cation exchange capacity by preparation 2N NaCI and by method spectrophotometry is 0170202. With a cation exchange capacity value of 80.5 for horizon A of a soil, the Manual Soil Laboratory Data Entry Form looks like this.



The corresponding input transaction is as follows:

ADDL02 8203175A0170202 80.5

Data entering the system from the Kelowna lab is automatically transformed into this format. Note that a transaction contains one and only one test code and value. Thus, if ten analyses were performed on a soil sample from Level A, then ten ADDL02 transactions would be required for that particular sample.

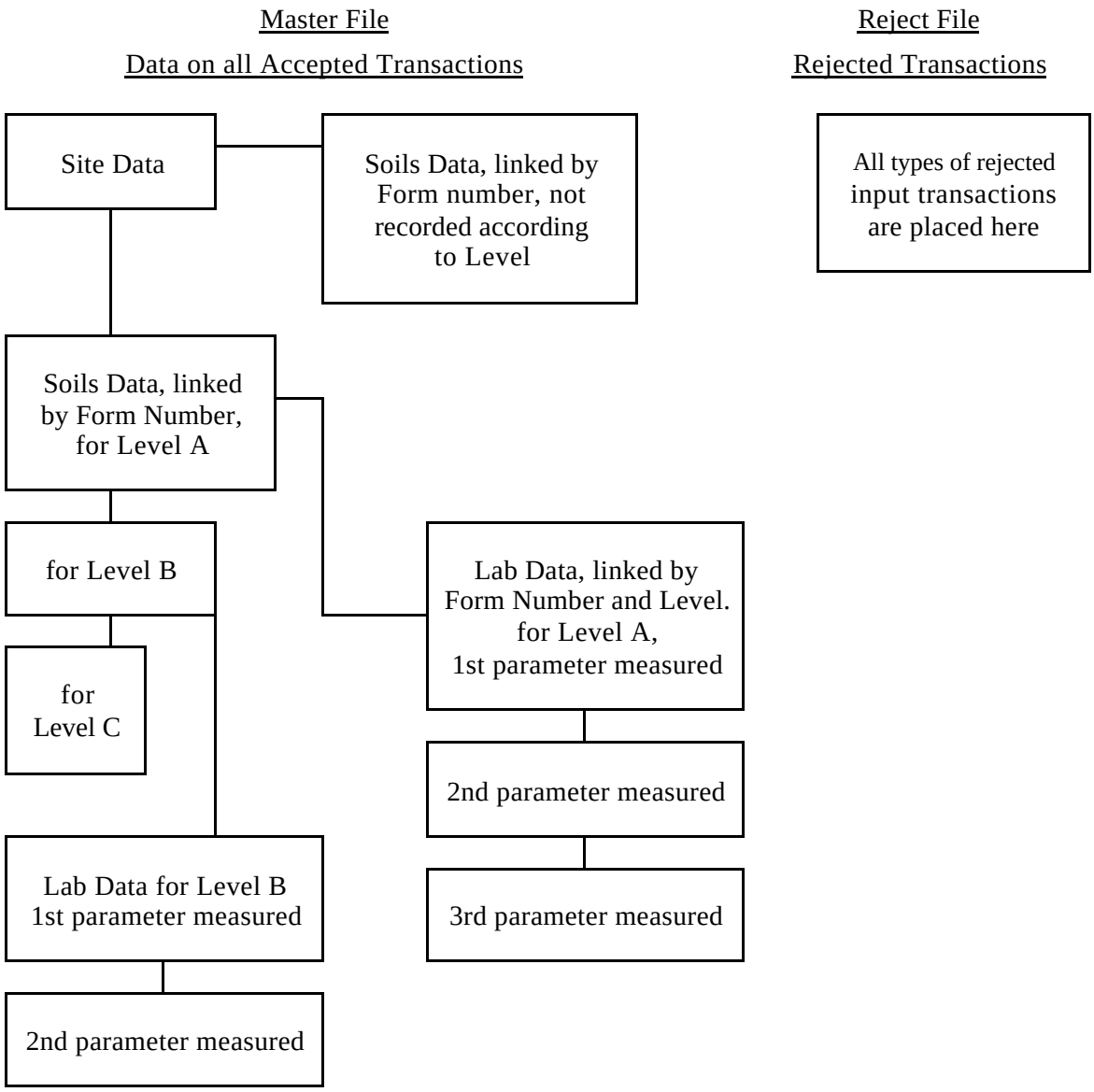
Order of Entry of Data

One final comment on the structure of the input data concerns ADDSOO, ADDPOO, and ADDLOO. ADDSOO tells BCSIS that, for the first time, site data for such and such a form number are being entered into the system. The ADDPOO and ADDLOO transactions fulfill identical functions with respect to the soil and laboratory data, respectively. For a given form number, the ADDSOO transaction must exist and must be entered into the system before any other transactions. If there are soils data, the ADDPOO and other soil transactions follow the site transactions. Finally the ADDLOO and associated lab transactions may be entered. Thus, BCSIS will accept soils data only so long as they follow site data; lab data for a given form number and Level(s) are accepted only if the corresponding site and soil data have already been entered into the system.

Structure of the Data when Stored

When data is entered into BCSIS each transaction is individually scrutinized by an edit/update procedure called EDUP. EDUP examines each field on a transaction to determine whether it contains

a legal entry. A soil classification of OH.FP is not a legal entry; it should be O.HFP. An elevation of 6000 metres is not a legal entry since it is greater than the highest point in the province. If EDUP detects no errors in a transaction, then the transaction is said to be accepted and the data on the transaction are placed in the Master File. If one or more errors are detected on the transaction, the entire transaction is placed in the Reject File. Thus, an illegal elevation value causes the transaction ADDS02, covering site items 7 through 11, to be put in the Reject File. Since only data in the Master File are accessible for data reports and general data manipulation, it is imperative that the transactions in the Reject File be corrected as soon as possible. The structure of the data in BCSIS is represented by the following scheme.



The Master File is hierarchically structured with the linkages defined by Form Number or by Form Number and Level. All data in the Master File were previously on input transactions which successfully passed the EDUP procedure. Rejected transactions for any type of data are all dumped in the Reject File. Data entered into BCSIS are either in the Master File or the Reject File, but not both.

Changing, Adding or Deleting Data

As described later in this document, the transactions in the Reject File may be corrected and resubmitted to the EDUP procedure. These corrections typically would involve changes to values of items on the transactions; however, they could include deletion of data or addition of data. If the transactions successfully pass EDUP, they are removed from the Reject File and the data on them are placed in the Master File. Those transactions which fail are returned to the Reject File for further correction. This cycle may occur as many times as required, though in practice it should happen only once or twice for any given set of data.

Changes may also be made to the Master File. If for example, a soil is later found to be Brunisolic instead of Podzolic, O.HFP could be replaced by O.DYB. If latitude and longitude had not been entered initially, they may be added to the Master File at a later date. If it were later felt that the entry for Bedrock type was wrong and that the correct type was not known, the entry could be deleted from the Master File.

Validation of Data

The EDUP procedure examines only whether or not the values on the input transactions are legal entries. It does not test whether they are reasonable or logical entries. Very poor soil drainage (Site item 31) and a slope of 110% (Site item 10) are a highly unlikely combination. Each of these values is a legal entry, however, and assuming all else on the corresponding transactions (ADDS07 and ADDS02) is also legal, the data will pass through EDUP and enter the Master File. In order to make the surveyor aware of such potential errors, a so called validation procedure has been developed. Validation consists of three independent routines: Consistency Validation, Horizon Validation, and Pedon Validation.

Consistency Validation is composed of a series of tables. Each table has the possible values of one item listed across the top of the table and the possible values for another item listed down the left-hand side. In the case of continuous variables, such as slope, classes or categories are defined in the table. The table is filled wlth 1's and blanks, where the 1's represent likely combinations and the blanks unlikely combinations (See Appendix 2 or BCSIS Volume 4). If the values for the parameters indicate an unlikely combination, a potential error report is printed when the Validation procedure is run.

Horizon Validation checks the horizon (e.g. B) and suffix (e.g. fj) entries on Item 1 of the Soil Description Form against each other and against other soil and laboratory entries. The Canadian System of Soil Classification, 1978 edition, is used as the reference in terms of definitions. An A horizon with a t suffix would produce a Horizon Validation error. A B horizon with an hf suffix and with an organic carbon content of 5.0% would also produce an error message.

Pedon Validation checks the soil classification entry, Item 16 on the Site Description Form, against all appropriate site, soil, and laboratory data. If the soil is given as Chernozemic and there does not exist an A horizon with an h suffix meeting the requirements of a Chernozemic Ah, then an error message will be printed. An Orthic Regosol with a 5 cm thick Bf horizon will also produce an error. Pedon Validation operates by attempting to classify the soil itself with the data provided. If the computed classification matches the entry for soil classification the form number passes the procedure. If there is no match, an error message is printed stating what the entry for Item 17 is and what the computed value is. The procedure operates down to the subgroup level.

Wherever there are insufficient data to run a test, the surveyor is given the benefit of the doubt. Should there be no chemical data for a Bf horizon, the system assumes that none of the chemical criteria for the horizon have been contradicted.

The validation status for a form number is represented in BCSIS by a single character having one of four values:

V: validated - passed all three routines;
X: validated - passed all three procedures, but in the absence of any lab data;
A: validation attempted but one or more of the routines was failed;
N or blank: not validated, the form number has not been run through the procedure.

The System Manager runs the Validation procedure once site, soil, and laboratory data are all present. The user may request that the procedure be run against one or more form numbers even if all three types of data are not present in the Master File. When changes are made to the Master File after a form number has been run through the validation procedure, then one of two things will happen. If all three types of data are present the form number will again be submitted to the validation procedure. If all three types of data are not present, the validation status will be changed to N.

It may happen that the validation procedure is run, that potential errors are found, but that the surveyor still maintains that his data are correct. He may have been working in an area where there exist steep slopes which really are poorly drained. In such cases the surveyor may request that the validation status be changed manually from A to either V or X, whichever is appropriate.

Promotion of Data

Once a survey is complete, the project coordinator may request the promotion of all of the data collected on the survey. The promotion status for a form number is represented in BCSIS by a single character having one of two values:

P: promoted;
N or blank: not promoted.

P indicates that the data have been reviewed and accepted by the project coordinator. In order for a form number to be promoted, it must have a validation status of either V or X. If changes are made to a form number after it has been promoted, the promotion status is automatically changed to N.

PROCEDURES AVAILABLE IN BCSIS

The main procedures contained in BCSIS are briefly outlined here. Besides showing which procedures are exclusive to Data Control, this listing should help indicate the scope of the system.

Procedures Accessible only by Data Control

EDUPS:	Reads site and soil transactions from a tape, evaluates them with the EDUP procedure, and places the contents in either the Master File or the Reject File.
EDUPL:	Identical to EDUPS, but works on lab transactions only.
EDUPK:	As above, but triggered automatically by data trasferred from the Kelowna Soil Laboratory System to BCSIS in Victoria.
EDUPR:	Reads site, soil, or laboratory trasactions from the main Reject File or from a Reject Subfile set up for a specific project, evaluates them, and places the contents in either the Master File or the Reject File.
VALALGO:	Submits form numbers specified to the validation procedure.
VALOVER:	Overrules the validation status of form numbers specified from A to either V or X.
PROMOTE:	Changes the promotion status of form numbers specified to P.
BKUPDAY:	Makes a copy (backs-up) of the entire system on a daily bais, thus increasing data integrity and security in the event of system crashes or management errors.
BKUPMON:	Identica to BKUPDAY, but operates on a monthly basis.
RESTORE:	Restores the system to a given date, if required.
REPPERM:	Puts detailed reports of given form numbers, or for form numbers which meet specific project and promotion criteria, into a Permanent Report File. This file is discussed later
REPFICHE:	Copies detailed reports of specified form numbers from the Permanent Report File onto a tape used in the production of microfiche.

Procedures Directly Available to the User

FORMLIST:	Lists form numbers of all data in the Master File and indicates whether soil and lab data are present.
FORMSTAT:	For specified form numbers, lists the validation and promotion status.
FORMFIND:	Finds and lists all form numbers which meet certain criteria, such as project i.d., latitude and longitude, etc.
REPSIM:	Produces a simple or abbreviated report of site, soil, and/or lab data (Appendix 2) for all form numbers which meet certain criteria, such as project i.d., latitude and longitude, etc.
REPDET:	For specified form numbers, a detailed, non-abbreviated report (Appendix 2) is given for all site, soil, and lab data.
EXTRACT:	For all form nubmers which meet certain criteria, such as project i.d., etc., extracts site, soil, and lab items specified, places them in a sequential file, and creates the appropriate SAS macro specifying the input format criteria.
SAS:	Runs a SAS job using the files and procedures which the user specifies.
DELOSMAC:	Deletes the OS file and associated macro, created by the EXTRACT procedure, once the user has finished his analysis of the data set.
DELSAS:	Deletes one or more SAS files, as specified by the user, once these files are no longer of interest.
SISINFO:	Provides update information for BCSIS, assistance in space and DCB parameter calculation, and depth averaging macros.

BCSIS FILES

Files within BCSIS

There are five major types of files within the system, as discussed below.

REJECT FILE: The reject file contains a series of subfiles, where each subfile corresponds to a given project. Thus, for example, all of the rejected transactions for the Vancouver Island Detail Soil Survey reside in a subfile created specifically for that project.

MASTER FILE: As discussed before, the Master File contains all the site, soil, and laboratory data which are available to the validation, reporting, and extract procedures.

PERMANENT REPORT FILE: Once a form number has been promoted, a detailed report is placed in this file. Creating a detailed report is expensive, whereas simply copying a detailed report from this file onto tape or computer paper is cheap. Thus, running the REPDET procedure is cheap, even if it is run a number of times on the same form number. If any edit or update changes are made after a form number has been promoted, the REPPERM procedure is run again on that form number, with the new version replacing the old one in the Permanent Report File.

BACKUP FILES: There exist a number of backup files in the system regularly created by the two backup procedures, BKUPDAY, and BKUPMON.

DEPTH AVERAGING MACRO FILE: A macro library is being established which contains various depth averaging procedures. Use of these macros will facilitate comparisons of soil data among sites. The macros are discussed in BCSIS Volume 5.

Files External to BCSIS

Any files created by the extract procedure are not considered to be part of BCSIS. Any macro or SAS files created by the user are not part of BCSIS either. BCSIS contains only the files described earlier, as well as several management oriented files of no direct interest to the user. BCSIS files are of course managed by BCSIS Data Control. It is the responsibility of each user to manage the files which he or she has created; the procedures DELSOMAC and DELSAS can help in this regard.

LIVING WITH BCSIS: A TYPICAL SEQUENCE OF EVENTS

There are many different ways in which BCSIS may be used. A typical sequence of events is as follows.

a. The surveyor completes the Site and Soil Description Forms and sends them to Data Control in Victoria. Soil samples are sent to the Kelowna lab.
b. Data Control has the forms key entered and then proceeds with the edit/update procedure. The lab meanwhile analyzes the samples according to the instructions on the Kelowna Soils Laboratory Requisition Form.
c. An error report from the edit/update procedure is sent to the surveyor. He corrects it on the paper report and returns the report to Data Control.
d. Data Control runs the corrected transactions through EDUP. If necessary, c is repeated as well as this step, until no further errors are detected.
e. The user obtains a simple report of those form numbers which may be of particular interest. He may also extract those variables of particular interest into a SAS compatible file and then run simple descriptive statistics (bar charts, graphs, contingency tables, etc.) to help him assess trends in his data. If any data errors are found, c and d are repeated.
f. The lab results are completed in Kelowna and the data is transferred into BCSIS, whereupon the validation procedure is run. A report giving potential errors is generated and sent to the surveyor. Steps c, d, and this step may have to be repeated. For form numbers without lab data, the surveyor may request that the validation routines be run. Eventually all data should be validated and then promoted.
g. The surveyor may wish to perform more sophisticated analyses on his data. As well, he may wish to place certain data into SAS and then create his own specialized data reports. Another possibility is that he may wish to obtain detailed reports using BCSIS for publication purposes. Before he is finished with a project, he should delete any files which he has created and which are no longer of interest.

BCSIS ERROR AND VALIDATION PROCEDURES IN DETAIL

Introduction

BCSIS users will interact with the system in two ways. They will initially receive paper reports containing lists of errors found in their data. These must be corrected and returned to Data Control. Once these problems are corrected, it is likely that the user will run procedures to manipulate and analyze the data.

The following text discusses these processes in detail. Included are examples of error reports and how to correct them, and examples of each procedure available to the user and any associated options. Typical outputs from the running of the various procedures are contained in appendices at the end of the report.

ERROR REPORTS

Two processes in BCSIS produce error reports: the editing procedure for illegal entries, and the validation procedure.

Error Reports as a Result of the Edit Procedure

Illegal data entries are output in the form of error reports which pertain to the type of data, i.e., site, soil or lab. An error report consists of two types of lists. The first list shows each rejected site, soil, or lab transaction, as itwas transcribed by data entry. The second list is a detailed report, indicating the field in which the error occurred, and the type of error.

The surveyor should make corrections to the rejected transactions list by crossing out the error and writing in the correct entry. All error reports should then be returned to Victoria for editing.

1. Site Error Reports

Figures 1 and 2 contain examples of rejected site transactions, and the associated detailed error report. Referring to Figure 1, the sequence number refers to the order of the transactions when input; the number is useful when checking the more detailed report of errors. This is followed by a copy of the rejected transaction as transcribed by key entry. The second, more detailed report indicates the transaction in which the error occurred (including the transaction identifier and form number), the length and starting position of the rejected field, the type of error, and all data present in the field where the error occurred.

The four incorrect transactions in the figures illustrate common errors which occur on the SITE forms. The first transaction, sequence number 8, illustrates a key entry error. The detailed report indicates that the error occurred in the UTM field. Either an invalid code was used, or the code was incorrectly placed. Looking at the 'Field Contents', it appears that the photo number is entered in the UTM zone. This data should be in ADDS02, not ADDSOl, this was a key entry error. An error in soil classification code appears as shown in sequence number 49. The code, RBL.C, is illegal. Reference to BCSIS Volume 2 shows the code should be R.BL. The error in terrain classification (sequence number 62) occurred because of incorrect spacing, while the code for physiographic subdivision is not a legal entry in the last transaction (sequence no. 75).

Figure 1: Site Transaction Verification Procedure Rejected Transactions (See Detailed Report)

SEQ. TRANSACTION-------->>

NO.

```
          1    1    2    2    3    3    4    4    5    5    6    6    7    7    8    8    9    9   10
++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0
```

8 ADDS01 8200318SEPARATION LAKE 810812 92109 50361030120164030 BC764

0 247 86150350 20 990 20

49 ADDS05 8200354 R.OB 78

CALCAREOUS

62 ADDS03 820035778G FM B 7140

75 ADDS03 820035878FGM B 7640

Figure 2: Detailed Site Transaction Error Report

Seq. No.	Transaction Identifier	Form Ident. Series& Num.	Transaction Field Name	Starting Position	Field Length	Type of Error	Field Contents
8	ADDS01	8200318	UTM	87	15	Invalid Code or Combination	BC7641
49	ADDS05	8200354	SCLSFLDS	16	88	Invalid Code or Combination	RBL.C 78
62	ADDS03	8200357	TCLSSTR1	18	8	Invalid Code or Combination	G FM B
75	ADDS03	8200358	PHYSSUBD	51	4	Invalid Code or Combination	7640

2. Soil Error Reports

The soil error reports are very similar to those for rejected site transactions with horizon levels supplied in addition to the other information. A forgotten form number at the top of the soil form results in a blank form ID field, and an 'INVALID FORMID' message, as illustrated in Figures 3 and 4 (sequence number 1). If more than one error is found in a transaction, the transaction is repeated for each error in the detailed transaction report, as the second and third entries show. In this instance the A and V were both in incorrect positions. Sequence number 85 indicates that an illegal value, X in this case, was found. This could indicate that an incorrect code was used, or that the code was placed in the wrong columns by key entry or the surveyor.

FIGURE 3: SOIL TRANSACTION VERIFICATION PROCEDURE
REJECTED TRANSACTIONS (SEE DETAILED REPORT)

```
                                                SEQ.
NO.             TRANSACTION-------->>
                1   1   2   2   3   3   4   4   5   5   6   6   7   7   8   8   9   9   10
                ++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0
1               ADDP02
                A                   A H   00  200       20  20A             L
62              ADDP03 8200319A08  25Y  3J  20    AV

85                     ADDP02    8200321A      L             10     00              X
```

FIGURE 4: DETAILED SOIL TRANSACTION ERROR REPORT

SEQ. NO.	TRANSACTION IDENTIFIER	FORM IDENT. SERIES & NUM.	HORIZ LEVEL	TRANSACTION FIELD NAME	STARTING POSITION	FIELD LENGTH	TYPE OF ERROR	FIELD CONTENTS
1	ADDP02		A	FORMID	9	7	INVALID FORM ID	
62	ADDP03	8200319	A	MOTABUN1	41	1	INVALID CODE	A
62	ADDP03	8200319	A	MOTSIZE1	42	1	INVALID CODE	V
85	ADDP02	8200321	A	CFPCVOL	49	3	OUTSIDE SPECIFIED RANGE	X

3. Lab Error Reports

Errors which occur in data entered on manual lab data forms are most commonly missing codes, incorrect codes, or an excessive number of digits past the decimal. Figures 5 and 6 illustrate these problems. The preparation and methods codes are both incorrect in sequence number 2. Thus, the transaction is repeated in the detailed error report for each mistake. Sequence number 29 is missing a number to the left of the decimal, while the last transaction has too many numbers to the right of the decimal. The Test Method Dictionary should be referenced when making corrections to lab data.

Lab warning reports may also be sent to the user. These contain lists of lab transactions in which the analysis results are over upper limits specified in the Test Method Dictionary. The user should check the values over, in case re-analysis is necessary. Where the user is suspicious of the results, the head of the soils laboratory should be contacted.

FIGURE 5: LAB TRANSACTION VERIFICATION PROCEDURE
REJECTED TRANSACTION (SEE DETAILED REPORT)

```
                                                SEQ.
NO.             TRANSACTION-------->>
                          1    1    2    2    3    3    4    4    5    5    6    6    7    7    8    8    9    9   10
                ++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0++++5++++0
2               ADDL02 8100350A1060000          1.44

29              ADDL02 8100351B0020000          .73

71                      ADDL02    8100353C0350000  4.16
```

FIGURE 6: DETAILED LAB TRANSACTION ERROR REPORT

SEQ. NO.	TRANSACTION IDENTIFIER	FORM IDENT. SERIES & NUM.	TRANSACTION FIELD NAME	STARTING POSITION	FIELD LENGTH	TYPE OF ERROR	FIELD CONTENTS
2	ADDL02	8100350	PREPCODE	17	5	INVALID CODE	10600
2	ADDL02	8100350	METHCODE	17	7	INVALID CODE	1060000
29	ADDL02	8100351	VALUE	26	20	INVALID CODE	.73
71	ADDL02	8100353	VALUE	26	20	MAX. NO. OR DECIMALS EXCEEDED	4.16

Error Reports as a Result of the Validation Procedure

The validation error reports are divided into Consistency, Horizon, and Pedon validation errors. The tables and statements referred to in the reports are found in BCSIS Volume 4, and will assist in error correction. The mistakes should be crossed out, with corrections written in beside, as indicated.

1. Consistency Validation Error Reports

Consistency validation is a comparison of the given value of two variables to check that these results are consistent with one another. If this is not the case, an error report results. Figure 7 illustrates such a report. Usually 'FIELD 1 NAME' lists the vertical axis variable of the consistency table, 'FIELD 2 NAME' the horizontal. The FIELD CONTENTS columns indicate the values for the two variables. The reference column indicates which consistency table, found in BCSIS Volume 4, the user should refer to for assistance in error correction. The codes following the reference to tables should be ignored.

In the first example of Figure 7, Horizon Level E of form 82-00341 shows an inconsistency in its data. This inconsistency is between Mottle Abundance, having a value of F, and Upper Horizon Drainage, given as C. Reference to Table 9 indicates that such a combination is unlikely.

FIGURE 7: CONSISTENCY VALIDATION ERROR REPORT

FORMID	HORIZON LEVEL	FIELD 1 NAME	FIELD 1 CONTIENTS	FIELD 2 NAME	FIELD 2 CONTIENTS	REFERENCE
8200341	E	MOTABUN1	F	DRNG/HUP	C/300	TABLE 9 - SISTDLMA
8209552		SOILDRNG	C	FREEWTR	A	TABLE 4 - SISTSDFW
	B	SOILTEXT	CL	CONSPLST	2	TABLE 25 - SISTSTCP
8209573	A	EFFDEGR	X	PH	7.6	TABLE 3 - HARD CODE

2. Horizon Validation Error Reports

The Horizon Validation Error Report gives all horizon designation information for the soil horizon in error, as Figure 8 illustrates. BCSIS Volume 4 lists all statements indicated in the statement violated column, and should be referred to when checking errors.

The surveyor should be aware that a horizon will be listed in the horizon validation error report for every rule it breaks. The correction should be made at the first occurrence of the horizon level, and the remaining copies of the level crossed out.

FIGURE 8: HORIZON VALIDATION DETAILED ERROR REPORT

FORM ID	HORIZON LEVEL	PARENT MAT. DISCONTINUITY	MASTER HORIZON DESIGNATION	SUFFIXES	STATEMENT VIOLATED
8009552	A		FH		1.2
	A		FH	GF	2.7
	B		O	M	4.7
	K	V	B	N SA	3.25
	K	V	B	N SA	3.29

3. Pedon Validation Error Reports

This report simply states that a soil classification for a particular form appears correct or incorrect. Also listed is what the computer has calculated it to be. The classification should be checked and changed if incorrect.

Surveyors should note the following: Subdivided horizons are recognized as distince levels by the computer. If, for example, Bf1 and Bf2 horizons exist, but are each less that 10 cm in thickness, the sum of their depths may be greater than 10 cm, which would be acceptable for Podzols. The computer will not add the thicknesses, and would therefore reject the Podzolic classification. If such problems occur, the user should notify Data Control.

FIGURE 9: PEDON VALIDATION-REPORT

SOIL CLASSIFICATION FORFORMID:	80-09552	APPEARS INCORRECT
YOU HAVE CLASSIFIED SOIL AS:	FR.LG	
COMPUTED CLASSIFICATION IS:	GL.HFP	
SOIL CLASSIFICATION FOR FORMID:	80-09573	APPEARS INCORRECT
YOU HAVE CLASSIFIED SOIL AS:	0.DB	
COMPUTED CLASSIFICATION IS:	0.SB	
SOIL CLASSIFICATION FOR FORMID:	80-09763	APPEARS CORRECT

BCSIS USER PROCEDURES IN DETAIL

Where the Procedures are Stored

All procedures available for use in BCSIS are stored in a partitioned data set, identified as $SOILP.USER. Users have access to read these files via a WYLBUR terminal. The user can look at each file, but msut save changed versions of any procedures under a different name, preferable in the user's own library. Before running any BCSIS procedures, it is essential that the user has a working knowledge of JCL and WYLBUR.

A Typical Example of a Procedure

```
//FORMLIST JOB (PIN##,CH####,70,PRD),'NAME-LOCATION',CLASS=D
//        USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R##
/*PROCLIB DSNAME=SOILP.PROCLIB
//*
//        EXEC FORMLIST
/*
```

Before running any procedure, the underlined parameters must be changed. These values, explained below, can be obtained from computer personnel in the user's ministry.

PIN# #	- user pin number, 5 digits
CH# # # #	- group charge number, 6 digits
NAME-LOCATION	- of the user; 20 characters or less
R# #	- printer where output is to be directed

List Procedures

The following three procedures are useful to surveyors in keeping tabs on lab analysis and data input and correction. Appendix 3 contains examples of results of the three list procedures.

1. FORMLIST

This procedure produces a complete listing of form numbers for all site, soil and lab data stored in the MASTER file. It is useful as a quick ckeck on lab data input. The user should keep in mind that all form numbers in the MASTER file are listed with this request; requests by project cannot be made.

```
//FORMLIST JOB (63309,253163,70,PRD),'SUTTIE-777 BR.',CLASS=Q,
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSN=SOILP.PROCLIB
//*
//         EXEC FORMLIST
/*
```

*underlined values should be changed accordingly.

2. FORMFIND

The FORMFIND procedure will print a listing of form numbers contained in the MASTER file which meet specific requests.

```
//FORMFIND JOB (63309,253163,70,PRD),'SUTTIE-777 BR.',CLASS=D,
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP.PROCLIB
//         EXEC SISEXTR,FILEID=DUMMY,DISP1=OLD,DISP2=KEEP
//EXTRAN DD*
REQUEST CH                              EXTRACT FORMS
REQUEST STPROJ VID,QUADRA
/*
```

*underlined values should be changed accordingly.

The 'CH' request transaction indicates that an EXTRACT process is being used to obtain a report containing a list of FORM numbers. This statement must not be changed in any way.

'ST' transactions state what information is to be searched for in the MASTER FILE. In this instance, the user is requesting a list of all form numbers for the VID and QUADRA projects. Various field codes can be requested in place of PROJ, used in this example, and more than one 'ST' requests can be used at one time. The user should be aware that only MASTER FILE form numbers which satisfy all search criteria will be reported. Table 1 lists acceptable codes, and if a range of specifications can be used. Referring to the table, it can be seen that using PROJ, more

that one project can be specified with commas dividing each, but a range of projects is obviously impossible. However, a range of form numbers or plot numbers can be used with FORM or PLOT, respectively. An example of the request for a range of form numbers and flight line photos is as follows:

```
(JCL as above)
REQUEST CH                          EXTRACT FORMS
REQUEST STFORM 8200423/8294321
REQUEST STFLIGHT BCC264 041/BCC264 043
```

The user must take care not to change the spacing of the REQUEST statements in any way when using FORMFIND.

TABLE 1
SEARCH CRITERIA FOR 'ST' TRANSACTIONS

FIELD CODE	NAME	RANGE ALLOWED
FORM	Form #	Yes
PROJ	Project ID	No
PLOT	Plot #	Yes
DATE	Survey Date	Yes
VAL	Validation Status	No
PROMO	Promotion Status	No
LAT	Latitude	Yes
LONG	Longitude	Yes
NTS	Mapsheet	Yes
FLIGHT	Flightline/Photo #	Yes
SNAME	Soil Name	No
SCLASS	Soil Classification	No
UTM	UTM	Yes
ZONE	Zone/Subzone	No
ECOL	Ecological Classification	No
VEG	Vegetation Classification	No
TYPE	Soil Sample Type	No

3. FORMSTAT

The validation status of specified form numbers can be referenced using FORMSTAT. With this STATUS request, the user must insert specific form numbers (separated by commas) and/or ranges of numbers (indicated with a slash).

```
//FORMSTAT JOB (63309,253163,70,PRD),'SUTTIE-777 BR.',CLASS=S
//        USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP.PROCLIB
//        EXEC SISSTAT
//TRANS DD*
STATUS 8212340/8212355,8249621
/*
```

*underlined values should be changed accordingly.

Report Procedures

Two types of printed reports can be produced in BCSIS: a SIMPLE report and a DETAILED report. Examples of these are contained in Appendix 4.

1. REPSIM - Simple Report

The running of REPSIM results in a report which is basically a copy of the original field forms. It is most useful as a method of checking original forms against data entered into BCSIS.

```
//REPSIM JOB (63309,253163,70,PRD),'SUTTIE-777 BR',CLASS=D
//        USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP,PROCLIB
//        EXEC SISREPS1
//REPTRAN DD*
REQUEST CH                              REPMED SITE
REQUEST STFORM 8009552/8009560,8200946
REQUEST STPROJ VID
/*
```

*underlined values should be changed accordingly.

This example is asking for a report of site data only, as specified in the ‘CH’ transaction. The user has the choice of requesting ALL, all data for the form in question, SITE, SOIL, LAB, or S+S, which is site and soil data only. Once again the search criteria (ST) can be specified. Refer to Table 1 for the appropriate codes.

2. REPDET - Detailed Report

A detailed report request produces an unabbreviated copy of information for form numbers requested. This report will print all data present in the PERMANENT REPORT file for the specified forms.

```
//REPDET JOB (63309,253163,70,PRD),'SUTTIE-777 BR',CLASS=D,
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP,PROCLIB
//         EXEC SISREPFC
//TRANS       DD DISP=(OLD,KEEP,KEEP),DSN=SOILP.USER(DETFILE)
/*
```

*underlined values should be changed accordingly.

This procedure is run in conjunction with an external file created by the user. The external file contains ‘PRINT’ transactions, formatted as follows:

```
PRINT        8204953,8200952/820099
```

Appropriate form ID's must replace the examples shown in this instance. Specific requests are separated by commas, with a range of forms indicated with a slash. The request can extend to column 80, and if required, more 'PRINT' transactions added.

The 'PRINT' request example shown above is contained in the file $SOILP.USER (DETFILE), indicated as the DSN above. This name is used in the procedure for the convenience of the user. The user should refer to SOILP.USER(DETFILE) for assistance when creating the external file, but must save these ‘PRINT’ requests in a file of another name. The file name should be $SC#####.DETFILE, the user's pin number replacing the '#' signs. The user must remember to replace the DSN shown above [SOILP.USER(DETFILE)] with this name. The user-created file must be deleted after the procedure runs successfully.

Extractlon and SAS Procedures

To analyse data stored in BCSIS, it must first be extracted to an external file. Procedures are available to carry this out, and to create SAS data files containing the extracted data. Analyses can then be performed using SAS functions.

1. EXTRACT - Data Extraction to External Flles

This procedure extracts information from specified fields of the MASTER FILE into external, sequential files.

```
//EXTRACT JOB (63309,253163,70,PRD),'SUTTIE-777 BR',CLASS=D,
//        USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP.PROCLIB
//        EXEC SISEXTR,FILEID='VIDEMS'
//EXTRAN    DD *
REQUEST   CH                    EXTRACT FIELD
REQUEST   FTSITE003/005,007
REQUEST   FTSOIL010/012
REQUEST   FTLAB 001/010
REQUEST   STFORM    8009552/8009570,8212345
REQUEST   STVAL     V,X
/*
```

*underlined values must be changed accordingly.

The underlined values in the JCL, such as the pin, charge and route numbers must be changed as usual. The next parameter to vary is the FILEID= , in line 5 above. The user must create and insert a name of eight characters or less here. The name should include an abbreviation of the project ID, followed by the first letter of their ministry (i.e. A,E,F) and the user's initials. All data extracted during the running of this procedure will be placed in a file identified by this name. The example above indicates that user 'MS' from the Ministry of Environment is extracting Vancouver Island Detailed soil survey data.

The 'CH' transaction indicates that the procedure is going to EXTRACT information for specified FlELDs, and must not be changed in any way.

The 'FT' request which follows indicates what fields of the field forms the user wishes extracted. Referring to the example, 'FTSITE' and 'FTSOIL' indicate an extraction of site and soil data, respectively, while the 3 digit numbers list the fields (of the Description Forms). The 'FTLAB' request lists the lab parameter codes to be

extracted. Commas and slashes are used to indicate specific fields and ranges of fields, respectively. The example above requests extraction of data from site fields 3 to 5, and 7, soil fields 10 to 12, and values lab parameters 001 to 010. One or more ‘FT’ transaction must always follow the 'CH' transaction. The three shown above have been left in the EXTRACT procedure to assist in creating these requests, and must be deleted from a users program if unnecessary.

As explained in FORMFIND, the 'ST' requests specify the subset of the MASTER file to be used in the procedure. This example requests that the data specified in the 'FT' requests be extracted for form numbers 80-09552 to 80-09570, and 82-12345, and within this group, only forms which have a validation status of V or X. The user should keep in mind that to be extracted, data must meet all 'ST' criteria specified.

2. EXTRACT Fields

When data extraction is requested in BCSIS, all information contained in fixed-format fields, and most free-format fields of the field forms is transferred. However, only part of some the free-format fields will be moved at present.

Only fifteen characters will be extracted for the following site and soil fields.

FIELD

Site Form

18. Plot Representing
37. Bedrock Structure
53. Veg. Sampling Tech.
54. Notes on Site Descriprion

Soil Form

14. Horizon Notes

In the GENERAL COMMENTS ON SOIL CHARACTERISTICS, twenty characters are extracted.

3. EXTRACT Data File Creation

The EXTRACT procedure results in the creation of one or two data files:

$SOILP.EXTRACT.SITE.fileid and $SOILP.EXTRACT.HORIZON.fileid

SOlLP.EXTRACT.SlTE.fileid will be created with each run of EXTRACT. If SITE is specified in the 'FT' transaction, this file will contain data for all site fields specified. A SOIL request causes a transfer of specified

non-horizon soil data into this file. With SOIL and/or LAB requests, SOlLP.EXTRACT.HORlZON.fileid will be created, containing all soil and/or lab data associated with horizons.

Therefore, once EXTRACT has been run, the data transferred to the external files are prepared for conversion to SAS, and subsequent analysis.

4. SAS MACROS

The running of EXTRACT automatically causes the creation of one or two SAS MACROs: SASSITE and SASHORZ. These macros, contained in the PDS file $SOlLP.SASMACRO#fileid, include INPUT formats for the data in the two EXTRACT files. When the SAS procedure is run, these formats are used automatically. However, for many of the items on the site and soil form, the EXTRACT procedure treats the item as a single alphanumeric variable, where it may not necessarily be useful to do so.

The user will likely want most numeric variables recognized as such, for use in SAS analysis. To make the data more readable and logical, users will also require certain data fields to be broken into several variables. CONVERSION MACROS have therefore been developed. These macros split many of the fixed-format data fields into more than one variable, and/or recognize numeric variables. Although not accessible to the user, a list of the CONVERSION macros is contained in $SOILP.SISINFO.

5.Use of SAS MACROS

Although users cannot access the CONVERSION MACROS, they can control which macros are used in the SAS procedure.

When EXTRACT is run, a PDS file is created under the name $SOlLP.SASMACRO#fileid. This file contains the SAS name for each field that the user has extracted, and the alphanumeric format macro, only. For example, if a user extracted site fields 1, 2 and 3 into a data set with fileid VIDMS, the file $SOILP.SASMACRO#VIDMS would be:

```
MACRO SASSITE
INPUT
@ 1 FORMID          $CHAR7.
@ 8 PLOTNUM         $CHAR15.
@ 23 DATE           $CHAR6.
;
%
```

By referring to the list of CONVERSION MACROS, it can be seen that conversion formats exist for FORMID and DATE. As PLOTNUM is a free-format field, it has no such macro.

By accessing and editing SOlLP.SASMACR0#fileid, the user now has three choices in reading each extracted variable into SAS. The simple alphanumeric macro can be used for each variable, or the conversion macro, if one exists, or the user can create a new macro if neither of the others is suitable. Each of these procedures will be discussed in detail. However, before these procedures can be used, the word 'INPUT' (under MACRO SASSITE and under MACRO SASHORZ) must always be removed, as must the semicolon on the second to last line of each macro.

No more than 40 macros may be used at one time when running the SAS procedure. Therefore, this file should contain no more than 40 macro statements. The user can delete macros if they are unnecessary for a particular SAS run, but should save a copy of the original file for future reference under some other name.

a) Use of Alphanumeric Macros

If a data field does not have a conversion macro, the simple, alphanumeric formats are used automatically by the SAS procedure. However, if a conversion macro exists, it overrides the format shown in this file. If the user wishes to use the simple macro, the SAS variable name in SOlLP.SASMACRO#fileid must be changed in some way. For example DATE could be changed to XDATE. The conversion macro will then be ignored.

b) Use of Conversion Macros

The user will usually require conversion of variables in the SAS procedure. To use the available conversion macros, the string $CHAR#. must be deleted from beside the SAS name in SOlLP.SASMACR#fileid. Therefore, in the previous example, the line for DATE would be:

@ 23 DATE

The computer, not finding the $CHAR... will automatically search the conversion macro file for MACRO Date, and use the format given there to read the variable.

c) Creation of Macros by the User

If available macros are unsuitable, users may create and use their own. The format of a new macro must be identical to that of the conversion macros. The macro name must correspond to the one found in SOlLP.SASMACRO#fileid, and variables created in the macro must be labeled with SAS names not used in any other macros.

The new macro is placed at the end of the SOlLP.SASMACRO#fileid, and the $CHAR#. must be removed from the appropriate line above.

Once the SOlLP.SASMACRO#fileid is edited and the changes saved in the same file, the SAS procedure can be run.

6. SAS - Data Analysis

The SAS procedure is used to read data from the external files into SAS files, and carry out analysis.

```
//SAS JOB (63309,253163,79,PRD),'SUTTIE-777 BR',CLASS=A,
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP.PROCLIB
//         EXEC SISSAS,FILEID=VIDEMS,MACROID=VIDEMS
//SASPROG      DD *
DATA SITE;
      INFILE SITEDATA;
      INPUT SASSITE;
DATA HORIZON;
      INFILE HORZDATA;
      INPUT SASHORZ;
/*
```

*underlined values should be changed accordingly.

The JCL parameters must be changed as usual in this procedure. The next changes are made to FILEID and MACROID. The user-specified file ID from the EXTRACT procedure is specified for both of these ID's, as shown above. The two DATA statements specify names of the temporary data sets in which the extracted data are to be stored for the remainder of the job. The DATA and INFILE statements must be deleted if unnecessary for the job being run. SAS programming should follow the input statements.

BCSIS users should do as few extracts as possible. Once all necessary data have been extracted, subsets of the data can be used in the SAS procedure by editing the SOILP.SASMACR0#fileid, as explained previously.

7. File Deletion

Appendix 5 contains a copy of a FILE CREATION/DELETION RECORD. It is recommended that this be used to keep track of file names, contents, and deletion dates. When a data set is no longer required, the user should immediately delete the file. The following two programs are simple delete procedures.

a) DELOSMAC - Deleting EXTRACT Files

This procedure deletes the file(s) created with EXTRACT, and the associated SASMACROS.

.

```
//DELOSMAC JOB (63309,253163,79,PRD),'SUTTIE-777 BR',CLASS=Q,
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
/*PROCLIB DSNAME=SOILP.PROCLIB
//         EXEC SISEXDEL,FILEID=VIDEMS
//STEP2.MEMBER    DD *
      SCRATCH DSNAME=SOILP.SASMACRO,VOL=3350=USR014,MEMBER=VIDEMS
/*
```

*underlined values should be changed accordingly.

The user must insert the FILEID, used in EXTRACT, as both the FILEID and MEMBER in this procedure.

b) DELSAS - Deleting SAS Files

SAS files are deleted by simply inserting their names in the DELSAS procedure.

```
//DELSAS JOB (63309,253163,70PRD),'SUTTIE-777 BR',CLASS=Q
//         USER=*,GROUP=SOILP,PASSWORD=*
/*ROUTE PRINT R03
         EXEC PGM = 1EFBR14
//DD1 DDDISP=(OLD,DELETE),DSN=SC63309.SAS.VIDEMS
//DD2 DDDISP=(OLD,DELETE),DSN=SOILP.####
/
```

*underlined values should be changed accordingly.

If only one file is to be deleted, remove the DD2 statement. If more than two files are to be deleted, simply create more DD statements.

8. SOILP.SISINFO

A PDS identified as $S0ILP.SISINFO has been created for the user's referral. It contains several members, identified as follows:

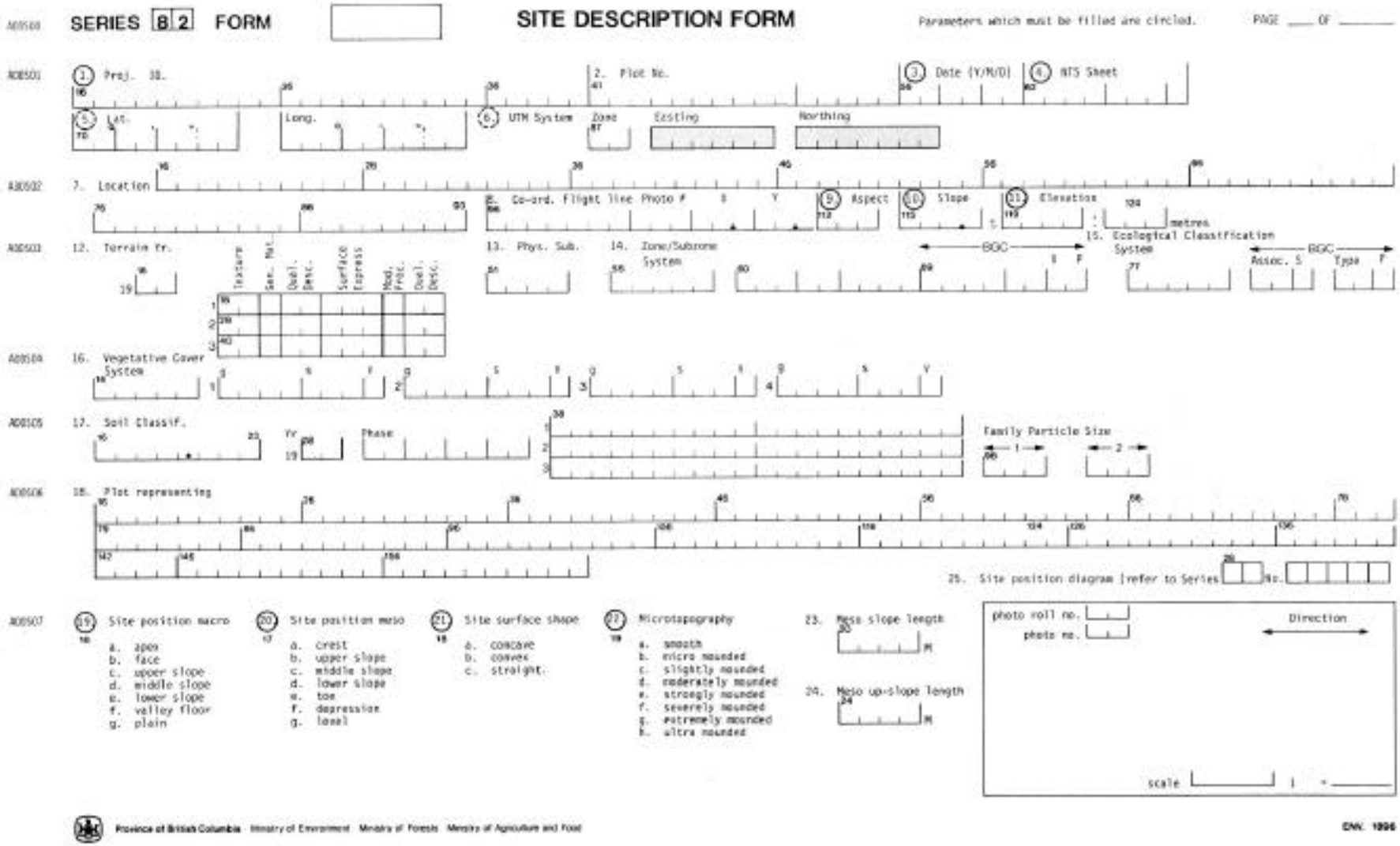
UPDATE	- indicates any updates to BCSIS;
SPACE	- indicates how to calculate space and DCB parameters for file creation;
MACRODE P	- contains depth averaging macros available to users;
MACROS	- contains a listing of all CONVERSION MACROS available to users.

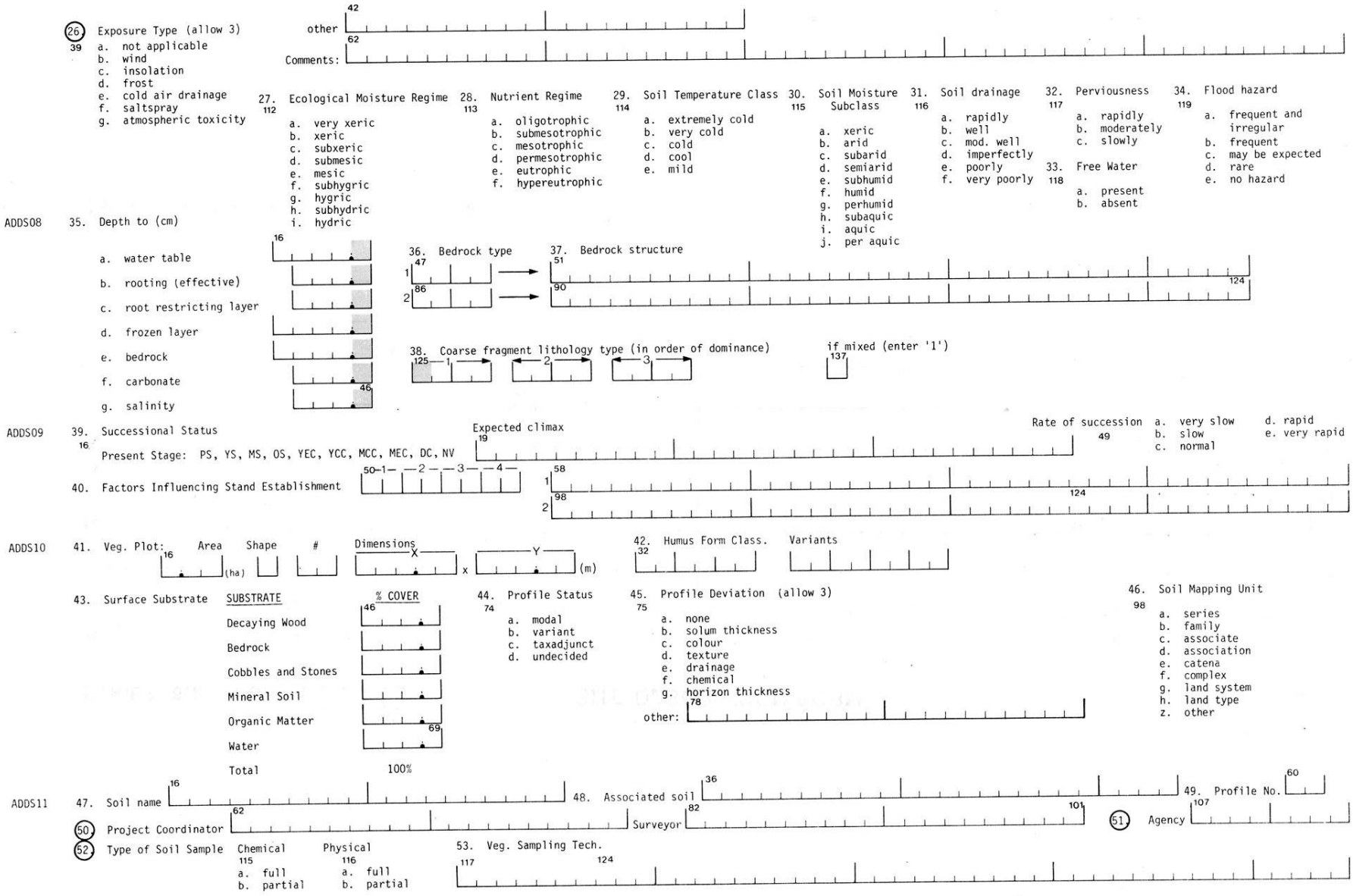
APPENDIX 1

Site Description Forms

Soil Description Forms

Manual Lab Entry Form


SERIES 8 2 FORM
SITE DESCRIPTION FORM
Parameters which must be filled are circled.
PAGE ___ OF ___
1. Proj. ID.
2. Plot No.
3. Date (Y/M/D)
4. NTS Sheet
5. Lat.
6. UTM System
Zone
Easting
Northing
7. Location
Co-ord.
Flight line
Photo #
X
Y
9. Aspect
10. Slope
11. Elevation
metres
12. Terrain Yr.
Texture
Sec. Mat.
Qual. Desc.
Surface Expres
Mod. Proc.
Qual. Desc.
13. Phys. Sub.
14. Zone/Subzone System
BGC
15. Ecological Classification System
Assoc. S
Type
16. Vegetative Cover System
17. Soil Classif.
Yr
Phase
Family Particle Size
18. Plot representing
25. Site position diagram (refer to Series
No.
19. Site position macro
a. apex
b. face
c. upper slope
d. middle slope
e. lower slope
f. valley floor
g. plain
20. Site position meso
a. crest
b. upper slope
c. middle slope
d. lower slope
e. toe
f. depression
g. level
21. Site surface shape
a. concave
b. convex
c. straight
22. Microtopography
a. smooth
b. micro mounded
c. slightly mounded
d. moderately mounded
e. strongly mounded
f. severely mounded
g. extremely mounded
h. ultra mounded
23. Meso slope length
m
24. Meso up-slope length
m
photo roll no.
photo no.
Direction
scale
1 :
Province of British Columbia Ministry of Environment Ministry of Forests Ministry of Agriculture and Food
ENV. 1996

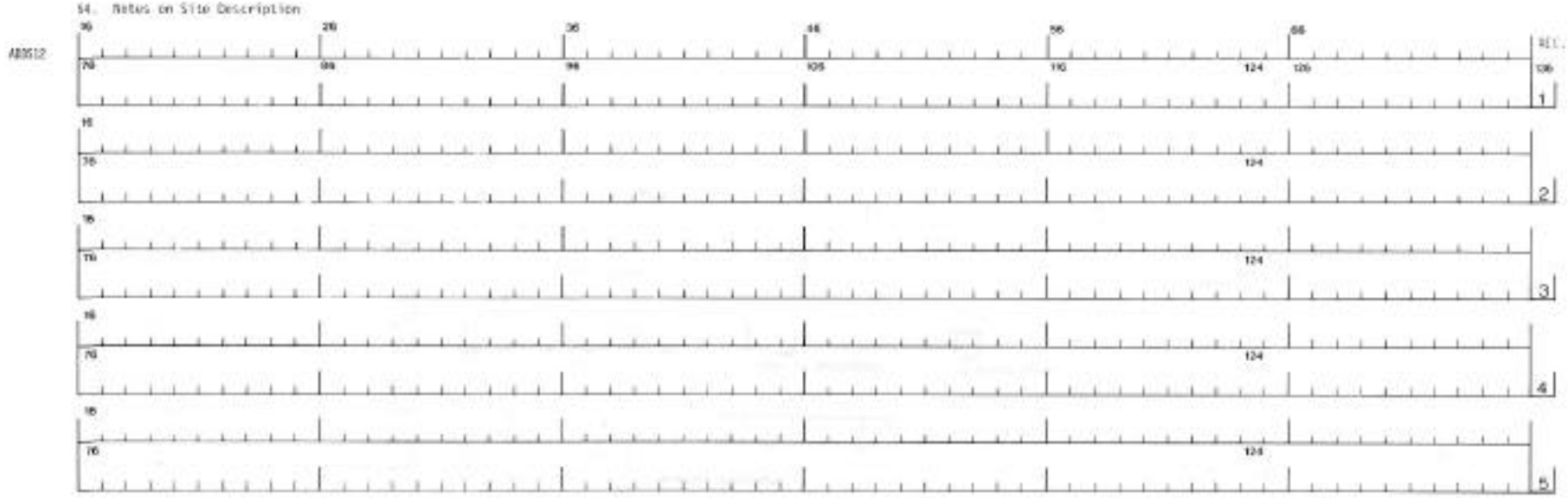

(26) Exposure Type (allow 3)
39
a. not applicable
b. wind
c. insulation
d. frost
e. cold air drainage
f. saltspray
g. atmospheric toxicity
other
42
Comments:
62
27. Ecological Moisture Regime
112
a. very xeric
b. xeric
c. subxeric
d. submesic
e. mesic
f. subhygric
g. hygric
h. subhydric
i. hydric
28. Nutrient Regime
113
a. oligotrophic
b. submesotrophic
c. mesotrophic
d. permesotrophic
e. eutrophic
f. hypereutrophic
29. Soil Temperature Class
114
a. extremely cold
b. very cold
c. cold
d. cool
e. mild
30. Soil Moisture Subclass
115
a. xeric
b. arid
c. subarid
d. semiarid
e. subhumid
f. humid
g. perhumid
h. subaquic
i. aquic
j. per aquic
31. Soil drainage
116
a. rapidly
b. well
c. mod. well
d. imperfectly
e. poorly
f. very poorly
32. Perviousness
117
a. rapidly
b. moderately
c. slowly
33. Free Water
118
a. present
b. absent
34. Flood hazard
119
a. frequent and irregular
b. frequent
c. may be expected
d. rare
e. no hazard
ADDS08
35. Depth to (cm)
a. water table
b. rooting (effective)
c. root restricting layer
d. frozen layer
e. bedrock
f. carbonate
g. salinity
16
46
36. Bedrock type
47
86
37. Bedrock structure
51
90
124
38. Coarse fragment lithology type (in order of dominance)
125
if mixed (enter '1')
137
ADDS09
39. Successional Status
16
Present Stage: PS, YS, MS, OS, YEC, YCC, MCC, MEC, DC, NV
Expected climax
19
Rate of succession
49
a. very slow
b. slow
c. normal
d. rapid
e. very rapid
40. Factors Influencing Stand Establishment
50
58
98
124
ADDS10
41. Veg. Plot:
16
Area
(ha)
Shape
#
Dimensions
X
Y
(m)
42. Humus Form Class.
32
Variants
43. Surface Substrate
SUBSTRATE
% COVER
46
Decaying Wood
Bedrock
Cobbles and Stones
Mineral Soil
Organic Matter
Water
69
Total
100%
44. Profile Status
74
a. modal
b. variant
c. taxadjunct
d. undecided
45. Profile Deviation (allow 3)
75
a. none
b. solum thickness
c. colour
d. texture
e. drainage
f. chemical
g. horizon thickness
other:
78
46. Soil Mapping Unit
98
a. series
b. family
c. associate
d. association
e. catena
f. complex
g. land system
h. land type
z. other
ADDS11
47. Soil name
16
48. Associated soil
36
49. Profile No.
60
(50) Project Coordinator
62
Surveyor
82
101
(51) Agency
107
(52) Type of Soil Sample
Chemical
115
a. full
b. partial
Physical
116
a. full
b. partial
53. Veg. Sampling Tech.
117
124

SERIES [8][2] FORM [ ][ ][ ][ ][ ]

SITE DESCRIPTION FORM

PAGE ___ OF _____

54. Notes on Site Description



(if continuation then put X over ADDP00)

ADDP00 **SERIES** 8 2 **FORM** ☐☐☐☐☐

SOIL DESCRIPTION FORM

PROJECT I.D. _____ PLOT NO. _____ SURVEYOR _____ PAGE ___ OF ___

ADDP02

0	1							2		3		4		5								6	7								8	9				10
	HORIZON							HORIZON DEPTH cm.		HORIZON THICKNESS cm.		HORIZON BOUNDARY		COARSE FRAGMENT DESCRIPT								SOIL TEXTURE <2mm	STRUCTURE								MST	CONSIST.				
															Gravel <7.5 cm		Cobbles 7.5 - 25cm		Stones >25cm				PRIMARY				SECONDARY								
LEVEL	discont	horizon	suffixes 1	2	3	4	subdivision	UPPER	LOWER	MIN	MAX	Dist	Form	% by vol	%	type	%	type	%	type			GRADE	CLASS	KIND	KIND MOD.	GRADE	CLASS	KIND	KIND MOD.	DMW	dry	moist	wet	plast.	LAB SAMPLE
16 17								33		41		47		49								64	68								88	89				93
a																																				
b																																				
c																																				
d																																				
e																																				
f																																				
g																																				
h																																				
i																																				
j																																				

ADDP03

0	11								12										13								14
	COLOUR 1					COLOUR 2				MOTTLES									ROOTS 1				ROOTS 2				HORIZON NOTES
		Hue					Hue			AB	SI	CO	COLOUR	Hue				DIS	Ab.	Size	Ori	Dist	Ab.	Size	Ori	Dist	
LEVEL	aspect	Number	Letter(s)	Value	Chroma	aspect	Number	Letter(s)	Value	Chroma	XTCM	FMC	FDP	Aspect	Number	Letter(s)	Value	Chroma	BOUND SCD	XVPA	VFMC	VHØR	INEXMX	VPA	VFMC	VHØR	INEXMX	
16 17				25 27		29			37 39		41						52 54		57					62				67
a																												
b																												
c																												
d																												
e																												
f																												
g																												
h																												
i																												
j																												

Province of British Columbia Ministry of Environment Ministry of Forests Ministry of Agriculture and Food

ENV. 1895

LEVEL	15 pH: reaction	15 pH: method	16 PORES: Ab.	Size	Ori	Dist	Cont	Mor	Type	17 HOR. POR.	18 CLAY FILMS: Freq.	Thk	Loc	19 EFFER: Degr	20 SECONDARY CARBONATE DESCRIPTION: Cont	Ab.	Size	Shape	Consist	21 SAL	22 CONCRETIONS, NODULES AND CASTS: Kind	Ab.	Size	Loc	Shape	Aspect	Colour: Hue Number	Hue Letter(s)	Value	Chroma	23 CEMENT: Agent	Degree	Extent	24 ORGANIC MATERIAL DESCRIPTION: Material Composit	Woody Material	Pyro. Index	von Post Scale
a																																					
b																																					
c																																					
d																																					
e																																					
f																																					
g																																					
h																																					
i																																					
j																																					

25

GENERAL COMMENTS ON SOIL CHARACTERISTICS

REC. 1 2 3 4 5

27

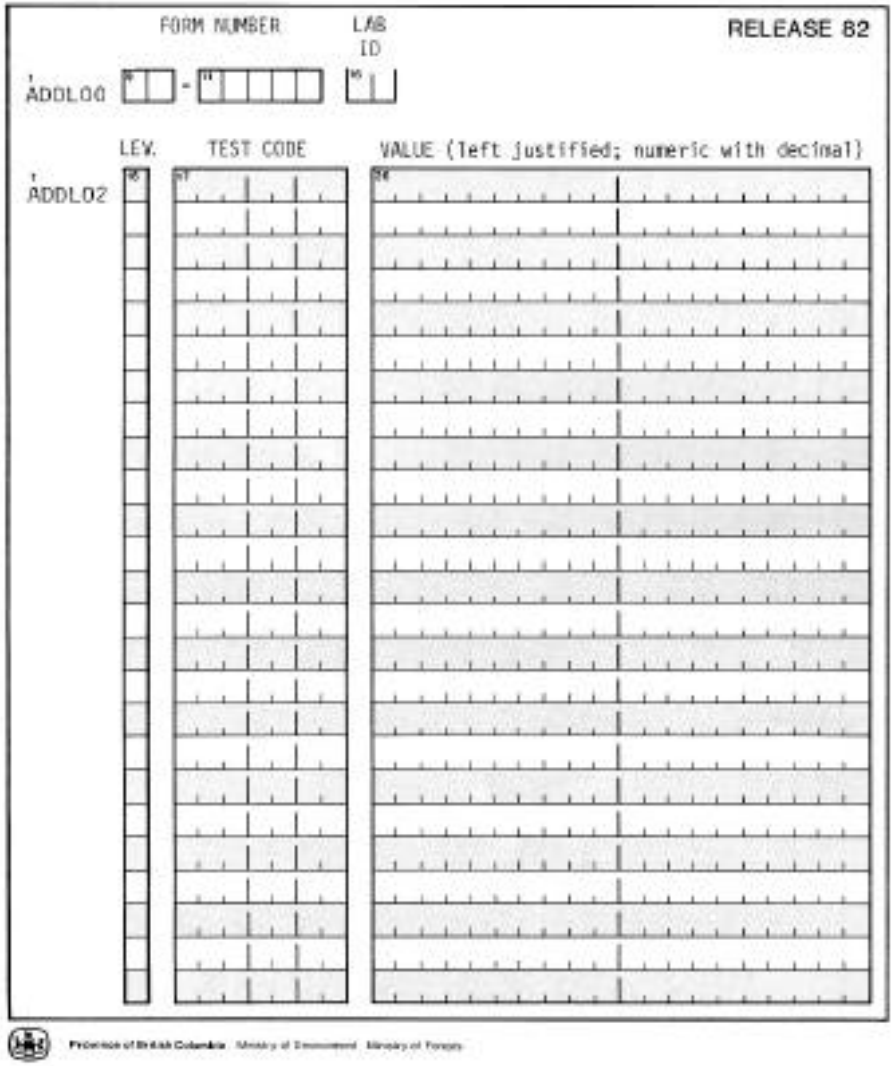
SCHEMATIC SOIL PROFILE

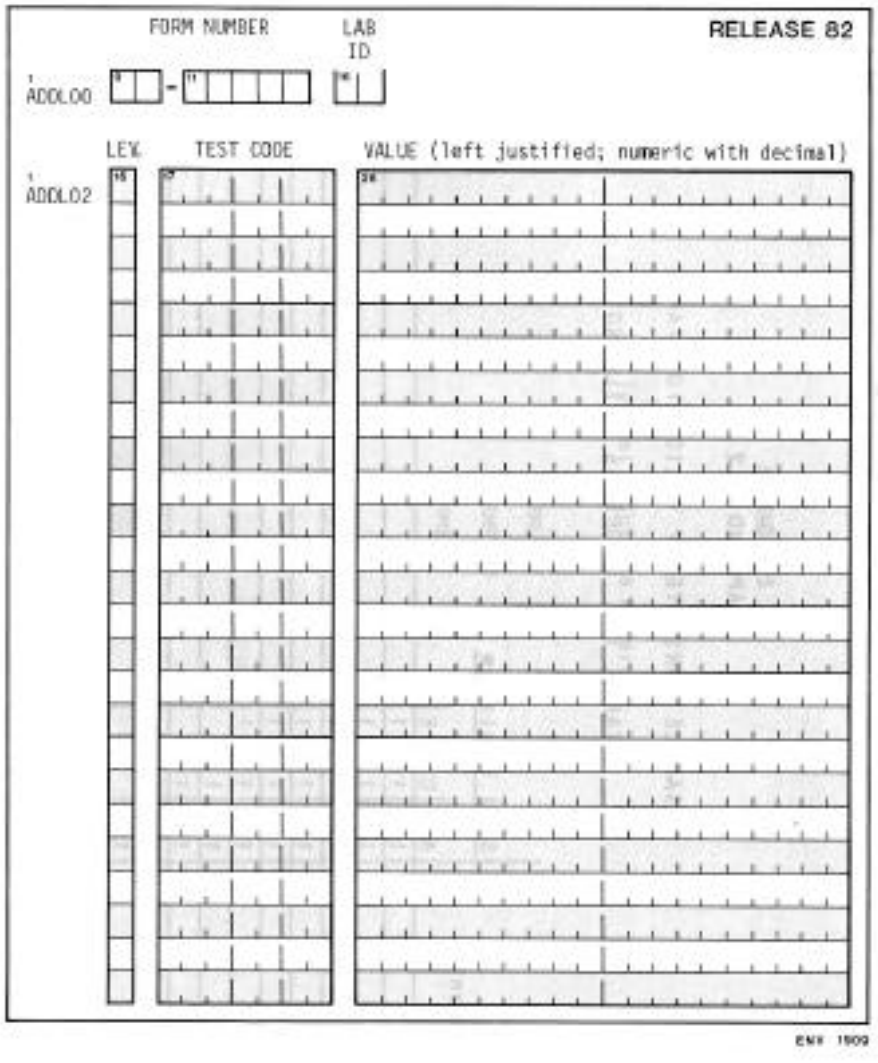
DEPTH (cm): 10, 0, 25, 50, 75, 100

26

SOIL TEMPERATURE

Depth 1	°C	Depth 2	°C	Depth 3	°C	Depth 4	°C	Depth 5	°C	Depth 6	°C	Depth 7	°C	Depth 8	°C





Province of British Columbia Ministry of Environment Ministry of Forests

ENV 1909

APPENDIX 2

SAMPLE CONSISTENCY VALIDATION TABLE

TABLE 17: SLOPE VS SOILDRNG

Slope Percent	Soil Drainage					
	A	**B**	**C**	**D**	**E**	**F**
≤0.5	1	1	1	1	1	1
>0.5, ≤2.5	1	1	1	1	1	1
>2.5, ≤5	1	1	1	1	1	1
>5, ≤10	1	1	1	1	1	
>10, ≤15	1	1	1	1	1	
>15, ≤30	1	1	1	1	1	
>30, ≤45	1	1	1	1		
>45, ≤70	1	1	1	1		
>70, ≤100	1	1	1			
>100	1	1				

APPENDIX 3

Typical Printouts From:

FORMLIST
FORMFIND
FORMSTAT

B.C. SOIL INFORMATION SYSTEM

FORM IDENTIFIER LISTING

SITE	SOIL	LAB
8200318	8200318	-
8200319	8200319	-
8200320	8200320	8200320
8200321	-	-
8200322	-	-
8200323	8200323	8200323
8200340	-	-
8200341	8200341	-
8200365	8200365	8200365
8200366	8200366	-
8200367	-	-
8200572	-	-
8200624	8200624	-
8200711	-	-

B.C. SOIL INFORMATION SYSTEM

DATA EXTRACT PROCEDURE

THE FOLLOWING FORM IDENTIFIERS WHERE FOUND TO MEET THE REQUESTED CRITERIA

FORM IDENTIFIER	
8200318	8200341
8200319	8200365
8200320	8200366
8200321	8200367
8200322	8200572
8200323	8200624
8200340	8200711

B.C. SOIL INFORMATION SYSTEM

MASTER FILE STATUS REPORT

FORM IDENTIFIER	VALIDATION STATUS	VALIDATION DATE	PROMOTION STATUS	PROMOTION DATE	DATE CREATED	DATE LAST UPDATED
82-02672	A	83/01/17		-	82/11/10/	82/12/22
82-02673	A	83/01/17		-	82/11/10	83/01/22
82-02674	A	83/01/17		-	82/11/10	82/11/14
82-03101	V	83/12/12	P	83/01/21	82/11/14	83/02/04
82-03102	X	83/01/07		-	82/11/14	82/01/22
82-03103	A	83/01/03		-	82/11/14	83/01/22
82-03104	N	83/01/14		-	82/11/19	83/01/14
82-03105	V	83/01/22	P	83/02/04	82/11/17	83/02/04
82-04562	V	83/01/19		-	82/11/21	83/02/04
82-04563	N	83/02/04		-	82/11/21	83/02/07
82-04564	A	83/02/02		-	82/11/22	83/02/07
82-04575	V	83/01/11	P	83/01/21	82/11/24	83/02/07

APPENDIX 4

Typical Examples of:

SIMPLE REPORT
DETAILED REPORT

FORM ID: 82-02705 FEB 2, 1983

SITE DECSRIPTION FORM

Date Created: 82/11/17 Date Last Updated: 82/11/30 Date Deleted:

Validation Status: V Validation Date: 83/01/17 Date Microfiched:

Promotion Status: P Promotion Date: 83/01/21

1. Project ID VID **2.** Plot Number 2PS-113-10 **3.** Date (Y/M/D) 82/07/06

4. NTS Sheet 92F/ 7 / **5.** Lat. 49 20 26 ± 00 Long. 124 38 02 ± 00

6. UTM System Zone 10 Easting 3831 Northing 54664

7. Location E. of Horne Lk. Park (Spider Lk.Park)

8. Photo # and Co-ord. Flight Line BC80060 Photo # 113 X = 12.2 Y = 17.5

9. Aspect 320° **10.** Slope 16.0% **11.** Elevation 155 ± 10 meters

12. Terrain Year 1978 **13.** Physiographic Subdivision 2220 **14.** Zone/Subzone System

TERRAIN TEXTURE	GEN. MAT.	QUAL. DESC.	SURFACE EXPRESS.	MOD. PROC.	QUAL. DESC.
GS	F	G	HM		

15. Ecological Classification System

16. Vegetative Cover System
G S V
G S V

17. Soil Classification O.HFP Year 1978
Phase
Family Particle Size

18. Plot Representing AGC:5AT:5AT;

19. Site Position Macro	**20.** Site Position Meso	**21.** Site Surface Shape	**22.** Microtopography
G	C	B	D

23. Meso Slope Length (m) **24.** Meso Upslope Length (m)

25. Site Position Diagram (Refer to Data Form ID -)
Photo Roll Number
Photo Number

26. Exposure Type
A
Other
Comment

FORM ID: 82-02705 FEB 2, 1983

SITE DESCRIPTION FORM

27. Ecological Moisture Regime
C

28. Nutrient Regime

29. Soil Temperature

30. Soil Moisture Subclass

31. Soil Drainage
A

32. Perviousness
A

33. Free Water
B

34. Flood Hazard
E

35. Depth To (cm)
- **A.** Water Table .x
- **B.** Rooting Effective 70.0
- **C.** Root Restricting Layer .x
- **D.** Frozen Layer .x
- **E.** Bedrock .x
- **F.** Carbonate .x
- **G.** Salinity .x

36. Bedrock Type

37. Bedrock Structure

38. Coarse Fragment Lithology
- **A.** Type (In Order Of Dominance)
- **B.** Mixed

39. Successional Status
- Present Stage
- Expected Climax
- Rate of Succession

40. Factors Influencing Stand Establishment

41. Vegetation Plot
- Shape
- Area (ha)
- Dimension (m)

42. Humus Form Classification Variants:

43. Surface Substrate

Substrate	% Cover
Decaying Wood	20.0
Bedrock	.0
Cobbles &Stones	.0
Mineral Soil	.0
Organic Matter	80.0
Water	.0
Total	100%

44. Profile Status

45. Profile Deviation

46. Soil Mapping Unit

47. Soil Name Quennell

48. Associated Soil

49. Profile Number

50. Project Co-ordinator R. Maxwell
Surveyor P. Sanborn

51. Agency METS:MALC

52. Type of Soil Sample
- **A.** Sampled
  - **1.** Chemical **2.** Physical

53. Sampling Technique

54. Notes on Site Description

FORM ID. 82-02705 — SOIL DESCRIPTION FORM — FEB 02, 1983

0	1							2		3		4	5						6	7											8	9			10
	HORIZON							HORIZON DEPTH		HORIZON THICK. CM.			COARSE FRAG. DESCR.							STRUCTURE													CONSIST			
			SUFFIXES																	PRIMARY				SECONDARY											
LEVEL	DESIG	HORIZ	1	2	3	4	SUBDIV	CM.		MIN	MAX	BNDRY DIST	FORM	% BY VOL	GRAV %	TYP	COBB %	TYP	STONE % TYP	SOIL TEXT	GRAD	CLAS	KIND	MOD	GRAD	CLAS	KIND	MOD	MIST	CONDRY	MOIS	WET	PLAST	LAB SAMPLE
A		LE						4.0-	0.0																									
B		A	H					0.0-	1.0					47	45	S	2	S		LS															
C		B	F					1.0-	35.0					47	45	S	2	S		LS															
D		B-	M					35.0-	100.0					55	50	S	5	S		S															
								-	.																									
								. -	.																									
								. -	.																									
								. -	.																									
								. -	.																									
								. -	.																									

0	11										12														13				14
	COLOUR 1					COLOUR 2					MOTTLES														ROOTS 1			ROOTS 2	
															COLOUR														
LEVEL	ASPECT	NUMBR	LETTR	VALUE	CHROM	ASPECT	NUMBR	LETTR	VALUE	CHROM	ABUND	SIZE	CONTR	ASTIP	NUMB	LETT	VALU	CHRO	ABUND	SIZE	CONTR	ASTIP	NUMB	LETT	VALU	CHRO	ABUND	DIST	ABUND	SIZE	DIST	DIST	HORIZON NOTES
A		•	-	•	•		•		•	•	X				•		•	•														
B	07	5.0	YR	6.0	6.0		•		•	•	X				•		•	•														20%
C		•	-	•	•		•		•	•	X				•		•	•														20%
D		•	-	•	•		•		•	•	X				•		•	•														20%
		•	-	•	•		•		•	•					•		•	•														
		•	-	•	•		•		•	•					•		•	•														
		•	-	•	•		•		•	•					•		•	•														
		•	-	•	•		•		•	•					•		•	•														
		•	-	•	•		•		•	•					•		•	•														
		•	-	•	•		•		•	•					•		•	•														

60

45

FORM ID. 82-02705

SOIL DESCRIPTION FORM

FEB 02, 1983

01 LEVEL	15 PH REACT.	16 PORES MEDIUM	16 PORES ABUNDANCE	16 PORES SIZE	16 PORES DISTINCTNESS	16 CUTANS	16 MINERALOGY	16 TYPE	17 HORIZON	18 CLAY FILMS FREQ	18 CLAY FILMS THICK	18 CLAY FILMS LOC	19 EFFERVESCENCE	20 SEC. CARB. ABUNDANCE	20 SEC. CARB. SIZE	20 SEC. CARB. SHAPE	20 SEC. CARB. CONSISTENCY	21 SALINE	22 CONCRET. NODULES. & CASTS ABUNDANCE	22 CONCRET. NODULES. & CASTS SIZE	22 CONCRET. NODULES. & CASTS COLOUR NUMB	22 CONCRET. NODULES. & CASTS COLOUR LETT	22 CONCRET. NODULES. & CASTS COLOUR VALU	22 CONCRET. NODULES. & CASTS CHRO	23 CEMENT AGENT	23 CEMENT GRADE	23 CEMENT INTENSITY
A	--		-		-				-												•		•	•			X
B	--		-		-				-												•		•	•			X
C	-		-		-				-												•		•	•			X
D	--		-		-				-												•		•	•			X
	--		-		-				-												•		•	•			
	--		-		-				-												•		•	•			
	--		-		-				-												•		•	•			
	--		-		-				-												•		•	•			
	--		-		-				-												•		•	•			
	--		-		-				-												•		•	•			

01 LEVEL	24 ORG. COMP. 1	24 ORG. COMP. 2	24 MAT. DESC. WOOD	24 MAT. DESC. HIV	24 MAT. DESC. PYR	24 MAT. DESC. IND	24 MAT. DESC. IVO	24 MAT. DESC. INP	24 MAT. DESC. IPO
A	-	-			•				
B	-	-			•				
C	-	-			•				
D	-	-			•				
	-	-			•				
	-	-			•				
	-	-			•				
	-	-			•				
	-	-			•				
	-	-			•				

25 GENERAL COMMENTS ON SOIL CHARACTERISTICS

26 SOIL TEMP

DEPTH CM.	TEMP. DEG C
	•
	•
	•
	•
	•
	•
	•
	•
	•

27 SCHEMATIC SOIL PROFILE

10 — 0 — 25 — 50 — 75 — 100

FORM ID: 82-02705 JAN 24,1983

B.C. SOIL INFORMATION SYSTEM

SITE SURVEY REPORT

Date Created: 82/11/17
Validation Status: Validated
Validation Date: 83/01/17
(Also Described On Form ID)

Date Last Updated: 82/11/30
Promotion Status: Promoted
Promotion Date: 83/01/21

Date Deleted:
Date Microfiched:

SITE DESCRIPTION

Project ID: VID
Plot Number: 2PS-113-10
Date (Y/M/D): 82/07/06
Agency: Min. of Env. - Terrestrial St.
Min. of Agr. - Land Comm.
Project Co-ordinator: R. Maxwell
Surveyor: P. Sanborn
Location: E. of Horne Lk. Park (Spider Lk. Park)
Plot Representing:
Site Position Reference: See Form

NTS Mapsheet: 92F / 7 /
Latitude (D:M:S): 49:20:26 ± 00
Longitude (D:M:S): 124:38:02 ± 00
UTM - Zone: 10 Easting: 3813 Northing: 54664
Air Photo - Flight Line: BC80060 113
Photo Number:
Photo Co-ordinates: X - 12.2 Y - 17.5
Physiographic Subdivision: Nanaimo Lowland

SITE CHARACTERISTICS

Aspect (°): 320
Slope (%): 16.0
Elevation (m): 155 ± 10
Site Position Macro: Level
Site Postion Meso: Upper Slope
Site Surface Shape: Convex
Microtopography: Moderately Mounded
Exposure Type: Not Applicable
Comment:

Meso Slope Length (m):
Meso Upslope Length (m):
Ecological Moisture Regime: Subxeric
Nutrient Regime:
Free Water: Absent
Flood Hazard: No Hazard

Surface Substrate	% Cover
Decaying Wood	20.0
Bedrock	00.0
Cobbles & Stones	00.0
Mineral Soil	00.0
Organic Layer	80.0
Water	00.0

B.C. SOIL INFORMATION SYSTEM

SITE SURVEY REPORT

•**NOTES ON SITE DESCRIPTION**

•**TERRAIN CLASSIFICATION** YEAR: 78

TEXTURE		GENETIC MATERIAL	QUALIFYING DESCR.	SURFACE EXPRESSION
GRAVELLY	SANDY	FLUVIAL	GLACIAL	HUMMOCKY SUBDUED

MODIFYING PROCESS:

•**BEDROCK**

TYPE STRUCTURE

COARSE FRAGMENT LITHOLOGY
MIXED

•**VEGETATION AND LANDSCAPE**

ZONE / SUBZONE CLASSIFICATION SYSTEM:
FOREST REGION:
FOREST SECTION:
ZONE:
SUBZONE
VARIANT:
PHASE:

VEGETATIVE COVER CLASSIFICATION SYSTEM: (GENUS - SPECIES - VARIANT)

VEGETATION CLASSIFICATION CLASSIFICATION SYSTEM:

SUCCESSIONAL STATUS PRESENT STAGE: RATE:
EXPECTED CLIMAX:

FACTORS INFLUENCING STAND ESTABLISHMENT

FORM ID: 82-02705 JAN 24, 1983

B.C. SOIL INFORMATION SYSTEM

SITE SURVEY REPORT

VEGETATION PLOT SHAPE: AREA(hectares): DIMENSION(m): # OF SUBPLOTS:

SAMPLING TECHNIQUE

ECOLOGICAL CLASSIFICATION CLASSIFICATION SYSTEM:
ASSOCIATION: TYPE:
SUBASSOCIAITON: PHASE:

SOIL CHARACTERISTICS

DRAINAGE: RAPIDLY
PERVIOUSNESS: RAPID

DEPTH TO (cm):

Water Table	- Absent
Rooting (Effective)	- 70.0
Root Restricting Layer	- Absent
Frozen Layer	- Absent
Bedrock	- Absent
Carbonate	- Absent
Salinity	- Absent

TEMPERATURE CLASS:

MOISTURE SUBCLASS:

SOIL CLASSIFICATION (YEAR: 1978)

CLASSIFICATION: ORTHIC HUMO - FERRIC PODZOL

PHASE (S):

FAMILY PARTICLE SIZE:

HUMUS FORM CLASSIFICATION:
VARIANTS:

SOIL MAPPING UNIT:
SOIL NAME: QUENNELL ASSOCIATED SOIL NAME:
PROFILE STATUS: PROFILE NUMBER:
PROFILE DEVIATION:

TYPE OF SOIL SAMPLE: PARTIAL CHEM.

FORM ID: 82-02705 JAN 24,1983

PROFILE DESCRIPTION

SOIL TEMPERATURE

DEPTH (cm)								
TEMP. (°C)								

GENERAL COMMENTS ON SOIL CHARACTERISTICS

FORM ID: 82-02705 JAN 24, 1983

PROFILE DESCRIPTION

LEVEL	HORIZON DESIGNATION	HORIZON DEPTH (cm)	HORIZON THICKNESS		HORIZON BOUNDARY		COARSE FRAGMENT DESCRIPTION		
			min	max	dist.	form	% by vol	%	type
A	LF	4.0 - 0.0						Gravel - Cobbles - Stones -	
B	A H	0.0 - 1.0					47	Gravel - 45 Cobbles - 2 Stones -	Subrounded/Subangular Subrounded/Subangular
C	B F	1.0 - 35.0					47	Gravel - 45 Cobbles - 2 Stones -	Subrounded/Subangular Subrounded/Subangular
D	B M	35.0 - 100.0					55	Gravel - 50 Cobbles - 5 Stones -	Subrounded/Subangular Subrounded/Subangular

FORM ID: 82-02705 JAN 24,1983

PROFILE DESCRIPTION

LEVEL	SOIL TEXTURE	STRUCTURE		MOISTURE	CONSISTENCE
		PRIMARY	SECONDARY		
A					Dry - Moist - Wet - Plast. -
B	LOAMY SAND				Dry - Moist - Wet - Plast. -
C	LOAMY SAND				Dry - Moist - Wet - Plast. -
D	SAND				Dry - Moist - Wet - Plast. -

FORM ID: 82-02705 JAN 24,1983

PROFILE DESCRIPTION

LEVEL	COLOUR 1	COLOUR 2	MOTTLES	ROOTS 1	ROOTS 2	HORIZON NOTES
A			ABSENT			
B	Crushed Moist 5.0 yr 5.0 / 6.0		ABSENT			20%
C			ABSENT			20%
D			ABSENT			20%

FORM ID: 82-02705 JAN 24,1983

PROFILE DESCRIPTION

LEVEL	pH	PORES	HORIZON POROSITY	CLAY FILMS	EFFEVESCENCE	SECONDARY CARBONATE DESCRIPTION	SALINITY
A						Streaked - Spotted - Moist - Dry -	
B						Streaked - Spotted - Moist - Dry -	
C						Streaked - Spotted - Moist - Dry -	
D						Streaked - Spotted - Moist - Dry -	

APPENDIX 5

FILE CREATION/CONTENTS LOG

FILE NAME	DATE CREATED	USER	CONTENTS	DATE DESTROYED