Field Book for Describing and Sampling Soils

9H U V L R Q

National Soil Survey Center
Natural Resources Conservation Service
U.S. Department of Agriculture

6 H S W H P E H U

[redacted]

7KH VFLHQFH DQG NQRZOHGJH LQ WKLV GRFXPHQW D
H[SHULHQFH RI WKRXVDQGV RI GHGLFDWHG 6RLO 6FL
\HDUV RI WKH 1DWLRQDO &RRSHUDWLYH 6RLO 6XU
GXH WR WKHVH ODUJHO\ XQNQRZQ VWHZDUGV RI WKH

7KLV ERRN ZDV ZULWWHQ FRPSLOHG DQG HGLWHG E
'RXJODV $:\VRFNL (OLV & %HQKDP 15&6 /LQFRO
%URGHUVRQ 15&6 6DOW /DNH &LW\ 87

6SHFLDO WKDQNV DQG UHFRJQLWLRQ DUH H[WHQGHG
H[WHQVLYHO\ WR WKH SUHSDUDWLRQ DQG SURGXFWL
IURP WKH 15&6 DORQJ ZLWK 1&66 FRRSHUDWRUV ZKR
7DPP\ 1HSSOH IRU GRFXPHQW SUHSDUDWLRQ DQG JUD
JUDSKLFV -LP &XOYHU IRU VSRQVRULQJ LW DQG WK
IXQGLQJ LW

3URSHU FLWDWLRQ IRU WKLV GRFXPHQW LV

*6FKRHQHEHUJHU 3 - :\VRFNL ' $ %HQKDP (&
HGLWRUV)LHOG ERRN IRU GHVFULELQJ DQ
1DWXUDO 5HVRXUFHV &RQVHUYDWLRQ 6HUYLFH 1
/LQFROQ 1(*

Cover Photo 6RLO SURILOH RI D 6HJROXWLF 6DQGV[WRQH [illegible]
VKRZLQJ UHWLFXODWH PDVVHV RU EORFNV RI SOLQW
IHH&RXUWHV\ RI)UDQNIH) :KHHOHU UHWLUHG 15
/DUU\ 5DWOLII UHWLUHG 1DWLRQDO 6RLO 6XUYH\ &

*8VH RI WUDGH RU ILUP QDPHV LV IRU UHDGHU LQIRUPDWLR
HQGRUVHPHQW RU UHFRPPHQGHG XVH E\ WKH 8 6 'HSDUWP
FRPPHUFLDO SURGXFW RU VHUYLFH*

*7KH 8 6 'HSDUWPHQW RI $JULFXOWXUH 86'$ SURKLELWV GL
DFWLYLWLHV RQ WKH EDVLV RI UDFH FRORU QDWLRQDO RU
EHOLHIV VH[XDO RULHQWDWLRQ RU PDULWDO RU IDPLO\ VW
SURJUDPV 3HUVRQV ZLWK GLVDELOLWLHV ZKR UHTXLUH DO
SURJUDP LQIRUPDWLRQ %UDLOOH ODUJH SULQW 7$3(GLVN
&HQWHU DW YRLFH DQG 7''*

*7RILOH D FRPSODLQW RI GLVFULPLQDWLRQ ZULWH 86'$ 'LU
: :KLWWHQ %XLOGLQJ ,QGHSHQGHQFH $YHQXH 6: :DVK
FDOO YRLFH DQG 7'' 86'$ LV DQ HTXDO RSSRUW*

Purpose: 7KH IROORZLQJ LQVWUXFWLRQV GHILQLWLRQV ILHOG JXLGH IRU PDNLQJ RU UHDGLQJ VRLO GHVFU SUHVHQWO\ SUDFWLFHG LQ WKH 86$

Background: 7KH PHWKRGORJ\ RI VRLO GHVFULSWLRQV Z VFLHQWLVWV WKURXJKRXW WKH 6RLO 6XUYH\ 3URJUDP SXEOLVKHG VPDOOHU UHJLRQDO PDQXDOV RYHU WKH \HDUV GHVFULSWLRQV LQ DQG 7KH ILUV LGHQWLILFDWLRQ DQG GHVFULSWLRQ IRU VRLO KR %XUHDX RI &KHPLVWU\ DQG 6RLOV 5R\ 6LPS VXPPDUL]HG DQG UHYLVHG WKLV LQIRUPDWLRQ 6 6XUYH\ 6WDII EULHI9HFRORU ERRN LQVHUWV ZLWK ZHUH UHOHDVHG 6RLO &RQVHUYDWLRQ 6HUYLFH H J :HVWHUQ 7HFKQLFDO &HQWHU 7KLV GRFXPHQW DQ H[SDQGHG DQG XSGDWHG YHUVLRQ RI HDUOLHU SUHVHQW NQRZOHGJH EDVH 7KLV YHUVLRQ LQ UHFHQW XSGDWHV WR WKH RULJLQDO UHOHDVH DO DQG XSGDWHV LQ VRXUFH GRFXPHQWV

Standards: 7KLV ERRN VXPPDUL]HV DQG XSGDWHV WKH F WLYH 6RLO 6XUYH\ FRQYHQWLRQV IRU GHVFULELQ 3'3 1$6,6 0XFK RI WKH FRQWHQ WLRQ RI WKH SULPDU\ VRXUFHV

Regarding PEDON (PDP 3.5 / 3.6): 7KLV GRFXPHQW LV LQWHQGHG V FXUUHQW DQG XVDEOH E\ WKH HQWLUH VRLO VFLH RQ+RZ WR XVH 3'3 RU 1$6,6 WLPH 3'3 LV WKH PR WKHUHIRUH WKH OHDVW FRPSDWLEOH 15&6 GRFXP 0DQXDO 1DWLRQDO 6RLO 6XUYH\ +DQGERRN 6RLO 'LIIHUHQFHV DQG OLQNDJHV EHWZHHQ 3'3 DQG UHDVRQDEOH WR GR VR DV DQ DLG WR LQWHUSUH GDWD

6WDQGDUG SURFHGXUHV DQG WHUPV IRU GHVFULE LQFUHDVHG LQ UHFHQW \HDUV H J UHGR[LPRUSK WKHVH FKDQJHV KDV EHEQ WKH GHYHORSPHQW DQ WR VWRUH VRLO GHVFULSWLRQV DQG LQIRUPDWLR EHWWHU RU ZRUVH UHTXRUHPHQWV DQG

Sources: 7KLV)LHOG %RRN GUDZV IURP VHYHUDO SULPL 6XUYH\ 0DQXDO 6RLO 6XUYH\ 6WDII WKH 3('3 3'3 9HUVLRQ 'HVLJQ 'RFXPHQWV 6RLO 6XUYH\

6RLO :DWHU 6WDWH
'HSWK 7R :DWHU 7DEOH
6HDVRQDO +LJK :DWHU 7DEOH .LQG
Vegetation / Land Cover
>(DUWK &RYHU .LQG 3ODQW 6\PERO 3
3ODQW 6FLHQWLILF 1DPH@
Parent MateriaO
Bedrock
>.LQG)UDFWXUH ,QWHUYDO &ODVV %HG
:HDWKHULQJ &ODVV 'HSWK@
Erosion
>.LQG 'HJUHH &ODVV@
Runoff ±
6XUIDFH 5XQRII ±
7KH ,QGH[2I 6XUIDFH 5XQRII &ODVV
Surface Fragments (Formerly Surface Stoniness) ±
Diagnostic Horizons Or Properties
>.LQG 'HSWK@
References ±

PROFILE / PEDON DESCRIPTION

Observation Method ±
>.LQG 5HODWLYH 6L]H@
Taxonomic Classification
Horizon Nomenclature ±
0DVWHU 7UDQVLWLRQDO DQG &RP±PRQ +
+RUL]RQ 6XIIL[HV ±
2WKHU +RUL]RQ 0RGLILHUV
>1XPHULFDO 3UHIL[HV 1XPHULFDO 6XI
'LDJQRVWLF +RUL]RQV ±
+RUL]RQ 'HSWK ±
+RUL]RQ 7KLFNQHVV ±
+RUL]RQ %RXQGDU\ ±
>'LVWLQFWQHVV 7RSRJUDSK\@
Soil Color ±
'HFLVLRQ)ORZFKDUW)RU 'HVFULELQJ 6R
6RLO 0DWUL[&RORU ±
> 6RLO &RORU 0RLVWXUH 6WDWH /RF
0RWWOHV ±
>4XDQWLW\ 6L]H &RQWUDVW &RORU
7DEXODU /LVW IRU 'HWHUPLQDWLRQ RI±&

Redoximorphic Features - RMF (Discussion) ±

Redoximorphic Features

>.LQG 4XDQWLW\ 6L]H &RQWUDVW &RO
6KDSH /RFDWLRQ +DUGQHVV %RXQGDU\

Concentrations (Discussion)

Concentrations ±

>.LQG 4XDQWLW\ 3HUFHQW 2I $UHD &RY
&RQWUDVW &RORU 0RLVWXUH 6WDWH 6
+DUGQHVV %RXQGDU\@

Ped and Void Surface Features

>.LQG $PRXQW &RQWLQXLW\ 'LVWLQFW

(Soil) Texture

7H[WXUH &ODVV
7H[WXUH 7ULDQJOH)LQH (DUWK
7H[WXUH 0RGLILHUV ±
> E\ 9ROXPH 6L]H 4XDQWLW\ &RPS
7HUPV 8VHG ,Q /LHX 2I 7H[WXUH
&RPSDULVRQ RI 3DUWLFOH 6L]H &ODVV 6\

Rock and Other Fragments

>.LQG 9ROXPH 3HUFHQW 5RXQGQHVV 6L]H
DQG 'HVFULSWLYH 7HUPV@

(Soil) Structure ±

>7\SH *UDGH 6L]H@

Consistence ±

5XSWXUH 5HVLVWDQFH ±
>%ORFNV 3HGV DQG &ORGV 6XUIDFH
&HPHQWLQJ $JHQWV ±
0DQQHU 2I)DLOXUH ±
6WLFNLQHVV ±
3ODVWLFLW\ ±
3HQHWUDWLRQ 5HVLVWDQFH
([FDYDWLRQ 'LIILFXOW\ ±

Roots ±

>4XDQWLW\ 6L]H *UDGH 4XDQWLW\ RI

SITE

Rock Charts
,JQHRXV 5RFNV &KDUW ±
0HWDPRUSKLF 5RFNV &KDUW
6HGLPHQWDU\ $QG 9ROFDQLFODVWLF 5RF
Mass Movement (Mass Wasting) Types For Soil Survey ±
North American Geologic Time Scale
Till Terms ±
Pyroclastic Terms ±
Hierarchical Rank of Lithostratigraphic Units ±
References ±

LOCATION ±
Public Land Survey ±
7RZQVKLSV DQG 5DQJHV
6HFWLRQV ±
6XE 'LYLVLRQV ±
State Plane Coordinate System
Universal Transverse Mercator (UTM) Rectangular Coordinate System ±
References ±

MISCELLANEOUS ±
Examples Of Percent Of Area Covered
Measurement Equivalents & Conversions
0HWULF 7R (QJOLVK ±
(QJOLVK 7R 0HWULF ±
&RPPRQ &RQYHUVLRQ)DFWRUV
Guide To Map Scales And Minimum-Size Delineations ±
Common Soil Map Symbols (Traditional)

FIELD SAMPLING ±
Introduction ±
Soil Sampling ±
6RLO 6DPSOH .LQGV ±
5HIHUHQFH 6DPSOHV
&KDUDFWHUL]DWLRQ 6DPSOHV
6DPSOLQJ 6WUDWHJLHV ±
Field Equipment Checklist
Examples Of Common Field Sampling Equipment ±
References ±

INDEX

[redacted]

&RPSLOHG E\ 3 - 6FKRHQHEHUJHU ' $:\VRFNL (&
/LQFROQ 1(: ' %URGHUVRQ 15&6 6DOW /DNH

DESCRIBER(S) NAME

NAME RU LQLWLDOV 5HFRUG WKH REVHUYHU V ZK
H J(UOLQJ (*RUHE

DATE

MONTH / DAY / YEAR 5HFRUG WKH GDWH RI WKH REVHUYD
QRWDWLRQ 00 '' <<<< HIRU 0D\

CLIMATE

'RFXPHQW WKH SUHYDLOLQJ JHQHUDO ZHDWKHU FR
REVHUYDWLRQ 1RW D GDWD HOHPHQW LQ 3'3 D V
VRPH ILHOG PHWKRGV UHFRUG WKH Weather Conditions
DQG Temperature H J 5DLQ °&

Weather Conditions	Code
VXQQ\ FOHDU	68
SDUWO\ FORXG\	3&
RYHUFDVW	29
UDLQ	5$
VOHHW	6/
VQRZ	61

AIR TEMPERATURE 7KH DPELHQW DLU WHPSHUDWXUH DW
KHLJKW LQ GHJUHHV &HOVLXV RU)DKUHQKHLW H

SOIL TEMPERATURE 5HFRUG WKH Soil Temperature DQG WKH
Depth DW ZKLFK LW LV GHWHUPLQHG H J RLO 7D[RQRP
JHQHUDOO\ UHTXLUHV D GHSWK RI FP 6RLO WH
GHWHUPLQHG IURP D IUHVKO\ H[FDYDWHG VXUIDFH
FRQGLWLRQV $YRLG VXUIDFHV HTXLOLEUDWHG ZL

Soil Temperature 5HFRUG WKH VRLO °&WHPSHUDWXUH

Soil Temperature Depth 5HFRUG WKH GHSWK DW ZKLFK W
WHPSHUDWXUH LV PHDVXUHG H J

2SWLRQDO $ RQH FKDUDFWHU VXE VDPSOH XVHG WR LQGLFDWH VRPH UHODWLRQVKLS V EHWZHHQ VDPSOLQJ VLWHV H J

$ FRPSOHWH HQGDPS2OH LV $ >7UDQVODWLRQ $ SHGR IRU VRLO FKDUDFWHUL]DWLRQ RU B2UNLQ2K RPO +DVNHOO &RXQWH ILIWK SHDPSOHG LQ WKDW FRXQ DQG LW LV D VDPSOHOLWHGVDWHRSWKH SULPDU\ S

Geomorph

COUNTY FIPS CODE

7KLV LV WKH WKUHH GLJLW),36 FRGH IRU WKH FR 6WDQGDUGV DQG 7HFKQRORJ\ LQ D 8 6 VWDW LV ORFDWHG ,W LV XVXDOO\ ID RGVNHXRE&RXQW)RU QRQ 86$ VDPSOHV RWKHU ZHUH \ WKH DSSURSULDWH ZRUOG ZLGH JHRJUDSKLFDO ORFDWLRQ FRGH 3XEO)1 IRU &DQDGD

MLRA

7KLV LV WKH RQH WR WKUHH GLJLW DQG RQH FKD 0DMRU /DQG 5HVRXUFH $UHD LGHQWLILHU IRU 6WKHU 5ROOLQJ +LJK 3ODLQV 1RUWKHDVWHUQ 3DUW

TRANSECTS

,I WKH VRLO GHVFULSWLRQ LV D SRLQW DORQJ D W LQIRUPDWLRQ RQ, Stop Number, Interval ,Q 1$6,6 DGGLWLRQ LQIRUPDWLRQ FD Transect Id FRUGHG RP 5 SRLQW XQ DU LQWHUYDO Transect Section Method >ELDV 1G UDQGR ± Delineation Size DFUH Transect Direction >FRPSDVV K DLQJ

TRANSECT ID 7KLV LV D IRXU WR ILYH GLJLW QXPEHU WUDQVHFW HW WK WUDQVHFW ZLWKLQ WKH VXU

STOP NUMBER ,I WKH VDPSOH SHGRQ LV SDUW RI D W GLJLW VWRS QXPEHU DORQJ WKH WUDQVHFW 6 FKDUDFWHUV

INTERVAL 5HFRUG GLVWDQFHV EHWZHHQ REVHUYDWL EHDULQJV DQG *36 FRRUGLQDWHV Field Notes UDZ D URX ³8VHU 'HILQHG 6HFWLRQ´ ,Q 3'3 LI WKH REVHUY HQWHU WKH GLVWDQFH LQ IHHW RU PHWHUV EHWZ

SERIES NAME

7KLV LV WKH DVVXPHG 6RLO 6HULHV QDPH DW WKH
&HFLO I XQQRZQ' HQRWHV 1RW 'HVLJQDWHG´3
LV QRW XVHG XVH DQ DSSURSULDWH 6RLO 7D[RQR
NOTE 7KLHOG DVVLJQHG VHULHV QDPH PD\ XOWLPD
DGGLWLRQDO GDWD FROOHFWLRQ DQG ODE DQDO\\

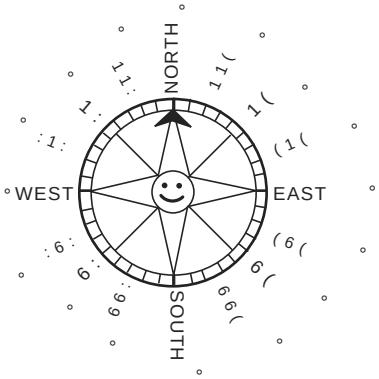
GEOMORPHIC INFORMATION

6HH WKH PRUSKRORJLFDO DQDOHWH FKRLFH OLVWV
VKRZQ IROORZLQJ HDFK H[DPSOH DQG WKH HQWLUH *PQRDXPQHWDLQV*

PART 1: PHYSIOGRAPHIC LOCATION

Physiographic Division H *JQ W H U L RRUU3 O D L Q V*

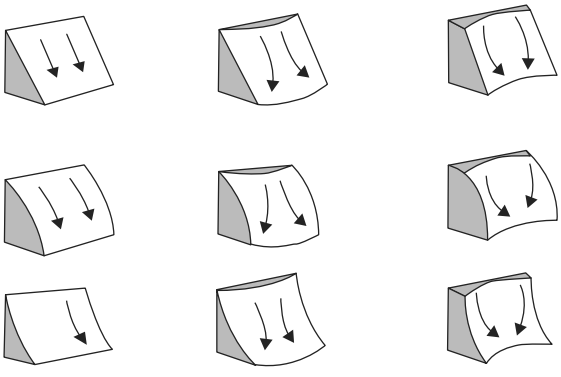
Slope Aspect 7KH FRPSDVV GLUHFWLRQ LQ GHJUHH GHFOLQDWLRQ WKDW D VORSH IDFHV ORRNLQJ



Slope Gradient 7KH DQJOH RI WKH JURXQG VXUIDFH WKH VLWH DQG LQ WKH GLUHFWLRQ WKDW RYHU FDOVXHRSHDNH REVHUYDWLRQV IDFLQJ GRZQVORS DVVRFLDWHG ZLWK VRPH EUDQGV RI FOLQRPHWH

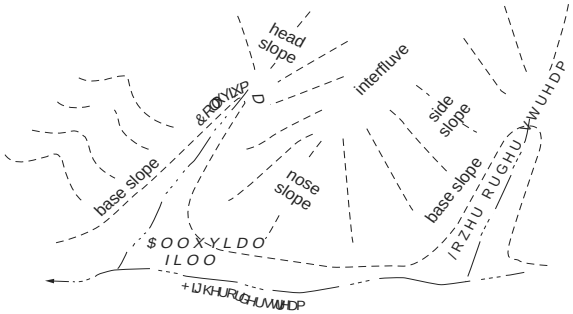
Slope Complexity hy"... @ ð 0 PV‡'(0 0 hy"... @ ð 0 #˜ hy"€S `³ 7KH

Slope Shape 6ORSH VKDSH LV GHVFULEHG LQ WZR
VORSH SHUSHQGLFXODU WR WKH FRQWRXU DQ
KRUL]RQWDO FRQWRXU &RQYH[



Geomorphic Component 7KUHH GLPHQVLRQDO GHVFULS
ODQGIRUPV RU PLFURIHDWXUHV WKDW DUH EHVW
GHVFULSWRUV DUH DYDLODEOH IRU +LOOV 7HUU
H J IRU*R R V H O V R B S H

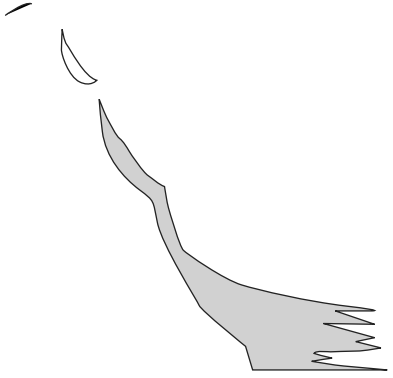
Hills	Code	
	3'3	NASIS
LQWHUIOXYH	I)	
FUHVW	2	&7
KHDG VORSH	+6	+6
QRVH VORSH	16	16
VLGH VORSH	66	66
IUHH IDFH 2	))	
EDVH VORSH	%6	



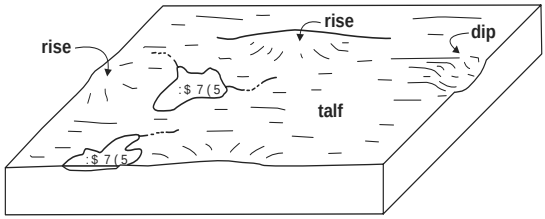
DGDSWHG IURP :\VRFNL HW DO

Terraces, Stepped Landforms	Code
ULVHU	I 5
WUHDG	75

Mountains	Code
PRXQWDLQWRS	07
PRXQWDLQIODQN	0)
XSSHU WKLUG	PRXQWDLQIODQN 87
FHQWHU WKLUG	PRXQWDLQIODQN &7
ORZHU WKLUG	PRXQWDLQIODQN /7
IUHH IDFH	))
PRXQWDLQEDVH	0%



Flat Plains	Code
GLS	'3
ULVH	5I
WDOI	7)



DGDSWHG IURP :\VRFNL HW DO

‡ YHU\ ORZ JUDGLHQWV H J VORSH ±

‡ GHUDQJHG QRQ LQWHJUDWHG RU LQFLSLHQW GUDLQDJH QHV

‡ ³KLJK DUHDV´ DUH EURDG DQG ORZ H J VORSH ±

‡ 6HGLPHQWV FRPPRQO\ ODFXVWULQH DOOXYLDO HROLDQ RU

Microrelief 6PDOO UHODWLYH GLIIHUHQFHV LQ HOHYD
RQ WKH HDUWK¶V *VXUIDFH WKDW RFFXU LQ FHUWDLQ SDWWHUQV*

PLFURKLJK	0+
PLFURORZ	0/

Drainage Pattern ±7KH DUUDQJHPHQW RI GUDLQDJH FKDQQHO
DOVR FDOOHG GUDLQDJH QHWZRUN 6HH JUDSKLFV S

Drainage Pattern	Code	
DQQXODU		2
DUWLILFLDO		2
FHQWULSHWDO		2
GHQGULWLF		2
GHUDQJHG		2
NDUVW	2	
SDUDOOHO	2	
SLQQDWH	2	
UDGLDO	2	
UHFWDQJXODU	2	
WKHUPRNDUVW	2	
WUHOOLV	2	

DRAINAGE $Q HVWLPDWH RI WKH QDWXUDO GUDLQDJH
ZHWQHVV FRQGLWLRQV WKDW SUHYDLOHG EHIRUH *GUDLQHG*

Drainage Class	Code	
	3'3	CONV.
9HU\ 3RRUO\ 'UDLQHG	93	93
3RRUO\ 'UDLQHG	3	3'
6RPHZKDW 3RRUO\ 'UDLQHG	63	63
0RGHUDWHO\ :HOO 'UDLQHG	0:	0:
:HOO 'UDLQHG	:	:'
6RPHZKDW ([FHVVLYHO\ 'UDLQHG	6(	6(
([FHVVLYHO\ 'UDLQHG	(	('

Water

7KH IROORZLQJ GHILQLWLRQV DUH IURP WKH WUDG
6RLO 'UDLQDJH &ODVVHV 6RLO 6XUYH\ GHILQLWLRQV D
FULWHULD YDU\ &RQWDFW DQ
FULWHULD

Very Poorly Drained :DWHU LV DW RU QHDU WKH VRLO
RI WKH JURZLQJ VHDVRQ *YHU VKDOORZ RU ZDWH
*WHQ RU PRUH DQG WKH VRLO LV DUWLILFLDOO
SK\WLF FURSV FDQQRW EH JURZQ &RPPRQO\ W
VLRQ RU LV OHYHO ,I UDLQIDOO LV SHUVLVWHQ

Poorly Drained 7KH VRLO LV ZHW DW VKDOORZ GHSW
WKH JURZLQJ VHDVRQ RU UHPDLQV ZHW IRU ORQ
LW *VKDOORZ ZHW \VKDOORZ ZDWHU RPPRQ SHUVLVWHQW WKH VR
DUWLILFLDOO\ GUDLQHG PRVW PHVRSK\WLF FUR
KRZHYHU LV QRW FRQWLQXRXVO\ ZHW GLUHFWO
WDEOH LV FRPPRQO\ ZLWKLQ URRWV XOW0RI p 0
L = D P

RQO\ D VKRUW WLPH ZLWKLQ WKH URRWLQJ GHS
ORQJ HQRXJK WKDW PRVW PHVRSK\WLF FURSV D
FRPPRQO\ *PKDG/VHD* *D DW WHRO* *ORZ* HU VDWXUDWHG K\G
WLYLW\ FODVV ZLWKLQ PHWHU RI WKH VXUIDFH
UDLQIDOO RU ERWK

Well Drained - :DWHU LV UHPRYHG IURP WKH UR
,QWHUQDO IUHH ZDWHU *WHHUSHRP* *PHQ* *QXO* GXUDWLF
QRW VSHFLILHG :DWHU LV DYDLODEOH WR SOD
RI WKH JURZLQJ VHDVRQ :HQHVV GRHV QRW L
VLJQLILFDQW SHULRGV GXULQJ PRVW JURZLQJ V

Somewhat Excessively Drained - :DWHU LV UHPRYHG IURP W
UDSLGO\ ,QWHUQDO IUH *YHU* *ZDU* *WHU* FRQ*HHRQ* LV
VRLOV DUH FRPPRQO\ FRDUV *KLJ* *WH[WXU* *D* *GHKQG*
FRQGXFWLY *W\ VKDO* ORZ

Excessively Drained - :DWHU LV UHPRYHG IURP WKH VRL
,QWHUQDO IUHH ZDWHU *ERUH* *H[HK* VRLOV DU
FRPPRQO\ FRDUVH WH[*WXUH* *D* *GHKG* K\GUDX
FRQGXFWLYLW\ *YDO* ORZ

FLOODING (VWLPDWHG duration and months WKDW IORRGL
LV H[SHFWHG *UHH* *EULHI -DQ 0DUFK*

Frequency (VWLPDWH KRZ RIWHQ W\SLFDOO\ WKD

Frequency Class	Code		Criteria: estimated, average number of flood events per time span [1]
	3'3	NASIS	
1RQH	12	12	1R UHDVRQDEOH FKDQFH H J WLPH LQ \HD
9HU\ 5DUH		95	≥ WLPH LQ \HDUV E WLPH LQ \HDUV
5DUH	5	5$	5$ WR WLPHV LQ \
2FFDVLRQDO	2&	2&	! WR WLPHV LQ \
)UHTXHQW	)5	)5	! WLPHV LQ \HDUV
9HU\ )UHTXH	9)	9)	! RI DOO PRQWKV LQ

)ORRGLQJ)UHTXHQF\ LV DQ HVWLPDWH RI WKH
QDWXUDO RU KXPDQ LQIOXHQFHG VXFK DV E\
,Q 3'3 *RQH* ODVV WLPH LQ \HDUDUHQGVSDQV
9HU\ 5DUH, 6 FODVVHV
+LVWRU*LFDOO* *ORZ* *QO* *H[FHHGHG* VV FRXOG EH FRP
DQG FD& *RPH* RW UHFRPPHQGHG
9HU\ )UHTXHQW WDNHV SU*HHG* *H[FHHGDQFH* SOH EO
7KH *9HU\ )UHTXHQW* LV LQWHQGHG IRU WLGDO I

Duration (VWLPDWH KRZ ORQJ W\SLFDOO\ LW VW

Duration Class	Code			Criteria: estimated average duration per flood event
	Conv.	3'3	NASIS	
([WUHPHO\ 9HU\ %ULHI %ULHI /RQJ 9HU\ /RQJ	%ULHI 9/	(% %(9% %5 /2 /9	(% %9 % / 9/	%((% 9 9% % WR K WR KR WR GD\V WR GD\V ≥

(SOIL) WATER STATE & DOCUMENTED Soil Moisture Status LQ 1$6,6
(VWLPDWH WKH ZDWHU VWDWH RI WKH VRLO DW WK
VDWLDWHG WRLGO WHPSHUDWXU&HPRXUHHRDEGRFRQGLWLR
WHPSHUDWXU[XHUVR]HQ ZDWHU IRU SHUPDQHQWO\ IU
Texture Modifiers RU Terms Used in Lieu of Texture LQ WKHR ILOH
'HVFULSWLRQV OF THE &RLRQ HULD KDYH FKDQJHG

Water State Class	Code Conv.	NASIS	Criteria: tension	Traditional Criteria: tension and field
Dry [1]	'	' !	N3D !	EDUV [2] RI WHQVL *N3D*
Moist [1]	0	≤ !	N3D WR)RUPHU 8VDJH ! N3D EDUV RI WHQVLR	
		RU !	[3] N3D WR N3D ILHO FDSDFLW\ WR ZLOWLC	
Wet	: [4]	0 ≤		

DEPTH TO WATER TABLE 0HDVXUH RU HVWLPDWH WKH GHS
JURXQG VXUIDFH WR WKH VWDELOL]HG FRQWDFW ZI
ERUH KROH RU ZHOO Seasonal High Water Table - Kind FRUG
DQG Frequency GXUDWLRQ EHJLQQLQJ PRQWK DQG GD\
FP IW ,I VHDVRQDOO\ YDULDEOH ZDWHU LV DEVH
FRPPRQ SUDFWLFH WR HVWLPDWH SUHYDLOLQJ ZDW
VRLO PRUSKRORJ\ H J SUHVHQFH RI 5H[GR[LPRSI
LQ OLHX RI ZDWHU WDEOH PRQLWRULQJ GDWD

NOTE :LWKLQ 7V 15'&6DQG 1$6,6 GDWDEDVHV WKH W
GHVLJQDWLRQ Seasonal High Water Table - Kind DQG Frequency DUH
UHSODFHG ,Q 3'3 3('21 DOO ZDWHU WDEOH L
WHPSRUDO WD1E@04%A6Observation Well

Veg.

EARTH COVER - KIND 5HFRUG WKH GRPLQDQW ODQG FRY
LQWHUPL[HG KDUGZRRG 1 DQG EVRQH 3 8

Kind	Code	Kind	Code
ARTIFICIAL COVER (A) - Nonvegetative cover; due to human activity.			
UXUDO WUDQVSRUWDWLRQ UDGV UDLOURDGV		$58 XUEDQ DQ IDUPVWHDGV LQGXVWU\	
BARREN LAND (B) - < 5% vegetative cover naturally or from construction.			
FXOWXUDOO\ LQGXFHG VHVV PLQHV TXDUULHV DQG RLO ZDVWH DUHDV	%	VDOWODNH EDUUHQ VPXGIODWV VDQG RU JUDYHO EDGODQGV	VDOW IODWV VOLFNVSRWV
SHUPDQHQW VQRZ RU LFH	%		
		VDQG RU JUDYHO	%6*
CROP COVER (C) - includes entire cropping cycle (land prep, crop, or crop residue) for annual or perennial herbaceous plants.			
FORVH JURZQ FURS ULFH RDWV DQG U\H VPDOO JUDLQV	ZKHDW	&&* URZ FURS VR\EHDQV WRPDWRHV RWKHU WUXFN FURSV	FRU DQG WXOLSV
GRASS / HERBACEOUS COVER (G) - > 50% grass, grass-like (sedge/rushes), or forb cover, mosses, lichens, ferns; non-woody.			
KD\ODQG DOIDOID EURPHJUDVV	IHVFXH WLPRWK\	*+/ WR	UDQJHODQG VD WUHH FRYHU
PDUVKODQG JUDVVHV JUDVV OLNH SODQWV	DQG	*0/ WR	UDQJHODQG VKU VKUXE FRYHU
SDVWXUHODQG EURPHJUDVV OHVSHGH]D	WDPH WLPRWK\	IHVFXHV DQG	*3/ UDQJHODQG\ *57
UDQJHODQG JUDVV	VODQG	*5* RWKHU JUDVV P 0	

TREE COVER (T) - > 25% canopy cover by woody plants, natural or planted.			
FRQLIHUV VSUXFH SLQH ILU 7&2 VZDPS WUHHV			
FURS WUHHV QXWV7&5UXLWUSLFDO PDQJURYH DQG QUHU\ &KULVWPDV WUHHV SDOPV			
KDUGZRRGV RDN KLFNRU\ 7+: RWKHU2&UHH FRY HOP DSHQ			
LQWHUPL[HG KDUGZRRGV DQG 7 FRQLIHUV RDN SLQH PL[			
WATER (W) - water at the soil surface; includes seasonally frozen water.			

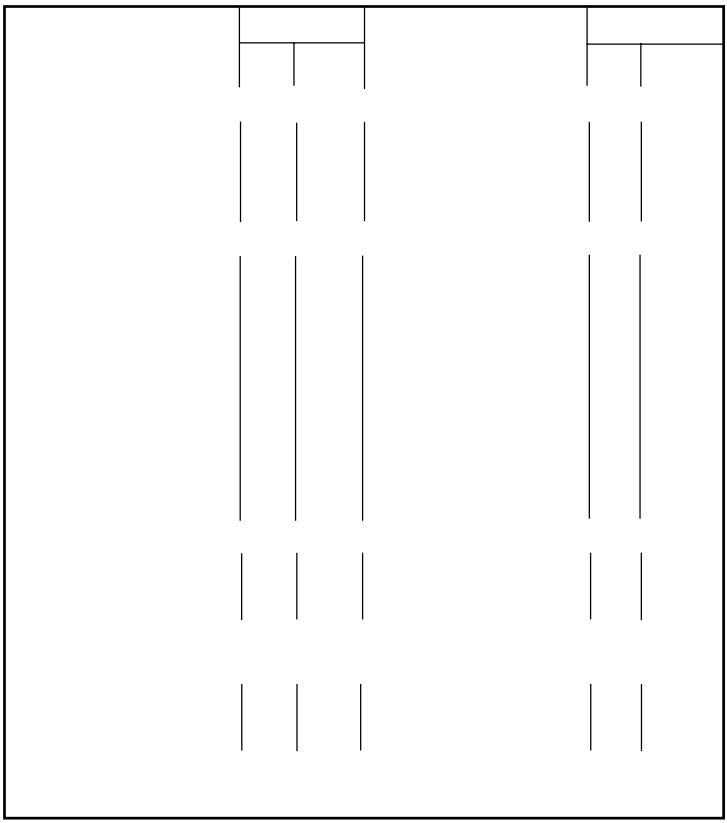
/DQG &RYHU .LQGV DUH SUHVHQWHG DW WZR OHY
VXEKHDGLQJV 1$6,6 WKHVH FRORÌHV 166+ 3DUW
6XUYH\ 6WDII E ,QGLYLGXDO FKRLFHV XQGH
³1$6,6 /HYHO FRLFHV

PLANT SYMBOL 5HFRUG WKH FRGHV VFLHQWLILF SODQ
IRU WKH PDMRU SODQW VSHFLHV IRXQG DW WKH VL
\$1(* \$QGURSRJRQ JHUDUGLLOTEU E7LKJLVE QXHWWWHHPSULF
SODQW GDWD HOHPHQW LQ 1\$6,6

PLANT COMMON NAME 5HFRUG WKH FRPPRQ QDPHV RI WK
VFSKHPFOLuGVD GRXpQGÀDOW WKH VLWH >15&6 F HOHFWU

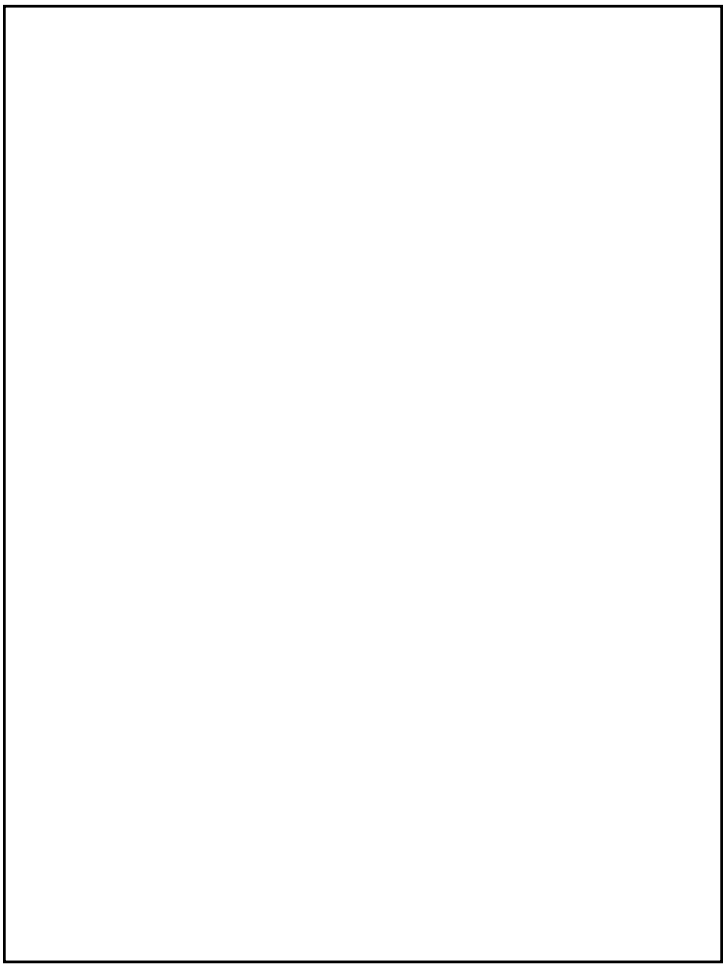
P.M./Geol.

5 H F R U G Kinds(s) of Parent Material Lithostratigraphic Unit(s) R I X Q F R Q V R O L G D W H G P
U H J R O L W K I U R P Z K L F K W K H V R O L O V G H U L Y H G >1 R W
) R U P D W L R Q 0 H P E H U H W F V H H S ± F X U U H Q W S R V H H F R Q
X Q G Wash Field Notes @ , I W K H V R O L O V G H U L Y H G G L U H F W O \
E H G U R F N H J J U D Q Parent Material G H Q W H L W K H U J U X V V D S U
U H V L G X X P D Q G W K H Q U H Bedrock K H F K S R F R S U O X W W L S O H
S



VOLCANIC DEPOSITS (unconsolidated; eolian and mass movement)					
DVK *PP*	+	$6+	FLQGHUV*PP*	²	&I1
DVK DFLGLF	²	6	ODKDU *YROFDQLFODVWLF PXGIORZ*	²	/$+
DVK DQGHVLWLF	²	$61	ODSLOLL *PP ! VJ*	²	/$3
DVK EDVDOWLF	²	$6%	S\URFODVWLF ORZ3<)		
DVK EDVLF	²	$6&	S\URFODVWLF XUJ3H-6		
DVK IORZ*RFODVWLF* $6)			SXPLFH *VJ*	²	380
ERPEV *PP*	²	%20	VFRULD *VJ*	²	6&2
			WHSKUDDO *HMHFWD*		7(3
WATER LAID or TRANSPORTED DEPOSITS					
DOOXYLXP	$	$//	ODFXVWULQH GHSRVLW		
EDFNVZDPS GHSRVLW6'			PDULQH GHSRVLW 0$'		
EHDFK VDQG	²	%(6	RYHUEDQN GHSRVLW2W%'		
HVWXDULQH GHSRVLW			= (6' SHG²LVH*(LPHQW		
IOXYLRPDULQH GHSRVLW			WO²RSH DOOXYLXP 6$/		
JUHHQVDQGV		²	YD²OOH\ VLGH D2OXY6X P		

3DUHQW PDWHULDO GHILQ*LOWRLVRQDU\ DHH /IRQGIRUPV
*HRORJLF 71HUP+V´ 3DUW 6RLO 6XUYH\ 6WDII
³*OVSU\ RI *HDRFNRVJRQ
8VH WKH PRVW SUHFLVH WHUP IRU WKH LQ VLWX
JHQHULF WHUP
&UGHQ DQG 9DUQHV
7KHVH JHQHULF WHUPV UHIHU WR WKH GRPLQDQW
RU GHSRVLWV IURP ZKLFK WKH RUJDQLF VRLO KD
6RLO 6XUYH\ 6WDII 7KHVH WHUPV SDUWLD
UHFRJQL]HG LQ 6RLO 7D[RQRP\ WHUPV ZKLFK UHI
RUJDQLF PDWHULDO SU'HDHQRVLWLRQV+RUL]RQV
WLHVDEOH
VJ VSHFLILF JUDYLW\ WKHUHQDWLRQV RIR DWRKDWHRU
>ZHLJKW LQ DLU ZHLJKW LQ DLU ZHLJKW LQ Z



METAMORPHIC					
DPSKLEROLWH	²	$03	PHWDYROFDQLFV	²	092
JQHLVV	0	*1(	PLFD VFKLVW	²	06+
JUDQRIHOV	²	*5)	PLJPDWLWH	²	0I*
JUDQXOLWH	²	*5/	P\ORQLWH	²	0</
JUHHQVWRQH	²	*5(	SK\OOLWH	²	3+<
KRUQIHOV	²	+25	VFKLVW		0
PDUEOH	/	0$5	VHUSHQWLQLWH	0	6(5
PHWDFRQJORPHUDWH	&RQ	VODWH			0
PHWDTXDUW]LWH	0	047	VRDSVWRQH	²	636
PHWDVHGLPHQWDU\	6RFNV				
SEDIMENTARY - CLASTICS					
DUHQLWH	²	$5(	PXGVWRQH	²	08'
DUJLOOLWH	²	$5*	RUWKRTXDUW]LWH	²	247
DUNRVH	$	$5.	SRUFHODQLWH	²	325
EUHFFLD QRQ YROFDQLF *DQJXODU IUDJPHQWV*			FDQGVWRQH	$	667

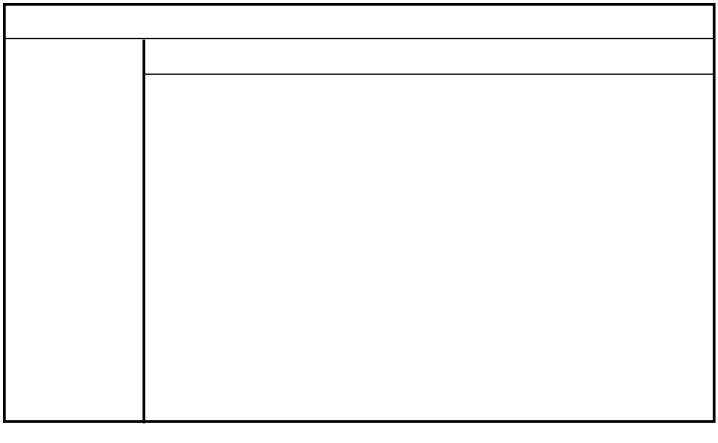
INTERBEDDED					

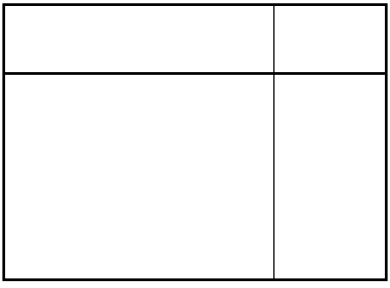
(VWLPDWH WKH GRPLQDQW NLQG DQG PDJQLWXGH F
6SHFLILHG WKH DHQGree

KIND

Kind	Code	Criteria [1]
	3'3 NASIS	
ZLQG	I I	'HIODWLRQ E\ ZLQG
ZDWHU	:	5HPRYDO E\ UXQQLQJ ZDWH
VKHHW		6(YHQ VRLO ORVV QR FKDQQ
ULOO	5	6PDOO FKDQQHOV
JXOO\	*	%LJ FKDQQHOV
WXQQHO		67XEVXUIDFH YRLGV ZLWKLQ
		HQODUJH E\ UXQQLQJ ZDW
		NASIS SLSLQJ

SURFACE RUNOFF 6XUIDFH UXQRII +RUWRQLDQ IORZ I
IORZ RI ZDWHU IURP DQ DUHD WKDW RFFXUV RYHU
UXQRII GLIIHUV IURP LQWHUQDO IORZ RU WKURXJK





SURFACE FRAGMENTS (formerly Surface Stoniness)

5HFRUG WKH DPRXQW RI VXUIDFH IUDJPHQW DV D FODVV QXPHULFDO SHUFHQW DV GHWHUPLQHG E\ HLWKHU LQWHUFHSW´ PHWKRG ,Q 1\$6,6 DGGLWLRQDO GHWDLOV RQ Fragment Kind XVH ³5RFN)UDJPHQW Mean Distance 7DEOH´ Between Fragments HGJH WR Shape JH/ IODW RU 1Size QRQIODW Roundness XVH FODVVHV DQG FULWHULD IRXQG LQ ³5 7DEOH´ Rock Fragment - Rupture Resistance

Surface Fragment Class [1]	Code		Criteria:
	&RQY 1\$6,6		3HUFHQWDJH RI VXUIDFH FRYHUHG
6WRQ\ RU %RXOGHU\			WR
9HU\ 6WRQ\ RU 9HU\ %RXOGHU\			
([WUHPHO\ 6WRQ\ RU ([W %RXOGHUV			WR
5XEEO\			WR
9HU\ 5XEEO\			≥

7KLV GDWD HOHPHQW LV DOVR XVHG WR UHFRU WUHH WUXQNV RQ RUJDQLF VRLOV LI WKH IUD FRQFHUQ DQG DSSHDU WR EH UHODWLYHO\ SHU

, GHQWLQJ Kind WKH Upper DQG Lower Depths RI RFFXUUHQFH RI 6RL
7D[RQRPLF GLDJQRVWLF KRUL]RQV DQG *HQHWLF 6\PERO LH
FP 0XOWLSOH IHDWXUHV SHU KRUL]RQ DUH DOVR EH U
Feature-Kind LQ 3'3 , Q Diagnostic Horizon/Feature UHFRUG
Kind Thickness, Representative Value 59± KLJK ORZ FDQ DOVR E
UHFRUGHG

KIND VHH GHILQLWLRQV LQ FXUUHQW .H\V WR 6RLO

Kind	Code		Kind	Code	
	3'3	NASIS		3'3	NASIS
EPIPEDONS (Diagnostic Surface Horizons)					
DQWKURSLF	$	$1	PROOLF	0	02
IROLVWLF	²	)2	RFKULF		2
KLVWLF	+	+I	SODJJHQ	3	3/
PHODQLF	0(	0(	XPEULF	8	80
DIAGNOSTIC SUBSURFACE HORIZONS					
DJULF	5	$*	QDWULF	1	1$
DOELF	4	$/	RUWVWHLQ	²	25
DUJLOOLF	7	$5	R[LF	;	2;
FDOFLF	&	&$	SHWURFDOFLF	(	3(
FDPELF	%	&0	SHWURJ\SVLF	-	3*
GXULSDQ	=	'8	SODFLF	.	3$
IUDJLSDQ	)	)5	VDOLF	<	6$
JORVVLF	72	*/	VRPEULF	I	62
J\SVLF	*	*<	VSRGLF	6	63
NDQGLF	.$	.$	VXOIXULF	9	68

2&

DEUXSW WH[WXUDO FKDQJH	$&	$&	JHOLF	*PDW		
DOELF PDWHULDOV	$0	JODFLF OD\HU	2	*	/	
DOELF PDWHULDOV LQWHUILQJHULQJ	I	OSDPHOOD	ODPHOODH	2		
DQGLF VRLO SURSHUWLHV	$1	$3	OLWKLF /FRQ			
DQK\GURXV FRQGLWLRQV	2	$+	SDUDOLWK&LF&F			
DTXLF FRQGLWLRQV			WKLF PDWHULDOV			

PROFILE

OBSERVATION METHOD

)RU HDFK OD\HU LQGLFDWH WKH W\SH DQG UHODWLY
WKH SULPDU\ REVHUYDWLRQV DUH PDGH ([DPSOHV
DUH LQFOXGHG LQ WKH ³)LHOG 6XPPDU\ Kind, Relative Size FWLRQ ´

KIND

Kind	Code	Criteria: Types (common size or ranges)
"Disturbed" Samples		
EXFNHW DXJHU	%$	H J RSHQ FORVHG VDQG FP GLDP
VFUHZ DXJHU	6$	H J H[WHUQDO WKUHDG KDQ SRZHU IOLJKW DXJHU FI
"Undisturbed" Samples		
SXVK WXEH	37	H J KDQGKHOG K\GUDXOLF FP GLDP
VKRYHO ³VOLFH´	66	H J XQGLVWXUEHG EORFN H VKRYHO VKDUSVKRRWHU
WALL / FLOOR - "Undisturbed" Area or Exposure		
VPDOO SLW	63	H J KDQG GXJ P [P
WUHQFK	75	H J EDFNKRH SLSHOLQH !
EHYHOHG FXW	%&	H J URDGFXWV JUDGHG WR
FXW	&8	H J URDGFXW VWUHDPEDQN VL]HG ERUURZ SLW ZDOO ! H J ! P P
ODUJH RSHQ SLW RU	TXDUU\ /3 ODUJH ERUURZ LUUHJXODU EDQNV H J !

)LHOG PHWKRG XVHG IRU K\GULF VRLO LQYHVWLJ

RELATIVE SIZE RI H[SRVXUH 5HFRUG WKH DSSUR[LPDWH REVHUYHG 8VH FP IRU ³'ULOO &RUHV´ DQG P IRU *EXFNHW DXJHU H[FDY DWLRQV* **NOTE** &RPPRQ VL]H UDQJH IRU PHWKRG LV LQGLFDWHG LQ WKH ³&ULWHULD´ FROXPQ 7DEOH ´ 7KHVH GLPHQVLRQV DUH DSSUR[LPDWH QRV

TAXONOMIC CLASSIFICATION $IWHU FRPSOHWHO\ GHVFULELQ.
WKH SHGRQ DV WKRURXJKO\ DV SRVVLEOH WR WKH O
YHUVLRQ RI 6RLO 7D[RQRP\ .H\V WR 6RLO 7D[RQRP\ R
OLVWILQH *H PL[HG DFWLYH PHVLF 7\SLF +DORKXPO

HORIZON NOMENCLATURE

8VH FDSLWDO OHWWHUV WR LG$H%Q W8LVH PDXMWLH[HU
ORZHUFDVH OHWWHUV WR GHQRWH DGGLWLRQDO
H J$S%WN>)RU PRUH GHWDLOHG FULWHULD VHH WK
IRU FRPSOHWH GHILQLWLRQV VHH 6RLO 7D[RQRP\ 6
/DEHO D KRUL]RQ UQQ PRUSKRORJ\ LV UHFRUGHG

MASTER, TRANSITIONAL AND COMMON HORIZON COMBINATIONS

CB RCA	'RPLQDQWO\ & KRUL]RQ FKDUDFWHULVW VRPH FKDUDFWHULVWLFV RI WKH % RU
C/B RCA	'LVFUHWH LQWHUPLQJOHG ERGLHV RI & PDMRULW\ RI KRL]RQ LV & PDWHULDO
C	/LWWOH RU QR SHGRJHQLF DOWHUDWLRQ PDWHULDO VRIW EHGURFN
L	/LPQLF VRLO PDWHULDOV
R	%HGURFN RXWURQJO\ &HPHQWHG
W	$ OD\HU RI OLTXLG ZDWHU : RU SHUPD :I ZLWKLQ WKH VRLO H[FOXGHV ZDWHU

5HIHU WR WKH ³6RLO 7D[RQRP\ 6HFWLRQ´ IRU ROG 15&6 6RLO &ODVVLILFDWLRQ 6WDII SHUVRQD

HORIZON SUFFIXES +LVWRULFDOO\ UHIHUUHG WR DV ³+ PRUH UHFHQWO\ DV ³6XERUGLQDWH &RPSRQHQW´ RU ³6&´ FRQYHUVLRQV DUH VKRZQ LQ WKH ³6RLO 7D[RQRP\

Horizon Suffix [1]	Criteria *H[SDQGHG GHWDLOV OLVWHG LQ 6RLO 7D[*
a	+LJKO\ GHFRPSRVHG RUJDQLF PDWWHU
b	%XULHG JHQHWLF KRUL]RQ QRW XVHG ZLWK &
c	&RQFUHWLRQV RU QRGXOHV
co	&RSURJHQRXV HDUWK 8VHG RQO\ ZLWK /
d	'HQVLF OD\HU SK\VLFDOO\ URRW UHVWULFWL
di	'LDWRPDFHRXV HDUWK 8VHG RQO\ ZLWK /
e	0RGHUDWHO\ GHFRPSRVHG RUJDQLF PDWWHU
f	3HUPDQHQWO\ IUR]HQ VRLO RU LFH SHUPDIU LFH QRW VHDVRQDO LFH
ff	3HUPDQHQWO\ IUR]HQ VRLO ³'U\´ SHUPDIURV QRW VHDVRQDO LFH
g	6WURQJ JOH\
h	,OOXYLDO RUJDQLF PDWWHU DFFXPXODWLRQ
i	6OLJKWO\ GHFRPSRVHG RUJDQLF PDWWHU
j	-DURVLWH DFFXPXODWLRQ
jj	(YLGHQFH RI FU\RWXUEDWLRQ
k	3HGRJHQLF FDUERQDWH DFFXPXODWLRQ
m	6WURQJ FHPHQWDWLRQ SHGRJHQLF PDVVLYH
ma	0DUO 8VHG RQO\ ZLWK /
n	3HGRJHQLF H[FKDQJHDEOH VRGLXP DFFXPXO

o	5HVLGXDO VHVTXLR[LGH DFFXPXODWLRQ SHGF
p	3ORZ OD\HU RU RWKHU DUWLILFLDO GLVWXUED
q	6HFRQGDU\ SHGRJHQLF VLOLFD DFFXPXODWL
r	: HDWKHUHG RU VRIW EHGURFN
s	,OOXYLDO VHVTXLR[LGH DFFXPXODWLRQ
ss	6OLFNHQVLGHV
t	,OOXYLDO DFFXPXODWLRQ RI VLOLFDWH FOD\
v	3OLQWKLWH
w	: HDN FRORU RU VWUXFWXUH ZLWKLQ % XVHG
x	)UDJLSDQ FKDUDFWHULVWLFV
y	3HGRJHQLF DFFXPXODWLRQ RI J\SVXP
z	3HGRJHQLF DFFXPXODWLRQ RI VDOW PRUH VRO

.H\V WR 6RLO 7D[RQRP\ WK (G 6RLO 6XUYH\ 6W
15&6 6RLO &ODVVLILFDWLRQ 6WDII SHUVRQDO

OTHER HORIZON MODIFIERS

Numerical Prefixes HWF 8VHG WR GHQRWH OLWK
%\ FRQYHQWLRQ LV XQGHUVWRRG %HGV QRW V
2 % &3 & 3 &

Numerical Suffixes 8VHG WR GHQRWH VXEGLYLVLRQV ZL
KRUL]RQ $ HG J(*W %W %W %V %V*

The Prime • 8VHG WR LQGLFDWH WKH VHFRQG RFFX
KRUL]RQ GHVFULSWRU V LQ $ E % ER W W H 7 H SHGRQ
SULPH GRHV QRW LQGLFDWH HLWKHU EXULHG KRU
ORZHU E DH H %WER OLWKRORJLF GLVFRQWLQXLWL
QXPHULFDO SUHIL[HV 'RXEOH DQG WULSOH SULP
VXEVHTXHQW RFFXUUHQFHV RI KRUL]RQ GHVFULSW
E • % WE[Y& G

DIAGNOSTIC HORIZONS 6HH WKH ³'LDJQRVWLF +RUL]RQV 7D
7DEOH´ LQ WKH ³6LWH 'HVFULSWLRQ 6HFWLRQ´

HORIZON DEPTH 5HFRUG WKH GHSWKV RI ERWK WKH XSSH
IRU HDFK KRUL]RQ VSHFLI\ XQLWV FHQWLPHWHUV
]HUR GDWXP DW WKH ZKLFK XQGLVWXUEHG VRLO
VXUIDFH NOTE 3ULRU WR WKH]HUR GDWXP ZDV DW
VXUIDFH H[FHSW IRU WKLFN RUJDQLF OD\HUV VXFK D
KRUL]RQV ZHUH UHFRUGHG DV DERYH DQG PLQHUDO K
UHODWLYH WR WKH PLQHUDO VXUIDFH

([DPSOH =HUR 'DWXP IRU WKH VDPH KRUL]
$W 3UHVHQW 2H FP $ FP (
%HIRUH 2H FP $ FP (

&RQYHQWLRQDOO\ WKH ³VRLO VXUIDFH´ LV FRQVG
ILUVW OD\HU WKDW FDQ VXSSRUW SODQW URRW J
D IRU EDUH PLQHUDO VRLO WKH DLU ILQH HDUWK
E IRU YHJHWDWHG PLQHUDO VRLO WKH XSSHU EP
VXSSRUW URRW JURZWK
F IRU RUJDQLF PDQWOH [FXGH WKH DPHUDWKER EDUWO H
OLWWHU DQG LQFOXGHV OLWWHU WKDW KDV FRP
H J 2L KRUL]RQ
G IRU VXEPHUJHG VRLO WKH VDPH DV E EXW UH
DQG H[WHQGV RXW IURP VKRUH WR WKH OLPLW R
H IRU URFN PXOFKHV H J GHVHUW SDYHPHQW V
WKH DUHDO SHUFHQWDJH RI VXUIDFH URFN FRYH
WRS RI WKH VRLO LV WKH PHDQ KHLJKW RI WKH V

HORIZON THICKNESS 5HFRUG WKH DYHUDJH WKLFNHVV D
RI KRUL]RQ *FP* J *FP*

HORIZON BOUNDARY 5HFRUG **Distinctness** DQG **Topography** RI KRUL]RQ
ERXQGDU\ ,Q 1\$6,6 'LVWLQFWQHVV LQ FDOOHG %R
QHVV LV WKH GLVWDQFH WKURXJK ZKLFK RQH KRUL]P
SK\ LV WKH ODWHUDO XQGXODWLRQ DQG FRQWLQXLW
\$FRPSOHWH H[*DPSOH* LRXQ Y

Distinctness

Distinctness Class	Code 3'3	Code NASIS	Criteria: thickness
9HU\ \$EUSW		²	9 FP
\$EUSW	\$	\$	WR FP
&OHDU	&	&	WR FP
*UDGXDO	*	*	WR FP
'LIIXVH	'	'	≥ FP

Topography &URVV VHFWLRQDO VKDSH RI WKH FRQW

Topography	Code	Criteria
6PRRWK	6	3ODQDU ZLWK IHZ RU QR LUUHJ
: DY\	:	:LGWK RI XQGXODWLRQ LV ! WI
,UUHJXODU I		'HSWK RI XQGXODWLRQ LV ! WK
%URNHQ		% 'LVFRQWLQXRXV KRUL]RQV LQWHUPLQJOHG RU LUUHJXODU

DECISION FLOWCHART FOR DESCRIBING SOIL COLORS 8VH WKH IROORZLQJ FKDUW WR GHFLGH KRZ DQG ZLWK ZKLFK RI D VRLO RU VRLO IHDWXUH VKRXOG EH GHVFULEHG

Mottles

NOTE *5HGXFHG FRORUV GHVFULEH [LV GHVFULEHG RQ WKH*

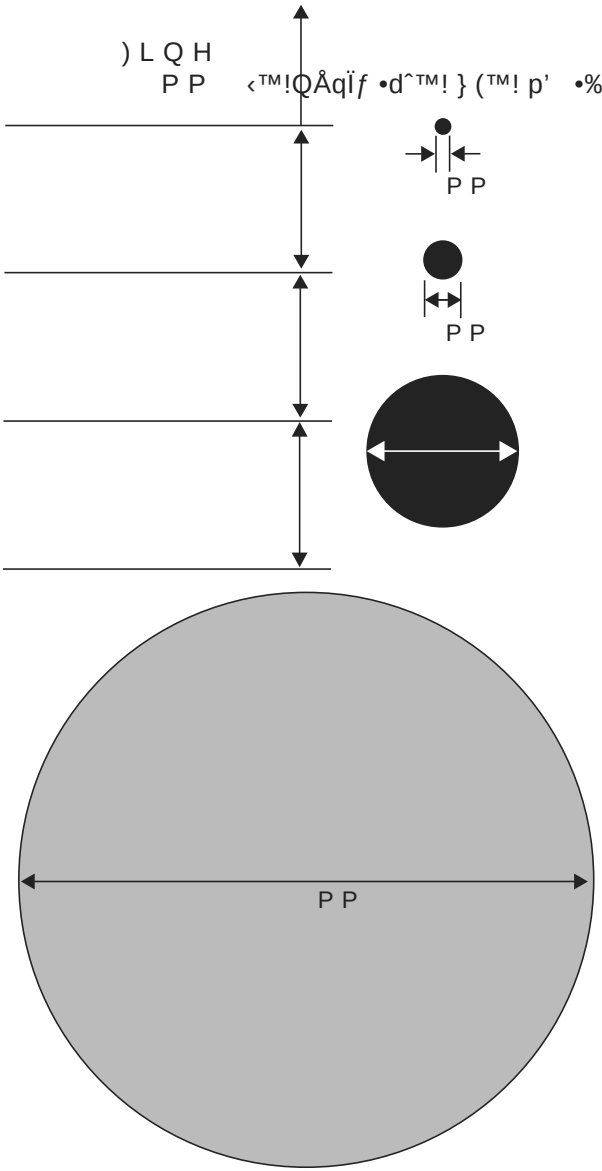
(Soil) Matrix Color - (Soil) Color ,GHQWLI\ WKH FRORU V RI W
ZLWK 0XQVHOO Hue, Value, Chroma R Q H J <5)RU
1HXWUDO FRORUV FKURPD LV1]HUR WKHQ RQO\ KRW
FRORUV XVH DSSURSULDWH QRWDWLRQ <VHH 0XQV
)RU QDUUDWLYH GHVFULSWLRQV 6RLO 6XUYH\ 5HS
WLRQV ERWK WKH YHUEDO QDPH DQG WKH 0XQVH
GUN EURZQ <5

(Soil) Matrix Color - Moisture State 5HFRUG WKH PRLVWXUH FR
WKH VRLO GHVFULSWLRQ 1RWHV WR EH FRQIXVHG ZLWK 6R

Moisture State	Code
'U\	'
0RLVW	0

(Soil) Matrix Color - Location or Condition 5HFRUG SHUWLQHQW
VWDQFHV RI WKH FRORU Color Physical State 1 QF DSSOH

MOTTLES


) L Q H
P P
P P
P P
P P

Mottles - Contrast - 5HFRUG WKH FRORU GLIIHUHQFH EHW
WKH GRPLQDQW PDWUL[FRORU 8VH WKLV WDEOH
WKH GLIIHUHQFH > VW WDEOH 2EVROHWH ²VKRZ

Contrast Class	Code	*Difference in Color*

OBSOLETE as of 1999

Tabular List for Determination of Color Contrast

Hues are the same (Δ h = 0)

Δ Value	Δ Chroma	Contrast
	≤	)DLQW
		'LVWLQFW
		'LVWLQFW
	≥	3URPLQHQW
	≤	)DLQW
		'LVWLQFW
		'LVWLQFW
	≥	3URPLQHQW
≤	≤	)DLQW
≤		'LVWLQFW
≤		'LVWLQFW
≤	≥	3URPLQHQW
	≤	'LVWLQFW
		'LVWLQFW
		'LVWLQFW
	≥	3URPLQHQW
≥	2	3URPLQHQW

Hues differ by 1 (Δ h = 1)

Δ Value	Δ Chroma	Contrast
	≤	)DLQW
		'LVWLQFW
	≥	3URPLQHQW
	≤	)DLQW
		'LVWLQFW
	≥	3URPLQHQW
	≤	'LVWLQFW
		'LVWLQFW
	≥	3URPLQHQW
≥	2	3URPLQHQW

Hues differ by 2 (Δ h = 2)

Δ Value	Δ Chroma	Contrast
		)DLQW
		'LVWLQFW
	≥	3URPLQHQW
	≤	'LVWLQFW
	≥	3URPLQHQW
≥	2	3URPLQHQW

Hues differ by 3 or more (Δ h ≥ 3)

Δ Value	Δ Chroma	Contrast
&RORU FRQWUDVW 3URPLQHQW H[FHSW IRU ORZ &KURPD DQG 9DOXH		

([FHSWLRQ ,I ERWK DFKURPDWLF &RORU DQG &KURPD DUH 9HU\ &ORVH WKH &RORU &RQWUDVW GLVHVWDEOHV WKH

5HGR[LPRUSKLF

NOTE 8VH RI 50) DOWHUV WKH WUDGLWLRQDO VHTXHQFH
3'HFLVLRQ)ORZFKDUW IRU 'HVFULELQJ &RORUV IRU 6RL
DUH GHVFULEHG VHSDUDWHO\ IURP RWKHU FRORU YDUL
FRORU YDULDWLRQV WR ORVV RU DFFUXDO RI)H 0Q R[LG
ZHDWKHUHG URFN DUH Soil Color-Texture Group XQGHU [LV U
DV D 50) DQG DV Soil Color-Location RU **Condition Described**

REDOXIMORPHIC FEATURES

5HFRPPHQG **Kind Quantity** SHUFHQW RI DUHD **Size** FRYHUHG

REDOXIMORPHIC FEATURES - SIZE 6HH VL]H FODVV JUDSKLF XQ
Mottles RQ Concentrations

Size Class	Code	Criteria
)LQH		PP
0HGLXP		WR PP
&RDUVH		WR PP
9HU\ &RDUVH		WR PP
([WUHPHO\ &RDUVH		≥ PP

REDOXIMORPHIC FEATURES - CONTRAST 8VH ³0RWWOH &RQWUD
³0RWWOH &RQWUDVW´ DQG ³3URPLQHQFH´ WR GHVFULEH WKH

REDOXIMORPHIC FEATURES - COLOR 8VH VWDQGDUG 0XQVHOO Š
IURP WKH ³6RLO &RORU &KDUWV´ DQG RWKHU VLPLODU VRXUFHV WR GHVFULEH WKH JUD\

REDOXIMORPHIC FEATURES - MOISTURE STATE 'HVFULEH WKH PRLV
FRQGLWLRQ RI WKH 5HGR[LPRUSKLF)HDWXUH XVH ³
7DEOH ´ 0RLVWXUH 6WDWH ´

&RQFHQWUDWLRQV DUH VRLO IHDWXUHV WKDW IRUP E
SHGRJHQHVLV 'RPLQDQW SURFHVVHV LQYROYHG DUH
SUHFLSLWDWLRQ R[LGDWLRQ DQG UHGXFWLRQ DQG
WUDQVSRUW DQG DFFXPXODWLRQ 7\SHV RI FRQFHQWUDWL
6WDII LQFOXGH WKH IROORZLQJ

Finely Disseminated Materials DUH SK\VLFDOO\ VPDOO SUHFL
VDOWV FDUERQDWHV GLVSHUVHG WKURXJKRXW W
PDWHULDOV FDQQRW EH UHDGLO\ VHHQ ; OHQV
FKHPLFDO UHDFWLRQ H J HE\H+U&YOHVHU QRWHKRU &SDU
LQGLFDWRUV

Masses DUH QRQFHPHQWHG ³5XSWXUH 5HVLVWDQFH
([WUHPHO\ :HDNO\ &HPHQWHG GLHV RI DFFXPXODW
VKDSHV WKDW FDQQRW EH UHPRYHG DV GLVFUHWH
FU\VWDO VWUXFWXUH WKDW LV UHDGLO\ GLVFHUQ
7KLV LQFOXGHV ILQHO\ 5HGXFHG &RQFUHWLRQDU\ &HPHQWHG
TXDOLI\ DV QRGXOHV RU FRQFUHWLRQV

Nodules DUH FHPHQWHG *GDO\ &HPHQWHG* ERGLHV
YDULRXV VKDSHV FRPPRQO\ VSKHULFDO RU WXEX
GLVFUHWH XQLWV IURP VRLO &U\VWDO VWUXFWX
KDQG OHQV

Concretions DUH FHPHQWHG *GDO\ &HPHQWHG* ERGLHV
VLPLODU WR QRGXOHV H[FHSW IRU WKH SUHVHQF
PDWHULDO DURXQG D SRLQW OLQH RU SODQH 7
WLRQ´ DUH QRW LQWHUFKDQJHDEOH

Crystals DUH PDFUR FU\VWDOOLQH IRUPV RI UHODWL
J\SVXP FDUERQDWH *HV VDOWV* FU\VWDOOL
7KH FU\VWDOOLQH VKDSH DQG VWUXFWXUH LV UHD
; KDQG OHQV

Biological Concentrations DUH GLVFUHWH ERGLHV DFFXPO
ELRORJLFDO SURFHVV H J IHFDO SHOOHWV RU
ELRORJLFDO SURFHVVHV H J LQVHFW FDVWV IR

Inherited Minerals DUH ILHOG REVHUYDEOH SDUWLFOHV
DJJUHJDWHV H J JODXFRQLWH SHOOHWV WKDW
WLFV DQG IRUPHG E\ JHRORJLF SURFHVVHV LQ WK
VXEVHTXHQWO\ LQKHULWHG E\ WKH VRLO UDWKHU
SHGRJHQLF SURFHVVHV ,QFOXGHG KHUH GXH WR
&RQFHQWUDWLRQV GHVFULSWRUV PD\ DSSO\ H J

Conc.

CONCENTRATIONS (NON-REDOX) *DFFXPXODWLRQV RI PDWHULDO*

Kind	Code 3'3 NASIS	Kind	Code 3'3 NASIS
FINELY DISSEMINATED (bodies not visible by unaided eye; proposed)			
)LQHO\ 'LVVHP FDUERQDWHV	²	)'&	)LQHO\ 'LVVHPLQDWHG VDOWV
MASSES (noncemented; crystals not visible with 10X hand lens)			
EDUL%WDH62	%	%$0	J\SVX&D62 +2 * *<0
FDUERQDWHV &D 0J 1D&2	.	&$0	VDOW 1D&O 1D 0J VXOIDWHV +
FOD\ ERGLHV	$	&%0	VLOLFD 6 6,0
J\SVXP*HVWV	*10		
NODULES (cemented; non-crystalline at 10X, no layers)			
FDUERQDWHV&	&$1	JLEEV\WH	(*%1
GXULQRGH6	'11	RSDO	6 231

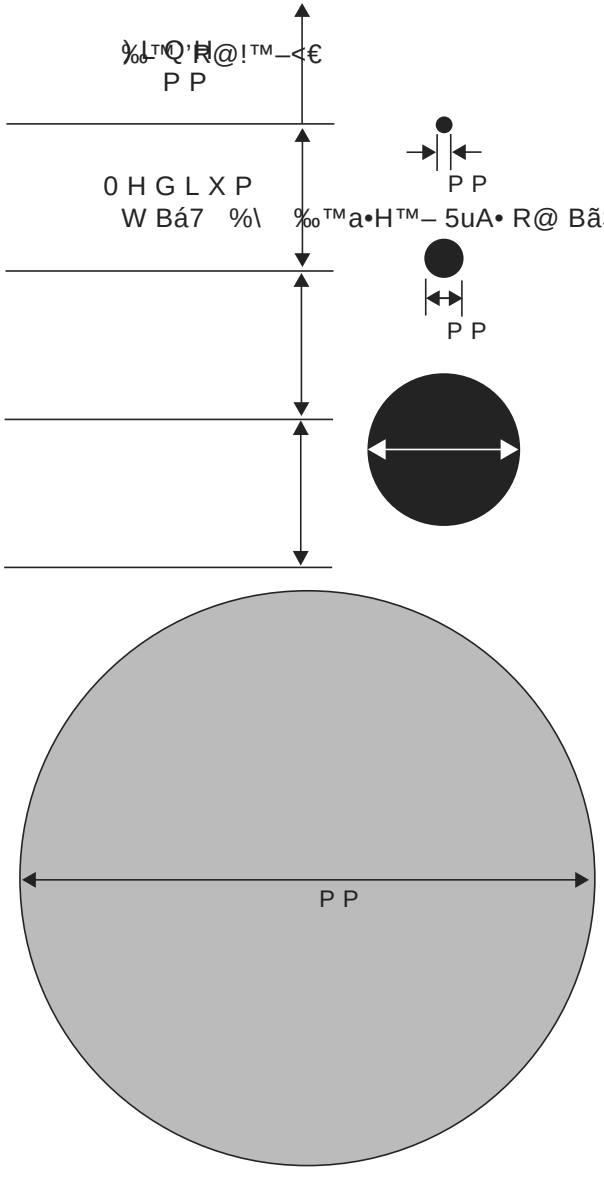
CONCENTRATIONS - QUANTITY (PERCENT OF AREA COVERED)

Class	Code		Criteria: % of Surface Area Covered
	Conv.	NASIS	
)HZ	I		
&RPPRQ	F		WR
0DQ\	P		≥

CONCENTRATIONS - SIZE - 6DPH DV ³50)¶V´ DQG ³0RWWOH 6L] 6HH JUDSKLF RQ QH[W SDJH

Size Class	Code	Criteria
)LQH		PP
0HGLXP		WR PP
&RDUVH		WR PP
9HU\ &RDUVH		WR PP
([WUHPHO\ &RDUVH		≥ PP

CONCENTRATIONS - CONTRAST 8VH ³0RWWOH &RQWUDVW 7D

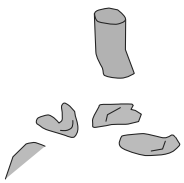

P P
P P
P P
P P

CONCENTRATIONS - SHAPE DOVR XVHG WR GHVFULEH WKH VKDSH RI **Mottles, Redoximorphic Features**

Shape	Code		Criteria
	3'3	NASIS	
F\OLQGULFDO		&	& WXEXODU DQG HORQJDWH ZRUPKROHV DQG LQVHFW EXUURZ
GHQGULWLF		'	' WXEXODU HORQJDWHG EUD SLSHVWHPV URRW SVHXGRPRUSK
LUUHJXODU	I =		ERGLHV RI QRQ UHSHDWLQJ VSDFL
SODW\	3		3 UHODWLYHO\ WKLQ WDEXODU ODPHOODH
UHWLFXODWH			2 5 FUXGHO\ LQWHUORFNLQJ E H J SOLQWKLWH
VSKHULFDO	2		ZHOO URXQGHG WR FUXGHO\ VSKH)H 0Q ³VKRW´
WKUHDGV	7		7 WKLQ H J PP GLDP HO JHQHUDOO\ QRW GHQGULWLF H J VWULQJHUV

&DOFXOD WRU &RQGLWLRQ 3'3

Examples of Mottles, Concentrations, and RMF Shapes



CONCENTRATIONS - LOCATION 'HVFULEH WKH ORFDWLRQ V R WLRQ RU GHSOHWLRQ IRU 50)¶V ZLWKLQ WKH **Concentrations - Distribution**

Location	Code 3'3NASIS
MATRIX (in soil matrix; not associated with ped faces or pores)	
,Q WKH PDWUL[DURXQG GHSOHWLRQV ZLWK SHGV S2RUHV 0 $	
,Q PDWUL[DURXQG GHSOHWLRQV 2 0$'	
,Q PDWUL[DURXQG FRQFHQWUDWLRQV 0$&	
7KURXJKRXW *ILQHO\ GLVHPLQDWHG FDUERQDWHV 2	
PEDS (on or associated with faces of peds)	
%HWZHHQ SHGV 3 %3)	
,QIXVHG LQWR WKH PDWUL[IURP SRUHV 0R3I) SHGV	
2Q IDFHV RI SHGV 2U |"ƒ D ÁRT—"(7 2	

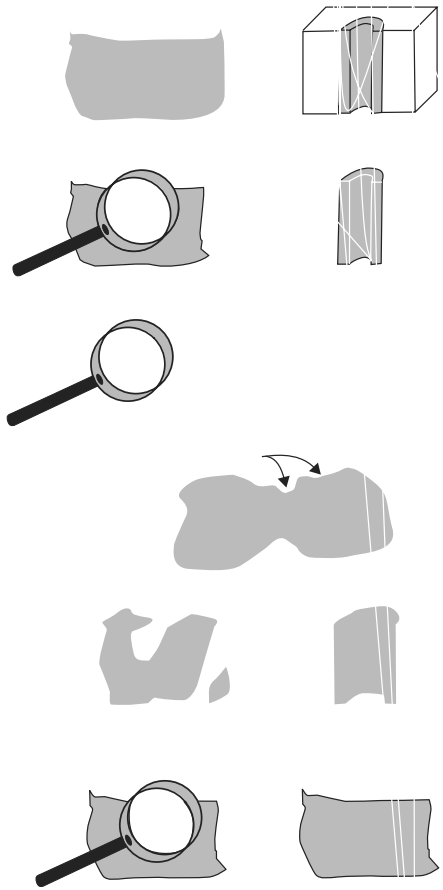
P & V Surface

7KHVH IHDWXUHV DUH FRDWV ILOPV K\SRFRDWV RU
WUDQVORFDWLRQ DQG GHSRVLWLRQ RU VKULQN VZH
'HVFULSWLRQ Kind Code Amount Class SHUFHQW LQ 1$6 Distinctness 3'3
Location DQG Color GU\ RU PRLVW $PDQH[DPSOH WLVEURZQ
0RLVW FOD\ ILOPV RQ PDOO kDFHV RI S&HVV)

PED and VOID SURFACE FEATURES - KIND QRQ UHGR[LPRUSKLF

Kind	Code	Field Criteria
	3'3 NASIS	
COATS, FILMS (exterior, adhered to surface)		
FDUERQDWH FRDWV	&$)	RII ZKLWH HIIHUYHVFHQW
VLOLFD VLODQV RSDO) I ZKLWH 6 QRQHIIHUYHVHQ		
FOD\ ILOPV DUJLOODQV	7 &/)	ZD[\ H[WHULU
FOD\ EULGJLQJ '	%5)	³ZD[´ EHWZHHQ VDQG JUDL
IHUULDUJLOODQV *GHVFULEHV FRDWV*	VHH)HVWDLQHG FOD\ ILOP 50)V	
JLEEVLWH FRDWV	VHVTXDQ RII ZKLWH 6 QRQHIIHUY ZLWK +&O	
PDQJDQHVH PDQJDQHVH *GHVFULEHV FRDWV*	EODFN WKLQ ILOPV 50)V +2	HIIHU
RUJDQLF VWDLQV	26)	GDUN RUJDQLF ILOPV
RUJDQRDUJLOODQV	2$)	GDUN RUJDQLF VWDLQHG
VDQG FRDWV	=61)	VHSDUDWH JUDLQV YLVLEC
VLOW FRDWV	5/)	VHSDUDWH JUDLQV QRW YL
VNHOHWDOQG RU VOW	66.)	FOHDQ VDQG RU V
VNHOHWDQV RQ P@À V F €`a`A™b1"< G8"H!tx @ À *		

,QGLYLGXDO VLOW JUDLQV DUH QRW GLVFHUQLEOH
D ILQH RII ZKLWH QRQHIIHUYHVFHQW ³JUDLQ\´ FR
6NHOHWDQV DUH SLJPHQWHG DQG GLSSHG JUDLQV
3UHIHUDEO\ GHWHUPLQH RQ XQVWDLQHG VOLGHV
OHQV*DQG FRDWHG GLVFHUQLEOH ZLWK ; OHQV
+\SRFDOFL¿HG VXVHG KHUH DUH ILHOG VFDOH IHDV
DV 5HGR[LPRUSKLF)HDWXUHV 0LFURPRUSKRORJLF
UHGR[IHDWXUHV %XOORFN HW DO



PED and VOID SURFACE FEATURES - DISTINCTNESS 7KH UHODWLYH H
WR ZKLFK D SHG VXUIDFH IHDWXUH YLVXDOO\ VWDQG

Texture

(SOIL) TEXTURE

7KLV LV WKH QXPHULFDO SURSRUWLRQ SHUFHQW E\
VRLO 6DQG VLOW DQG FOD\ FRQWHQW LV HVWLPD
WLYHO\ PHDVXUHG LQ WKH RIILFH ODE E\ K\GURPHWH
WKH WH[WXUH WULDQJOH WR GHWHUPLQH

Texture Class

TEXTURE MODIFIERS *D G M H F W L Y H V*

ROCK	Code	Criteria: Percent (By Volume)

COMPOSITIONAL TEXTURE MODIFIERS [1] *DGMHFWLYHV*

Types	Code 3'3 NASIS	Criteria:
VOLCANIC		
$VK\	² $6+<	1HLWKHU K\GURXV≥QRUR[HGKLDO D PP IUDFWLRQ LV WR PP ZKL≥K LV YROFDQLF JODVV
+\GURXV	² +<'5	$QGLF SURSHUWLHV DQG ZLWK ZDWHU F≥RQWHQW WKH GU\ ZHLJKW
0HGLDO	² 0('/	$QGLF SURSHUWLHV DQG ZLWK ZDWHU F≥RQWHQW RI WKH GU\ ZHLJKW≥ RU ZDWHU FRQWHQW IRU D VDPSOHV
ORGANIC SOILS (Histosols, Histels, and histic epipdons)		
*UDVV\	² *6 20 !	YRO JUDVV\ ILEHUV
+HUEDFHRXV	² +% 20 !	YRO KHUEDFHRXV
0RVV\	² 06 20 !	YRO PRVV ILEHUV
0XFN\ 0. 0.		8VHG ZLWK SHDW L H ³PXFN\ SHD PDWHULDOV ² 6RLO 7D[RQRP\
:RRG\	² :' 20≥	YRO ZRRG SLHFHV RU ILE
ORGANIC MATERIALS IN MINERAL SOILS		
0XFN\ 0. 0.		0LQHUDO VRLO ! 20 DQG IL
3HDW\ 37 37		0LQHUDO VRLO ! 20 DQG !
LIMNIC MATERIALS		
&RSURJHQRXV	² &23	
'LDWRPDFHRXVI$	² '	
0DUO\	² 05	
OTHER		
&HPHQWHG	² &(0	
*\SVLIHURXV	² ≥*<3	ZHLJKW J\SVXP
3HUPDQHQWO\ 3) 3)		H J 3HUPDIURVW)UR]HQ

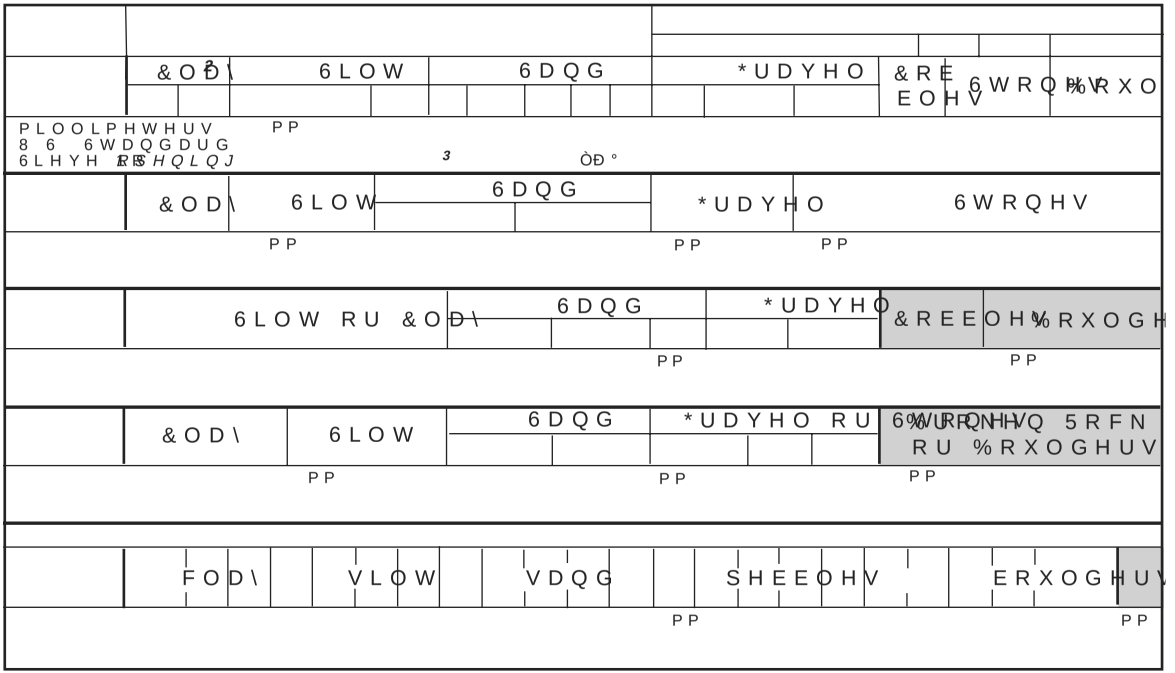
TERMS USED IN LIEU OF TEXTURE *QRXQV*

Terms Used in Lieu of Texture	Code	
	PDP	NASIS
SIZE (ROCK FRAGMENTS) *≥ 6WURQJO\ &HPHQWHG*		
*UDYHO	*	*
&REEOHV	&%	&%
6WRQHV	67	67
%RXOGHUV	%	%<
&KDQQHUV	[2]	&1
)ODJVWRQHV	[2]	)/
SIZE (PARAROCK FRAGMENTS) *6WURQJO\ &HPHQWHG*		
3DUDJUDYHO	[2]	3*
3DUDFREEOHV	[2]	3&%
3DUDVWRQHV	[2]	367
3DUDERXOGHUV	[2]	3%<
3DUDFKDQQHUV	[2]	3&1
3DUDIODJVWRQHV	[2]	3)/
COMPOSITION		
Cemented / Consolidated:		
%HGURFN	[2]	%5
8QZHDWKHUHG[illegible]	8:%	[2]
:HDWKHUHG[illegible]	[illegible]	[illegible]
Organics:		
+LJKO\ 'HFRPSRVHG 3ODQW 0DWHULDO		+30
0RGHUDWHO\ 'HFRPSRVHG 3ODQW 0DWHULDO	[2]	0300
6OLJKWO\ 'HFRPSRVHG 3ODQW 0DWHULDO	[2]	630
0XFN	[2]	08&.
0XFN\ 3HDW	[2]	037
3HDW	[2]	3($7
Other:		
,FH		[2]
0DWHULDO		[2]
:DWHU		[2]

8VH RQO\ ZLWK RUJDQLF VRLO OD\HUV RI PLQHUDO
8VH RQO\ ZLWK +LVWRVROV RU KLVWLF HSLSHGRQ
8VH RQO\ IRU OD\HUV IRXQG EHORZ WKH VRLO VXU
,Q 1\$6,6 XVH ³3HUPDQHQWO\ )UR]HQ´ :DWHU WR FRQYH\ S
³0DWHULDO´ LV RQO\ XVHG LQ FRPELQDWLRQ ZLWK
0RGLILHUV S *ZRRG\ PDWHULDO* PDWHULDO
³&HPHQWHG 0DWHULDO´ GHQRWHV DQG[illegible]
RUWVWHLQ SHWURFDOFLF SHWURIHUULF SHWURJ

Fragments

Comparison of Particle Size Classes in Different Systems



References for Table Comparing Particle Size Systems

1 6RLO 6XUYH\ 6WDII 6RLO VXUYH\ ODERUDWRU
1DWXUDO 5HVRXUFHV &RQVHUYDWLRQ 6HUYLFH 6R
1R 9HUVLRQ 1DWLRQDO 6RLO 6XUYH\ &HQWH

2 6RLO 6XUYH\ 6WDII 6RLO 6XUYH\ /DE LQIRUPDW
6RLO 6XUYH\ ,QYHVWLJDWLRQ 5HSRUW YHUVLRQ
&HQWHU /LQFROQ 1(1RWH 0LQHUDORJ\ VWXGLH
WKUHH VL]H UDQJHV IRU LQGLXP µP± DQG FRDUVH
±µP -DFNVRQ

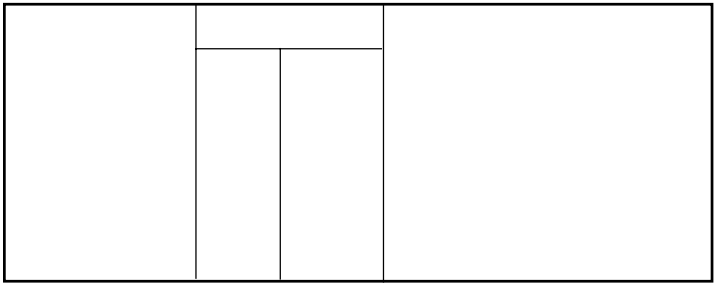
3 7KH 6RLO 6XUYH\ /DE /LQFROQ 1(XVHV D QR
RSHQLQJ IRU WKH 86'$ ± VDQG VLOW PHDVXUHPH
PP RSHQLQJ LV PRUH UHDGLO\ DYDLODEOH DQG ZL

4 ,QWHUQDWLRQDO 6RLO 6FLHQFH 6RFLHW\ 0DQXDO
6XUYH\ 6WDII 86'$ 6RLO &RQVHUYDWLRQ 6HUYLFH
8 6 *RY 3ULQW 2IILFH :DVKLQJWRQ ' & S

5 $670 6WDQGDUG FODVVLILFDWLRQ RI VRLOV
8QLILHG 6RLO &ODVVLILFDWLRQ 6\VWHP 6RLO GH
DQG URFN GLPHQVLRQ VWRQH JHRV\QWKHWLFV

XBVFX€BVRQHDQ °UDO D Q HQJ°QDZ°UVRÀ6$VHUUDPO `RQ RI SRVH

)UDJPHQWV VWURQJO\ FHPHQWHG E\ FDUERQDWH
GHULYHG IURP SHWURFDOFLF KRUL]RQV
*HQHULF URFN QDPHV PD\ EH DSSURSULDWH IRU L
D FREEOH EXW DUH WRR RQ HWQEHUDXVHDQ VRQDOH%
.LQGV
1XPHURXV XQVSHFLILHG IUDJPHQW OLWKRORJLHV
DOOXYLXP QRW IRU XVH ZLWK UHVLGXXP

ROCK and OTHER FRAGMENTS - VOLUME PERCENT (VWLPDWH WKH
TXDQWLW\ RQ D YROXPH*NOTE* SH)UFHQW RI WKH Texture
Modifiers UHIHU WR WKH ³3HUFHQW 9 RI 7DEOH´ IRX

ROCK and OTHER FRAGMENTS - ROUNDNESS (VWLPDWH WKH UHOD
URXQGQHVV RI URFN IUDJPHQWV XVH Fragment IROORZLQ
Roundness LQ 3'3