



**EXPLANATION**

**Qal** Alluvium  
Interbedded lenses of light-brown to gray unconsolidated clay, silt, sand, and gravel. Gravel consists of angular to well-rounded pebbles of quartzite, dolomite, limestone, and chert, and minor amounts of granite, gneiss, and porphyry. Thickness commonly 5 to 10 feet within 100 feet of the Marias River.

**Qs** Supertill silt  
Light-tan even-bedded unconsolidated silt covering hill. Margins of silt conform to topographic irregularities. Maximum known thickness about 20 feet.

**Qk** Kame deposits  
Unconsolidated poorly bedded brown sand and gravel flooring elongate broad, shallow narrow valleys. Gravel consists of well-rounded pebbles of quartzite, limestone, dolomite, and igneous rocks as much as 3 inches in diameter. Sand lenses 30 feet long and 2 feet thick interbedded in the gravel. Burrows in thickness from 6 to 25 feet.

**Qq** Outwash-channel deposits  
Unconsolidated poorly sorted and poorly bedded brown silt, sand, and gravel containing angular blocks of till. Gravel consists of angular to well-rounded pebbles of quartzite, limestone, dolomite, and igneous rocks. Fine to coarse-grained sand fills interstices. Locally silt and sand compose entire deposit. Maximum thickness about 50 feet.

**Qo** Onondaga  
Light-tan to buff indurated massive unsorted mixture of silt and clay, containing scattered pebbles, cobbles, and boulders. Contains local lenses of silt, sand, and gravel. Rock types consist principally of quartzite, limestone, and dolomite. Average thickness is about 30 feet except in buried valleys, where it is as much as 25 feet thick.

**Ql** Leithair till  
Light-tan to buff indurated massive unsorted mixture of silt and clay, containing scattered pebbles, cobbles, and boulders. Contains local lenses of silt, sand, and gravel. Rock types consist principally of quartzite, limestone, and dolomite. Average thickness is about 30 feet except in buried valleys, where it is as much as 25 feet thick.

**Qm** Miscellaneous ice-contact deposits  
Unconsolidated silt, sand, and gravel deposited in prominent topographic features of irregular shape and as much as 100 feet high. Till and gravel boulders are common both in the beds and on their flanks.

**Qn** North Saskatchewan (?) gravel of McConnell, 1888  
Darkish-brown to brown unconsolidated poorly bedded well-sorted fine sand pebbles and cobbles, which are chiefly quartzite and include small amounts of chert, limestone, and dolomite, in a matrix of fine to coarse-grained sand. Contains local lenses of sand. Gravel about 6 feet thick and locally overlain by about 6 feet of bluish-gray silt, yellow sand, and blue silt and clay.

**Qp** Pondera till  
Light-brown to chocolate-brown semipelite heterogeneous mixture of silt and clay, containing scattered pebbles, cobbles, and boulders. Rock types include quartzite, limestone, dolomite, granite, and gneiss. Locally includes Leithair till which was not mapped separately within the Pondera drift border. Commonly separated from the underlying Leithair till by as much as 60 feet of intertill silt. Pondera till as much as 60 feet thick.

**Qr** Rye  
Upper member, Kc, consists of buff, gray, greenish-gray, and brownish-purple sandstone alternating with irregular intervals with lenses of shale, siltstone, and buff crossbedded sandstone. Locally contains thin coal seams and carbonaceous shale layers. Upper member about 100 feet thick. Virgelle sandstone member, Kv, is a grayish-buff to yellow fine to coarse-grained sandstone to crossbedded sandstone that contains scattered brown ferruginous, colorless sandstone concretions and septaria. Thickness of the Virgelle sandstone member ranges from 65 to 150 feet.

**Qs** Siltstone  
Upper member, Kc, consists of buff, gray, greenish-gray, and brownish-purple sandstone alternating with irregular intervals with lenses of shale, siltstone, and buff crossbedded sandstone. Locally contains thin coal seams and carbonaceous shale layers. Upper member about 100 feet thick. Virgelle sandstone member, Kv, is a grayish-buff to yellow fine to coarse-grained sandstone to crossbedded sandstone that contains scattered brown ferruginous, colorless sandstone concretions and septaria. Thickness of the Virgelle sandstone member ranges from 65 to 150 feet.

**Qv** Virgelle sandstone  
Upper member, Kc, consists of buff, gray, greenish-gray, and brownish-purple sandstone alternating with irregular intervals with lenses of shale, siltstone, and buff crossbedded sandstone. Locally contains thin coal seams and carbonaceous shale layers. Upper member about 100 feet thick. Virgelle sandstone member, Kv, is a grayish-buff to yellow fine to coarse-grained sandstone to crossbedded sandstone that contains scattered brown ferruginous, colorless sandstone concretions and septaria. Thickness of the Virgelle sandstone member ranges from 65 to 150 feet.

**Qw** Water table  
Approximate eastern drift border of Pondera ice.

**Qx** X  
Strike and dip of beds

**Qy** Y  
Strike of vertical beds

**Qz** Z  
Buried channels of ancestral Marias River and major tributary

**Qaa** Aa  
Mesa and ridge

**Qab** Ab  
Gravel pit

**Qac** Ac  
Dry hole or abandoned test hole

**Qad** Ad  
Contact

**Qae** Ae  
Dashed where approximately located

**Qaf** Af  
Symbol in parenthesis indicate concealed bedrock

**Qag** Ag  
Approximate eastern drift border of Pondera ice

**Qah** Ah  
Strike and dip of beds

**Qai** Ai  
Strike of vertical beds

**Qaj** Aj  
Buried channels of ancestral Marias River and major tributary

**Qak** Ak  
Mesa and ridge

**Qal** Al  
Gravel pit

**Qam** Am  
Dry hole or abandoned test hole

**Qan** An  
Contact

**Qao** Ao  
Dashed where approximately located

**Qap** Ap  
Symbol in parenthesis indicate concealed bedrock

**Qaq** Aq  
Approximate eastern drift border of Pondera ice

**Qar** Ar  
Strike and dip of beds

**Qas** As  
Strike of vertical beds

**Qat** At  
Buried channels of ancestral Marias River and major tributary

**Qau** Au  
Mesa and ridge

**Qav** Av  
Gravel pit

**Qaw** Aw  
Dry hole or abandoned test hole

**Qax** Ax  
Contact

**Qay** Ay  
Dashed where approximately located

**Qaz** Az  
Symbol in parenthesis indicate concealed bedrock

**Qba** Ba  
Approximate eastern drift border of Pondera ice

**Qbb** Bb  
Strike and dip of beds

**Qbc** Bc  
Strike of vertical beds

**Qbd** Bd  
Buried channels of ancestral Marias River and major tributary

**Qbe** Be  
Mesa and ridge

**Qbf** Bf  
Gravel pit

**Qbg** Bg  
Dry hole or abandoned test hole

**Qbh** Bh  
Contact

**Qbi** Bi  
Dashed where approximately located

**Qbj** Bj  
Symbol in parenthesis indicate concealed bedrock

**Qbk** Bk  
Approximate eastern drift border of Pondera ice

**Qbl** Bl  
Strike and dip of beds

**Qbm** Bm  
Strike of vertical beds

**Qbn** Bn  
Buried channels of ancestral Marias River and major tributary

**Qbo** Bo  
Mesa and ridge

**Qbp** Bp  
Gravel pit

**Qbq** Bq  
Dry hole or abandoned test hole

**Qbr** Br  
Contact

**Qbs** Bs  
Dashed where approximately located

**Qbt** Bt  
Symbol in parenthesis indicate concealed bedrock

**Qbu** Bu  
Approximate eastern drift border of Pondera ice

**Qbv** Bv  
Strike and dip of beds

**Qbw** Bw  
Strike of vertical beds

**Qbx** Bx  
Buried channels of ancestral Marias River and major tributary

**Qby** By  
Mesa and ridge

**Qbz** Bz  
Gravel pit

**Qca** Ca  
Dry hole or abandoned test hole

**Qcb** Cb  
Contact

**Qcc** Cc  
Dashed where approximately located

**Qcd** Cd  
Symbol in parenthesis indicate concealed bedrock

**Qce** Ce  
Approximate eastern drift border of Pondera ice

**Qcf** Cf  
Strike and dip of beds

**Qcg** Cg  
Strike of vertical beds

**Qch** Ch  
Buried channels of ancestral Marias River and major tributary

**Qci** Ci  
Mesa and ridge

**Qcj** Cj  
Gravel pit

**Qck** Ck  
Dry hole or abandoned test hole

**Qcl** Cl  
Contact

**Qcm** Cm  
Dashed where approximately located

**Qcn** Cn  
Symbol in parenthesis indicate concealed bedrock

**Qco** Co  
Approximate eastern drift border of Pondera ice

**Qcp** Cp  
Strike and dip of beds

**Qcq** Cq  
Strike of vertical beds

**Qcr** Cr  
Buried channels of ancestral Marias River and major tributary

**Qcs** Cs  
Mesa and ridge

**Qct** Ct  
Gravel pit

**Qcu** Cu  
Dry hole or abandoned test hole

**Qcv** Cv  
Contact

**Qcw** Cw  
Dashed where approximately located

**Qcx** Cx  
Symbol in parenthesis indicate concealed bedrock

**Qcy** Cy  
Approximate eastern drift border of Pondera ice

**Qcz** Cz  
Strike and dip of beds

**Qda** Da  
Strike of vertical beds

**Qdb** Db  
Buried channels of ancestral Marias River and major tributary

**Qdc** Dc  
Mesa and ridge

**Qdd** Dd  
Gravel pit

**Qde** De  
Dry hole or abandoned test hole

**Qdf** Df  
Contact

**Qdg** Dg  
Dashed where approximately located

**Qdh** Dh  
Symbol in parenthesis indicate concealed bedrock

**Qdi** Di  
Approximate eastern drift border of Pondera ice

**Qdj** Dj  
Strike and dip of beds

**Qdk** Dk  
Strike of vertical beds

**Qdl** Dl  
Buried channels of ancestral Marias River and major tributary

**Qdm** Dm  
Mesa and ridge

**Qdn** Dn  
Gravel pit

**Qdo** Do  
Dry hole or abandoned test hole

**Qdp** Dp  
Contact

**Qdq** Dq  
Dashed where approximately located

**Qdr** Dr  
Symbol in parenthesis indicate concealed bedrock

**Qds** Ds  
Approximate eastern drift border of Pondera ice

**Qdt** Dt  
Strike and dip of beds

**Qdu** Du  
Strike of vertical beds

**Qdv** Dv  
Buried channels of ancestral Marias River and major tributary

**Qdw** Dw  
Mesa and ridge

**Qdx** Dx  
Gravel pit

**Qdy** Dy  
Dry hole or abandoned test hole

**Qdz** Dz  
Contact

**Qea** Ea  
Dashed where approximately located

**Qeb** Eb  
Symbol in parenthesis indicate concealed bedrock

**Qec** Ec  
Approximate eastern drift border of Pondera ice

**Qed** Ed  
Strike and dip of beds

**Qee** Ee  
Strike of vertical beds

**Qef** Ef  
Buried channels of ancestral Marias River and major tributary

**Qeg** Eg  
Mesa and ridge

**Qeh** Eh  
Gravel pit

**Qei** Ei  
Dry hole or abandoned test hole

**Qej** Ej  
Contact

**Qek** Ek  
Dashed where approximately located

**Qel** El  
Symbol in parenthesis indicate concealed bedrock

**Qem** Em  
Approximate eastern drift border of Pondera ice

**Qen** En  
Strike and dip of beds

**Qeo** Eo  
Strike of vertical beds

**Qep** Ep  
Buried channels of ancestral Marias River and major tributary

**Qeq** Eq  
Mesa and ridge

**Qer** Er  
Gravel pit

**Qes** Es  
Dry hole or abandoned test hole

**Qet** Et  
Contact

**Qeu** Eu  
Dashed where approximately located

**Qev** Ev  
Symbol in parenthesis indicate concealed bedrock

**Qew** Ew  
Approximate eastern drift border of Pondera ice

**Qex** Ex  
Strike and dip of beds

**Qey** Ey  
Strike of vertical beds

**Qez** Ez  
Buried channels of ancestral Marias River and major tributary

**Qfa** Fa  
Mesa and ridge

**Qfb** Fb  
Gravel pit

**Qfc** Fc  
Dry hole or abandoned test hole

**Qfd** Fd  
Contact

**Qfe** Fe  
Dashed where approximately located

**Qff** Ff  
Symbol in parenthesis indicate concealed bedrock

**Qfg** Fg  
Approximate eastern drift border of Pondera ice

**Qfh** Fh  
Strike and dip of beds

**Qfi** Fi  
Strike of vertical beds

**Qfj** Fj  
Buried channels of ancestral Marias River and major tributary

**Qfk** Fk  
Mesa and ridge

**Qfl** Fl  
Gravel pit

**Qfm** Fm  
Dry hole or abandoned test hole

**Qfn** Fn  
Contact

**Qfo** Fo  
Dashed where approximately located

**Qfp** Fp  
Symbol in parenthesis indicate concealed bedrock

**Qfq** Fq  
Approximate eastern drift border of Pondera ice

**Qfr** Fr  
Strike and dip of beds

**Qfs** Fs  
Strike of vertical beds

**Qft** Ft  
Buried channels of ancestral Marias River and major tributary

**Qfu** Fu  
Mesa and ridge

**Qfv** Fv  
Gravel pit

**Qfw** Fw  
Dry hole or abandoned test hole

**Qfx** Fx  
Contact

**Qfy** Fy  
Dashed where approximately located

**Qfz** Fz  
Symbol in parenthesis indicate concealed bedrock

**Qga** Ga  
Approximate eastern drift border of Pondera ice

**Qgb** Gb  
Strike and dip of beds

**Qgc** Gc  
Strike of vertical beds

**Qgd** Gd  
Buried channels of ancestral Marias River and major tributary

**Qge** Ge  
Mesa and ridge

**Qgf** Gf  
Gravel pit

**Qgg** Gg  
Dry hole or abandoned test hole

**Qgh** Gh  
Contact

**Qgi** Gi  
Dashed where approximately located

**Qgj** Gj  
Symbol in parenthesis indicate concealed bedrock

**Qgk** Gk  
Approximate eastern drift border of Pondera ice

**Qgl** Gl  
Strike and dip of beds

**Qgm** Gm  
Strike of vertical beds

**Qgn** Gn  
Buried channels of ancestral Marias River and major tributary

**Qgo** Go  
Mesa and ridge

**Qgp** Gp  
Gravel pit

**Qgq** Gq  
Dry hole or abandoned test hole

**Qgr** Gr  
Contact

**Qgs** Gs  
Dashed where approximately located

**Qgt** Gt  
Symbol in parenthesis indicate concealed bedrock

**Qgu** Gu  
Approximate eastern drift border of Pondera ice

**Qgv** Gv  
Strike and dip of beds

**Qgw** Gw  
Strike of vertical beds

**Qgx** Gx  
Buried channels of ancestral Marias River and major tributary

**Qgy** Gy  
Mesa and ridge

**Qgz** Gz  
Gravel pit

**Qha** Ha  
Dry hole or abandoned test hole

**Qhb** Hb  
Contact

**Qhc** Hc  
Dashed where approximately located

**Qhd** Hd  
Symbol in parenthesis indicate concealed bedrock

**Qhe** He  
Approximate eastern drift border of Pondera ice

**Qhf** Hf  
Strike and dip of beds

**Qhg** Hg  
Strike of vertical beds

**Qhh** Hh  
Buried channels of ancestral Marias River and major tributary

**Qhi** Hi  
Mesa and ridge

**Qhj** Hj  
Gravel pit

**Qhk** Hk  
Dry hole or abandoned test hole

**Qhl** Hl  
Contact

**Qhm** Hm  
Dashed where approximately located

**Qhn** Hn  
Symbol in parenthesis indicate concealed bedrock

**Qho** Ho  
Approximate eastern drift border of Pondera ice

**Qhp** Hp  
Strike and dip of beds

**Qhq** Hq  
Strike of vertical beds

**Qhr** Hr  
Buried channels of ancestral Marias River and major tributary

**Qhs** Hs  
Mesa and ridge

**Qht** Ht  
Gravel pit

**Qhu** Hu  
Dry hole or abandoned test hole

**Qhv** Hv  
Contact

**Qhw** Hw  
Dashed where approximately located

**Qhx** Hx  
Symbol in parenthesis indicate concealed bedrock

**Qhy** Hy  
Approximate eastern drift border of Pondera ice

**Qhz** Hz  
Strike and dip of beds

**Qia** Ia  
Strike of vertical beds

**Qib** Ib  
Buried channels of ancestral Marias River and major tributary

**Qic** Ic  
Mesa and ridge

**Qid** Id  
Gravel pit

**Qie** Ie  
Dry hole or abandoned test hole

**Qif** If  
Contact

**Qig** Ig  
Dashed where approximately located

**Qih** Ih  
Symbol in parenthesis indicate concealed bedrock

**Qii** Ii  
Approximate eastern drift border of Pondera ice

**Qij** Ij  
Strike and dip of beds

**Qik** Ik  
Strike of vertical beds

**Qil** Il  
Buried channels of ancestral Marias River and major tributary

**Qim** Im  
Mesa and ridge

**Qin** In  
Gravel pit

**Qio** Io  
Dry hole or abandoned test hole

**Qip** Ip  
Contact

**Qiq** Iq  
Dashed where approximately located

**Qir** Ir  
Symbol in parenthesis indicate concealed bedrock

**Qis** Is  
Approximate eastern drift border of Pondera ice

**Qit** It  
Strike and dip of beds

**Qiu** Iu  
Strike of vertical beds

**Qiv** Iv  
Buried channels of ancestral Marias River and major tributary

**Qiw** Iw  
Mesa and ridge

**Qix** Ix  
Gravel pit

**Qiy** Iy  
Dry hole or abandoned test hole

**Qiz** Iz  
Contact

**Qja** Ja  
Dashed where approximately located

**Qjb** Jb  
Symbol in parenthesis indicate concealed bedrock

**Qjc** Jc  
Approximate eastern drift border of Pondera ice

**Qjd** Jd  
Strike and dip of beds

**Qje** Je  
Strike of vertical beds

**Qjf** Jf  
Buried channels of ancestral Marias River and major tributary

**Qjg** Jg  
Mesa and ridge

**Qjh** Jh  
Gravel pit

**Qji** Ji  
Dry hole or abandoned test hole

**Qjj** Jj  
Contact

**Qjk** Jk  
Dashed where approximately located

**Qjl** Jl  
Symbol in parenthesis indicate concealed bedrock

**Qjm** Jm  
Approximate eastern drift border of Pondera ice

**Qjn** Jn  
Strike and dip of beds

**Qjo** Jo  
Strike of vertical beds

**Qjp** Jp  
Buried channels of ancestral Marias River and major tributary

**Qjq** Jq  
Mesa and ridge

**Qjr** Jr  
Gravel pit

**Qjs** Js  
Dry hole or abandoned test hole

**Qjt** Jt  
Contact

**Qju** Ju  
Dashed where approximately located

**Qjv** Jv  
Symbol in parenthesis indicate concealed bedrock

**Qjw** Jw  
Approximate eastern drift border of Pondera ice

**Qjx** Jx  
Strike and dip of beds

**Qjy** Jy  
Strike of vertical beds

**Qjz** Jz  
Buried channels of ancestral Marias River and major tributary

**Qka** Ka  
Mesa and ridge

**Qkb** Kb  
Gravel pit

**Qkc** Kc  
Dry hole or abandoned test hole

**Qkd** Kd  
Contact

**Qke** Ke  
Dashed where approximately located

**Qkf** Kf  
Symbol in parenthesis indicate concealed bedrock

**Qkg** Kg  
Approximate eastern drift border of Pondera ice

**Qkh** Kh  
Strike and dip of beds

**Qki** Ki  
Strike of vertical beds

**Qkl** Kl  
Buried channels of ancestral Marias River and major tributary

**Qkm** Km  
Mesa and ridge

**Qkn** Kn  
Gravel pit

**Qko** Ko  
Dry hole or abandoned test hole

**Qkp** Kp  
Contact

**Qkq** Kq  
Dashed where approximately located

**Qkr** Kr  
Symbol in parenthesis indicate concealed bedrock

**Qks** Ks  
Approximate eastern drift border of Pondera ice

**Qkt** Kt  
Strike and dip of beds

**Qku** Ku  
Strike of vertical beds

**Qkv** Kv  
Buried channels of ancestral Marias River and major tributary

**Qkw** Kw  
Mesa and ridge

**Qkx** Kx  
Gravel pit

**Qky** Ky  
Dry hole or abandoned test hole

**Qkz** Kz  
Contact

**Qla** La  
Dashed where approximately located

**Qlb** Lb  
Symbol in parenthesis indicate concealed bedrock

**Qlc** Lc  
Approximate eastern drift border of Pondera ice

**Qld** Ld  
Strike and dip of beds

**Qle** Le  
Strike of vertical beds

**Qlf** Lf  
Buried channels of ancestral Marias River and major tributary

**Qlg** Lg  
Mesa and ridge

**Qlh** Lh  
Gravel pit

**Qli** Li  
Dry hole or abandoned test hole

**Qlj** Lj  
Contact

**Qlk** Lk  
Dashed where approximately located

**Qll** Ll  
Symbol in parenthesis indicate concealed bedrock

**Qlm** Lm  
Approximate eastern drift border of Pondera ice

**Qln** Ln  
Strike and dip of beds

**Qlo** Lo  
Strike of vertical beds

**Qlp** Lp  
Buried channels of ancestral Marias River and major tributary

**Qlq** Lq  
Mesa and ridge

**Qlr** Lr  
Gravel pit

**Qls** Ls  
Dry hole or abandoned test hole

**Qlt** Lt  
Contact

**Qlu** Lu  
Dashed where approximately located

**Qlv** Lv  
Symbol in parenthesis indicate concealed bedrock

**Qlw** Lw  
Approximate eastern drift border of Pondera ice

**Qlx** Lx  
Strike and dip of beds

**Qly** Ly  
Strike of vertical beds

**Qlz** Lz  
Buried channels of ancestral Marias River and major tributary

**Qma** Ma  
Mesa and ridge

**Qmb** Mb  
Gravel pit

**Qmc** Mc  
Dry hole or abandoned test hole

**Qmd** Md  
Contact

**Qme** Me  
Dashed where approximately located

**Qmf** Mf  
Symbol in parenthesis indicate concealed bedrock

**Qmg** Mg  
Approximate eastern drift border of Pondera ice

**Qmh** Mh  
Strike and dip of beds

**Qmi** Mi  
Strike of vertical beds

**Qmj** Mj  
Buried channels of ancestral Marias River and major tributary

**Qmk** Mk  
Mesa and ridge

**Qml** Ml  
Gravel pit

**Qmn** Mn  
Dry hole or abandoned test hole

**Qmo** Mo  
Contact

**Qmp** Mp  
Dashed where approximately located

**Qmq** Mq  
Symbol in parenthesis indicate concealed bedrock

**Qmr** Mr  
Approximate eastern drift border of Pondera ice

**Qms** Ms  
Strike and dip of beds

**Qmt** Mt  
Strike of vertical beds

**Qmu** Mu  
Buried channels of ancestral Marias River and major tributary

**Qmv** Mv  
Mesa and ridge

**Qmw** Mw  
Gravel pit

**Qmx** Mx  
Dry hole or abandoned test hole

**Qmy** My  
Contact

**Qmz** Mz  
Dashed where approximately located

**Qna** Na  
Symbol in parenthesis indicate concealed bedrock

**Qnb** Nb  
Approximate eastern drift border of Pondera ice

**Qnc** Nc  
Strike and dip of beds

**Qnd** Nd  
Strike of vertical beds

**Qne** Ne  
Buried channels of ancestral Marias River and major tributary

**Qnf** Nf  
Mesa and ridge

**Qng** Ng  
Gravel pit

**Qnh** Nh  
Dry hole or abandoned test hole

**Qni** Ni  
Contact

**Qnj** Nj  
Dashed where approximately located

**Qnk** Nk  
Symbol in parenthesis indicate concealed bedrock

**Qnl** Nl  
Approximate eastern drift border of Pondera ice

**Qnm** Nm  
Strike and dip of beds

**Qno** No  
Strike of vertical beds

**Qnp** Np  
Buried channels of ancestral Marias River and major tributary

**Qnq** Nq  
Mesa and ridge

**Qnr** Nr  
Gravel pit

**Qns** Ns  
Dry hole or abandoned test hole

**Qnt** Nt  
Contact

**Qnu** Nu  
Dashed where approximately located

**Qnv** Nv  
Symbol in parenthesis indicate concealed bedrock

**Qnw** Nw  
Approximate eastern drift border of Pondera ice

**Qnx** Nx  
Strike and dip of beds

**Qny** Ny  
Strike of vertical beds

**Qnz** Nz  
Buried channels of ancestral Marias River and major tributary

**Qoa** Oa  
Mesa and ridge

**Qob** Ob  
Gravel pit

**Qoc** Oc  
Dry hole or abandoned test hole

**Qod** Od  
Contact

**Qoe** Oe  
Dashed where approximately located

**Qof** Of  
Symbol in parenthesis indicate concealed bedrock

**Qog** Og  
Approximate eastern drift border of Pondera ice

**Qoh** Oh  
Strike and dip of beds

**Qoi** Oi  
Strike of vertical beds

**Qoj** Oj  
Buried channels of ancestral Marias River and major tributary

**Qok** Ok  
Mesa and ridge

**Qol** Ol  
Gravel pit

**Qom** Om  
Dry hole or abandoned test hole

**Qon** On  
Contact

**Qoo** Oo  
Dashed where approximately located

**Qop** Op  
Symbol in parenthesis indicate concealed bedrock

**Qoq** Oq  
Approximate eastern drift border of Pondera ice

**Qor** Or  
Strike and dip of beds

**Qos** Os  
Strike of vertical beds

**Qot** Ot  
Buried channels of ancestral Marias River and major tributary

**Qou** Ou  
Mesa and ridge

**Qov** Ov  
Gravel pit

**Qow** Ow  
Dry hole or abandoned test hole

**Qox** Ox  
Contact

**Qoy** Oy  
Dashed where approximately located

**Qoz** Oz  
Symbol in parenthesis indicate concealed bedrock

**Qpa** Pa  
Approximate eastern drift border of Pondera ice

**Qpb** Pb  
Strike and dip of beds

**Qpc** Pc  
Strike of vertical beds

**Qpd** Pd  
Buried channels of ancestral Marias River and major tributary

**Qpe** Pe  
Mesa and ridge

**Qpf** Pf  
Gravel pit

**Qpg** Pg  
Dry hole or abandoned test hole

**Qph** Ph  
Contact

**Qpi** Pi  
Dashed where approximately located

**Qpj** Pj  
Symbol in parenthesis indicate concealed bedrock

**Qpk** Pk  
Approximate eastern drift border of Pondera ice

**Qpl** Pl  
Strike and dip of beds

**Qpm** Pm  
Strike of vertical beds

**Qpn** Pn  
Buried channels of ancestral Marias River and major tributary

**Qpo** Po  
Mesa and ridge

**Qpp** Pp  
Gravel pit

**Qpq** Pq  
Dry hole or abandoned test hole

**Qpr** Pr  
Contact

**Qps** Ps  
Dashed where approximately located

**Qpt** Pt  
Symbol in parenthesis indicate concealed bedrock

**Qpu** Pu  
Approximate eastern drift border of Pondera ice

**Qpv** Pv  
Strike and dip of beds

**Qpw** Pw  
Strike of vertical beds

**Qpx** Px  
Buried channels of ancestral Marias River and major tributary

**Qpy** Py  
Mesa and ridge

**Qpz** Pz  
Gravel pit

**Qqa** Qa  
Dry hole or abandoned test hole

**Qqb** Qb  
Contact

**Qqc** Qc  
Dashed where approximately located

**Qqd** Qd  
Symbol in parenthesis indicate concealed bedrock

**Qqe** Qe  
Approximate eastern drift border of Pondera ice

**Qqf** Qf  
Strike and dip of beds

**Qqg** Qg  
Strike of vertical beds

**Qqh** Qh  
Buried channels of ancestral Marias River and major tributary

**Qqi** Qi  
Mesa and ridge

**Qqj** Qj  
Gravel pit

**Qqk** Qk  
Dry hole or abandoned test hole

**Qql** Ql  
Contact

**Qqm** Qm  
Dashed where approximately located

**Qqn** Qn  
Symbol in parenthesis indicate concealed bedrock

**Qqo** Qo  
Approximate eastern drift border of Pondera ice

**Qqp** Qp  
Strike and dip of beds

**Qqq** Qq  
Strike of vertical beds

**Qqr** Qr  
Buried channels of ancestral Marias River and major tributary

**Qqs** Qs  
Mesa and ridge

**Qqt** Qt  
Gravel pit

**Qqu** Qu  
Dry hole or abandoned test hole

**Qqv** Qv  
Contact

**Qqw** Qw  
Dashed where approximately located

**Qqx** Qx  
Symbol in parenthesis indicate concealed bedrock

**Qqy** Qy  
Approximate eastern drift border of Pondera ice

**Qqz** Qz  
Strike and dip of beds

**Qra** Ra  
Strike of vertical beds

**Qrb** Rb  
Buried channels of ancestral Marias River and major tributary

**Qrc** Rc  
Mesa and ridge

**Qrd** Rd  
Gravel pit

**Qre** Re  
Dry hole or abandoned test hole

**Qrf** Rf  
Contact

**Qrg** Rg  
Dashed where approximately located

**Qrh** Rh  
Symbol in parenthesis indicate concealed bedrock

**Qri** Ri  
Approximate eastern drift border of Pondera ice

**Qrj** Rj  
Strike and dip of beds

**Qrk** Rk  
Strike of vertical beds

**Qrl** Rl  
Buried channels of ancestral Marias River and major tributary

**Qrm** Rm  
Mesa and ridge

**Qrn** Rn  
Gravel pit

**Qro** Ro  
Dry hole or abandoned test hole

**Qrp** Rp  
Contact

**Qrq** Rq  
Dashed where approximately located

**Qrr** Rr  
Symbol in parenthesis indicate concealed bedrock

**Qrs** Rs  
Approximate eastern drift border of Pondera ice

**Qrt** Rt  
Strike and dip of beds

**Qru** Ru  
Strike of vertical beds

**Qrv** Rv  
Buried channels of ancestral Marias River and major tributary

**Qrw** Rw  
Mesa and ridge

**Qrx** Rx  
Gravel pit

**Qry** Ry  
Dry hole or abandoned test hole

**Qrz** Rz  
Contact

**Qsa** Sa  
Dashed where approximately located

**Qsb** Sb  
Symbol in parenthesis indicate concealed bedrock

**Qsc** Sc  
Approximate eastern drift border of Pondera ice

**Qsd** Sd  
Strike and dip of beds

**Qse** Se  
Strike of vertical beds

**Qsf** Sf  
Buried channels of ancestral Marias River and major tributary

**Qsg** Sg  
Mesa and ridge

**Qsh** Sh  
Gravel pit

**Qsi** Si  
Dry hole or abandoned test hole

**Qsj** Sj  
Contact

**Qsk** Sk  
Dashed where approximately located

**Qsl** Sl  
Symbol in parenthesis indicate concealed bedrock

**Qsm** Sm  
Approximate eastern drift border of Pondera ice

**Qsn** Sn  
Strike and dip of beds

**Qso** So  
Strike of vertical beds

**Qsp** Sp  
Buried channels of ancestral Marias River and major tributary

**Qsq** Sq  
Mesa and ridge

**Qsr** Sr  
Gravel pit

**Qss** Ss  
Dry hole or abandoned test hole

**Qst** St  
Contact

**Qsu** Su  
Dashed where approximately located

**Qsv** Sv  
Symbol in parenthesis indicate concealed bedrock

**Qsw** Sw  
Approximate eastern drift border of Pondera ice

**Qsx** Sx  
Strike and dip of beds

**Qsy** Sy  
Strike of vertical beds

**Qsz** Sz  
Buried channels of ancestral Marias River and major tributary

**Qta** Ta  
Mesa and ridge

**Qtb** Tb  
Gravel pit

**Qtc** Tc  
Dry hole or abandoned test hole

**Qtd** Td  
Contact

**Qte** Te  
Dashed where approximately located

**Qtf** Tf  
Symbol in parenthesis indicate concealed bedrock

**Qtg** Tg  
Approximate eastern drift border of Pondera ice

**Qth** Th  
Strike and dip of beds

**Qti** Ti  
Strike of vertical beds

**Qtj** Tj  
Buried channels of ancestral Marias River and major tributary

**Qtk** Tk  
Mesa and ridge

**Qtl** Tl  
Gravel pit

**Qtm** Tm  
Dry hole or abandoned test hole

**Qtn** Tn  
Contact

**Qto** To  
Dashed where approximately located

**Qtp** Tp  
Symbol in parenthesis indicate concealed bedrock

**Qtq** Tq  
Approximate eastern drift