



Note: Centerline date shown is 7/31/08

24K USGS Quads Shown



PREPARED BY:



**TROW ENGINEERING CONSULTANTS, INC.**  
JANUARY 27, 2009  
REVISION 0

# KEYSTONE XL PROJECT SOUTH DAKOTA STUDY AREA MAPBOOK 2 SOIL MAP UNITS





# Soils Legend

Map Unit	Description
AaB	Bullock-Parchin loams, 0 to 9 percent slopes
AaB2	Anselmo loamy fine sand, 0 to 9 percent slopes, eroded
Ab	Albaton silty clay, depressional
AbB	Abor silty clay, 2 to 6 percent slopes, Meade County
AbB	Anselmo fine sandy loam, 3 to 6 percent slopes, Tripp County
AbC	Anselmo fine sandy loam, 6 to 9 percent slopes, Tripp County
AbC	Abor silty clay, 6 to 9 percent slopes, Meade County
AbC	Bullock-Slickspots complex, 0 to 15 percent slopes, Perkins County
AeB	Absher-Slickspots complex, 0 to 9 percent slopes
AhC	Anselmo-Holt fine sandy loams, 3 to 9 percent slopes
AkA	Archin-Bullock fine sandy loams, 0 to 4 percent slopes
AnA	Archin-Slickspots complex, 0 to 3 percent slopes
AsA	Assinniboine fine sandy loam, 0 to 3 percent slopes
AsB	Assinniboine fine sandy loam, 2 to 6 percent slopes, Meade County
AsB	Assinniboine fine sandy loam, 3 to 6 percent slopes, Harding County
AsC	Assinniboine fine sandy loam, 6 to 9 percent slopes
AtA	Assinniboine-Archin fine sandy loams, 0 to 3 percent slopes
AtC	Assinniboine-Twilight fine sandy loams, 6 to 9 percent slopes
AtD	Anselmo-Longpine fine sandy loams, 10 to 20 percent slopes
AvA	Anselmo-Vetal fine sandy loams, 0 to 3 percent slopes
Ba	Badlands, Harding County
Ba	Badland, Perkins County
Ba	Bankard loamy fine sand, Meade County
Bb	Bankard gravelly loamy sand, Meade County
Bb	Banks loamy fine sand, Perkins County
Bd	Badland
Bg	Bigbend silt loam
BhE	Blackhall-Cabbart complex, 15 to 40 percent slopes
BkF	Bullock fine sandy loam, 6 to 20 percent slopes, extremely stony
BIE	Blackhall-Rock outcrop complex, 15 to 40 percent slopes
BmC	Boro-Millboro silty clays, 5 to 9 percent slopes
BmE	Blackhall-Twilight fine sandy loams, 9 to 40 percent slopes
BnC	Boyd clay, 5 to 9 percent slopes
BOD	Boyd-Okaton association, 9 to 25 percent slopes, Tripp County
BoD	Bullock-Cabbart complex, 6 to 25 percent slopes, Harding County
Bp	Bridgeport complex
BpB	Bullock-Parchin fine sandy loams, 0 to 4 percent slopes, Meade County
BpB	Bullock-Parchin-Slickspots complex, 2 to 9 percent slopes, Harding County
BsA	Bullock-Slickspots complex, 0 to 4 percent slopes
BsB	Bullock-Slickspots complex, 0 to 4 percent slopes
Bt	Bridgeport complex, channeled
Bu	Bullcreek clay, 0 to 6 percent slopes
BuA	Bullcreek clay, 0 to 6 percent slopes
CaB	Canning loam, 2 to 5 percent slopes
CaD	Cabbart loam, 9 to 40 percent slopes
CbA	Capa silt loam, 0 to 6 percent slopes
CbD	Canning-Murdo loams, 6 to 15 percent slopes
Cc	Carter silty clay loam
CcE	Cabbart loam, 6 to 60 percent slopes, extremely stony
CdE	Cabbart-Delridge loams, 15 to 40 percent slopes
CeE	Cabbart-Rock outcrop complex, 15 to 40 percent slopes
ChA	Chinook fine sandy loam, 0 to 3 percent slopes
CnA	Chinook-Archin fine sandy loams, 0 to 3 percent slopes
CpA	Capa silt loam, 0 to 6 percent slopes
Ct	Capa-Wendte, channeled, complex
DbD	Dix soils, 9 to 18 percent slopes
DcC	Delridge-Cabbart loams, 6 to 15 percent slopes
DeC	Delridge-Cabbart loams, 6 to 15 percent slopes
DgB	Doger loamy fine sand, 0 to 6 percent slopes
DmA	Doger-Elsmere complex, 0 to 3 percent slopes
DnC2	Dunday loamy fine sand, 3 to 9 percent slopes, eroded
DuC	Dunday-Doger loamy fine sands, 3 to 9 percent slopes
EaA	Eapa loam, 0 to 2 percent slopes
EaB	Eapa loam, 2 to 6 percent slopes
EaC	Eapa loam, 6 to 9 percent slopes
EcA	Eapa-Archin complex, 0 to 3 percent slopes
EdB	Eapa-Delridge loams, 2 to 6 percent slopes

Map Unit	Description
EdC	Eapa-Delridge loams, 6 to 9 percent slopes
Eg	Egas silty clay loam
EgB	Eapa-Grail complex, 2 to 6 percent slopes
EgC	Eapa-Grail complex, 6 to 9 percent slopes
Em	Elsmere fine sandy loam
Er	Erd clay
Es	Erd-Capa complex
FtE	Fleak-Trey-Rock outcrop complex, 15 to 50 percent slopes
GaA	Gerdrum loam, 0 to 4 percent slopes
Gc	Glenberg fine sandy loam
GdA	Gerdrum silt loam, 0 to 4 percent slopes
Ge	Glendive fine sandy loam
Gr	Grail silt loam
Ha	Hanly fine sandy loam, Harding County
Ha	Bigbend soils, Tripp County
Ha	Hanly loamy fine sand,, Butte County
Hb	Havre loam, Meade County
Hb	Hanly loamy fine sand, Harding County
Hb	Herdcamp-Bullcreek complex, Jones County
HbA	Holt-Anselmo fine sandy loams, 0 to 3 percent slopes
Hc	Havre loam, channeled
Hd	Hanly-Dogiecreek fine sandy loams
He	Hanly-Slickspots complex
Hg	Havre loam
Hh	Havre-Harlake complex
Hm	Hilmoe silty clay
Hv	Hoven silt loam
Ic	Inavale complex, channeled
KcF	Kirby-Cabbart-Rock outcrop complex, 15 to 60 percent slopes
Ke	Korchea loam
KeA	Kirley clay loam, 0 to 2 percent slopes
KeB	Kirley clay loam, 2 to 6 percent slopes
KeC	Kirley clay loam, 6 to 9 percent slopes
KeD	Kirley clay loam, 6 to 15 percent slopes, Haakon County
KeD	Kirley clay loam, 9 to 15 percent slopes, Jones County
KfB	Kirley-Canning complex, 2 to 6 percent slopes
Kg	Korchea loam, channeled
KhA	Kirley-Mosher complex, 0 to 2 percent slopes
Km	Korchea-Archin complex
KmB	Kirley-Mosher complex, 0 to 6 percent slopes, Jones County
KmB	Kirley-Ottumwa complex, 2 to 6 percent slopes, Haakon County
KmC	Kirley-Ottumwa complex, 6 to 9 percent slopes
KnD	Kirley-Vivian complex, 6 to 15 percent slopes, Haakon County
KnD	Kirley-Vivian complex, 9 to 25 percent slopes, Jones County
Ko	Kolls clay, Haakon County
Ko	Kolls silty clay, Jones County
KyA	Kyle clay, 0 to 2 percent slopes
KyB	Kyle clay, 2 to 6 percent slopes, Meade County
KyB	Kyle clay, 3 to 6 percent slopes, Haakon County
LaB	Lakoma silty clay, 3 to 6 percent slopes, Haakon County
LaB	Lawther silty clay, 2 to 6 percent slopes, Meade County
LaC	Lakoma silty clay, 6 to 9 percent slopes
LaD	Lakoma silty clay, 6 to 15 percent slopes
LbD	Lakoma-Okaton silty clays, 6 to 15 percent slopes
LbE	Lakoma-Vivian complex, 9 to 25 percent slopes
LcA	Loburn-Gerdrum loams, 0 to 3 percent slopes
Ld	Lohmiller silty clay loam
Lg	Lohmiller silty clay loam, channeled
LkC	Lakoma-Millboro silty clays, 5 to 9 percent slopes
Lo	Lohmiller silty clay
LoD	Lakoma-Okaton silty clays, 9 to 15 percent slopes
Lp	Lohmiller silty clay, channeled
LvE	Lakoma-Vivian complex, 9 to 25 percent slopes
LwA	Lowry silt loam, 0 to 4 percent slopes
MaA	Manter fine sandy loam, 0 to 3 percent slopes
MaB	Manter fine sandy loam, 3 to 9 percent slopes, Tripp County
MaB	Marmarth fine sandy loam, 2 to 6 percent slopes, Harding County

*Note:*

*Some soil descriptions might have different map unit symbols based on the county they are in, according to NRCS U.S. soils database*



# Soils Legend

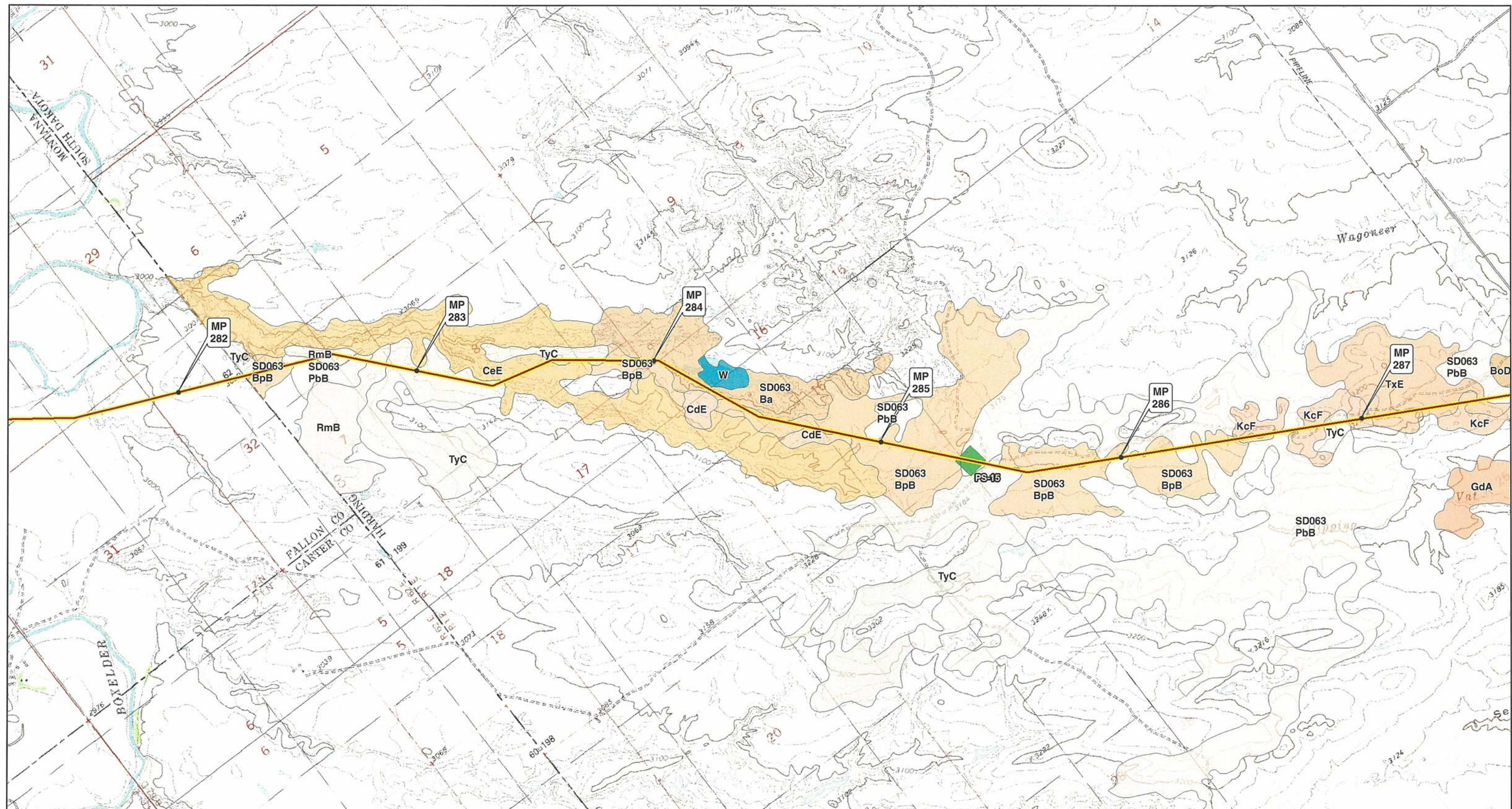
Map	Description
MbB	Marmarth loam, 2 to 6 percent slopes
McC	Marmarth-Cabbart complex, 6 to 9 percent slopes
MfE	Manter-Anselmo fine sandy loams, 15 to 30 percent slopes
MIA	Millboro silty clay loam, 0 to 3 percent slopes
MIB	Millboro silty clay loam, 3 to 6 percent slopes
MIC	Millboro silty clay loam, 6 to 9 percent slopes
MmA	Millboro silty clay, 0 to 3 percent slopes
MmB	Millboro silty clay, 3 to 6 percent slopes
MnC	Millboro-Boro silty clays, 6 to 9 percent slopes
Mo	Mosher silt loam
MoA	Millboro silty clay, 0 to 3 percent slopes
MoB	Millboro silty clay, 3 to 6 percent slopes
MoC	Millboro silty clay, 6 to 9 percent slopes
Mp	Mosher-Capa silt loams
MpB	Marmarth-Parchin fine sandy loams, 2 to 6 percent slopes
Mr	Mosher silt loam, Tripp County
Mr	Munjor fine sandy loam, Lyman County
MtD	Marmarth-Twilight fine sandy loams, 9 to 15 percent slopes
Mu	Munjor fine sandy loam
NaD	Nihill-Attewan complex, 4 to 20 percent slopes
Nb	Nimbro silty clay loam
Nc	Nimbro silty clay loam, channeled
NuB	Nunn clay loam, 2 to 6 percent slopes
ObE	Okaton-Lakoma silty clays, 15 to 40 percent slopes, Haakon County
OBE	Okaton-Lakoma association, 15 to 40 percent slopes, Tripp County
OeB	Opal-Promise clays, 3 to 6 percent slopes
OeC	Opal-Promise clays, 6 to 9 percent slopes
Og	Orthents, gravelly
OhE	Okaton-Lakoma silty clays, 15 to 40 percent slopes
OkE	Okaton-Wendte-Bullcreek complex, 0 to 45 percent slopes
OIC	Opal clay loam, 6 to 9 percent slopes
OID	Opal clay loam, 6 to 15 percent slopes
On	Onita silt loam
OpB	Opal clay, 3 to 6 percent slopes
OpC	Opal clay, 3 to 9 percent slopes, Tripp County
OpC	Opal clay, 6 to 9 percent slopes, Jones County
OpD	Opal clay, 6 to 15 percent slopes
OsE	Opal-Sansarc clays, 9 to 25 percent slopes
OtA	Ottumwa silty clay, 0 to 3 percent slopes
OtB	Ottumwa silty clay, 3 to 6 percent slopes
OvA	Ottumwa-Capa complex, 0 to 3 percent slopes
OwB	Ottumwa-Lakoma silty clays, 3 to 6 percent slopes
OwC	Ottumwa-Lakoma silty clays, 6 to 9 percent slopes
OyC	Ottumwa-Razor-Savo complex, 6 to 15 percent slopes
PaA	Parshall fine sandy loam, 0 to 3 percent slopes
PbB	Parchin-Bullock fine sandy loams, 2 to 6 percent slopes, Meade County
PbB	Parchin-Bullock fine sandy loams, 2 to 9 percent slopes, Harding County
PeB	Pierre clay, 2 to 6 percent slopes
PeC	Pierre clay, 6 to 9 percent slopes
Pg	Pits, gravel
PkE	Pierre-Samsil clays, 15 to 25 percent slopes
PoA	Promise clay, 0 to 3 percent slopes
PrA	Promise clay, 0 to 3 percent slopes, Jones County
PrA	Promise-Capa complex, 0 to 4 percent slopes, Lyman County
PrB	Promise clay, 3 to 6 percent slopes
PrC	Promise clay, 6 to 9 percent slopes
PsA	Promise-Bullcreek clays
PsC	Pierre-Samsil clays, 6 to 15 percent slopes
PtA	Hilmoie clay, 0 to 2 percent slopes
Pu	Promise-Capa complex
RaA	Ree loam, 0 to 3 percent slopes
RaB	Ree loam, 3 to 6 percent slopes
RaC	Ree loam, 6 to 9 percent slopes
RaD	Ree loam, 9 to 15 percent slopes
ReA	Ree loam, 0 to 2 percent slopes
ReB	Ree loam, 2 to 6 percent slopes, Haakon County
ReB	Reliance silty clay loam, 3 to 6 percent slopes, Tripp County

Map Unit	Description
ReC	Reliance silty clay loam, 6 to 9 percent slopes
RfA	Ronson fine sandy loam, 0 to 4 percent slopes
RfB	Regent-Savage silty clay loams, 2 to 6 percent slopes
RfC	Ree-Canning loams, 6 to 9 percent slopes
Rh	Ree-Hoven complex
RhB	Rhame fine sandy loam, 2 to 6 percent slopes
RkD	Ree-Vivian complex, 6 to 15 percent slopes
RmB	Rhame-Parchin fine sandy loams, 2 to 6 percent slopes
RnB	Rhoades-Daglum loams, 2 to 9 percent slopes
RnD	Rhoades-Rock outcrop complex, 6 to 20 percent slopes
RoB	Ronson-Longpine fine sandy loams, 0 to 6 percent slopes
Rv	Riverwash
SaA	Sage loam
SaD	Samsil clay, 6 to 25 percent slopes
SAE	Sansarc-Opal association, 15 to 40 percent slopes
SbE	Samsil-Rock outcrop complex, 15 to 40 percent slopes, Meade County
SbE	Sansarc-Opal clays, 9 to 40 percent slopes, Lyman County
SbF	Samsil clay, 25 to 60 percent slopes
Sc	Shambo loam
Sd	Shambo loam, channeled
SdF	Samsil-Rock outcrop complex, 15 to 60 percent slopes
Sh	Lohler-Trembles complex
ShE	Schamber-Murdo complex, 15 to 40 percent slopes
SnB	Sorum fine sandy loam, 0 to 6 percent slopes
SoE	Sansarc-Opal clays, 9 to 40 percent slopes, Haakon County
SoE	Sansarc-Opal clays, 9 to 40 percent slopes, Jones County
St	Stetter clay
StF	Schamber-Samsil complex, 6 to 60 percent slopes
Sw	Bullcreek clay
SwA	Swanboy clay
Ta	Trembles fine sandy loam
Tb	Trembles soils, channeled
TcD	Twilight-Marmarth-Parchin association, gently rolling
TdB	Tanna-Delridge complex, 2 to 6 percent slopes
TdC	Tanna-Delridge complex, 6 to 9 percent slopes
TfD	Twilight fine sandy loam, 3 to 25 percent slopes
ThD	Twilight-Blackhall fine sandy loams, 6 to 18 percent slopes
ToC	Tanna-Rhoades complex, 2 to 9 percent slopes
TrB	Trey loamy fine sand, 2 to 9 percent slopes
TrF	Longpine-Rock outcrop complex, 15 to 40 percent slopes
TsB	Tanna-Savo complex, 2 to 6 percent slopes
TsC	Tanna-Savo complex, 6 to 9 percent slopes
TtC	Trey-Fleak loamy fine sands, 2 to 15 percent slopes
TvB	Trey-Parchin-Bullock complex, 2 to 9 percent slopes
TwC	Twilight fine sandy loam, 6 to 9 percent slopes, Harding County
TwC	Twilight-Marmarth-Parchin fine sandy loams, 4 to 9 percent slopes, Meade County
TxE	Twilight-Blackhall fine sandy loams, 9 to 25 percent slopes
TyC	Twilight-Parchin fine sandy loams, 6 to 15 percent slopes
VdC	Valentine-Dunday complex, 3 to 9 percent slopes
VnD	Valentine-Longpine complex, 6 to 15 percent slopes
Vt	Vetal fine sandy loam
W	Water
WaD	Wabek sandy loam, 9 to 35 percent slopes
Wb	Wann fine sandy loam
Wd	Wendte-Herdcamp silty clays, channeled
WeE	Westover loam, 9 to 25 percent slopes
WgA	Wewela fine sandy loam, 0 to 3 percent slopes
WgB	Wewela fine sandy loam, 3 to 6 percent slopes
Wh	Whitelake fine sandy loam
Wk	Whitelake-Lute fine sandy loams
Wn	Witten silty clay
Wt	Witten silty clay
YaC	Yawdim silty clay loam, 6 to 9 percent slopes
ZaB	Zeona loamy fine sand, 2 to 9 percent slopes
ZaD	Zeona loamy fine sand, 9 to 25 percent slopes
ZbC	Zeona-Blownout land complex, 2 to 15 percent slopes
ZeB	Zeona loamy fine sand, 0 to 6 percent slopes

**Note:**

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### Legend

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station






0 0.125 0.25 0.5 0.75 1 Miles

0 0.25 0.5 1 1.5 2 Kilometers

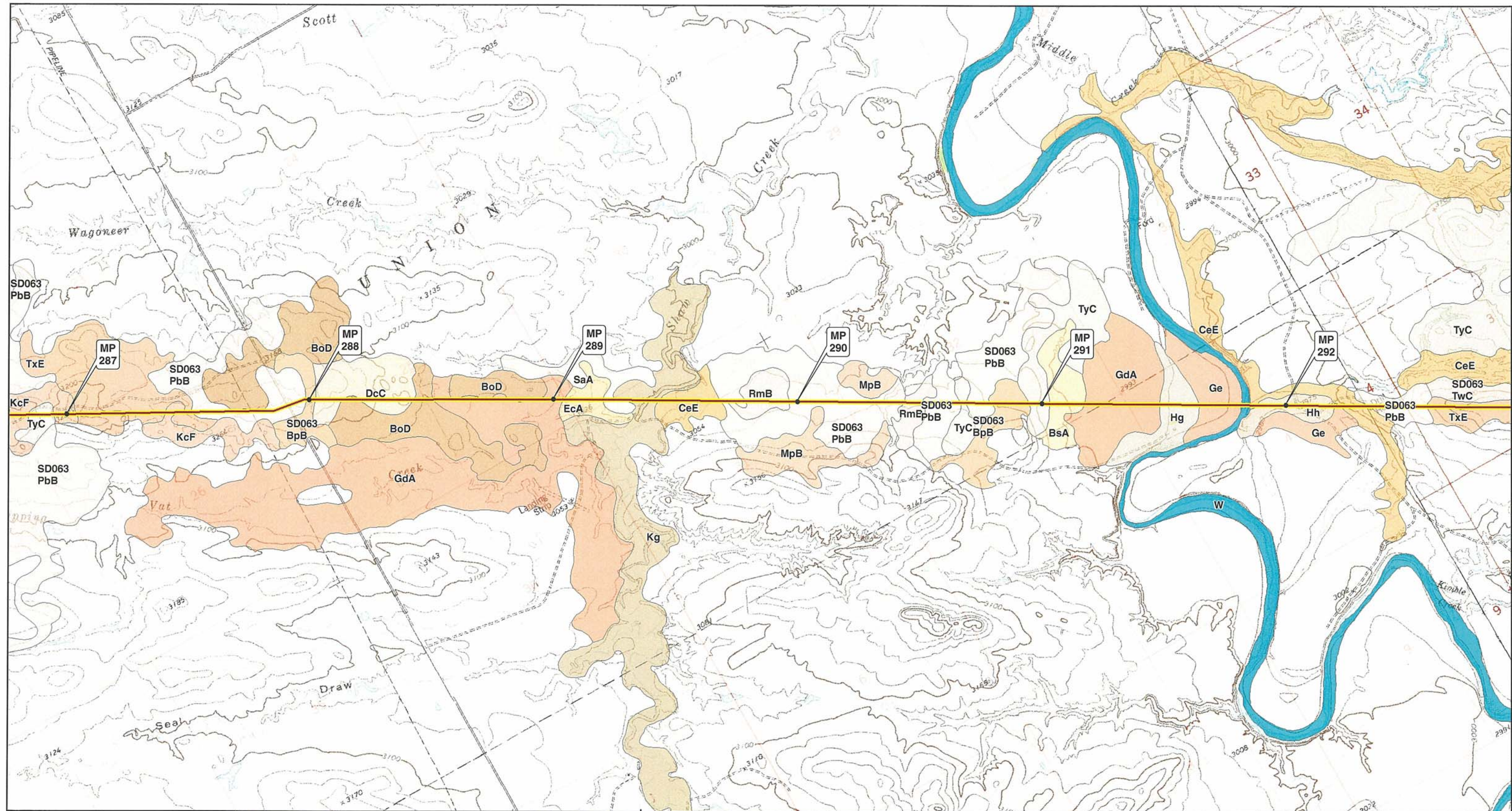
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SOUTH DAKOTA STUDY AREA  
KEystone XL PROJECT

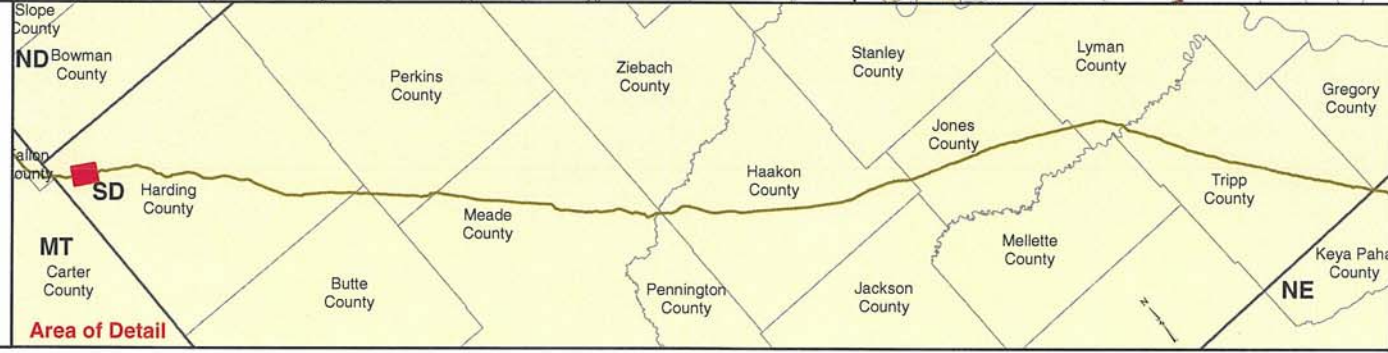
MAPBOOK 2  
SOIL MAP UNITS  
MAP 01 OF 58







**Legend**

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station






0 0.125 0.25 0.5 0.75 1 Miles

0 0.25 0.5 1 1.5 2 Kilometers

Scale 1:24,000

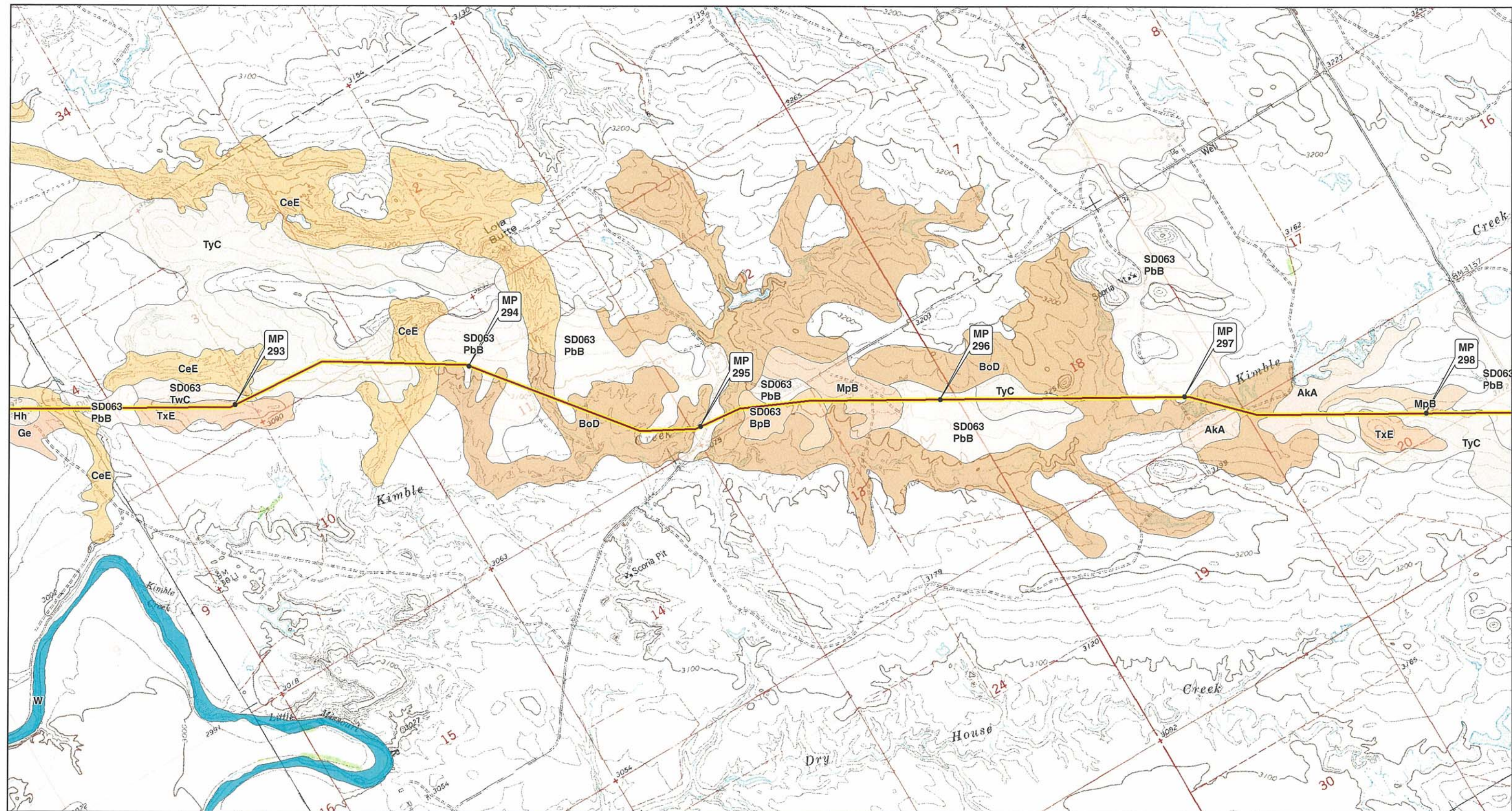


SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT

**MAPBOOK 2**  
**SOIL MAP UNITS**

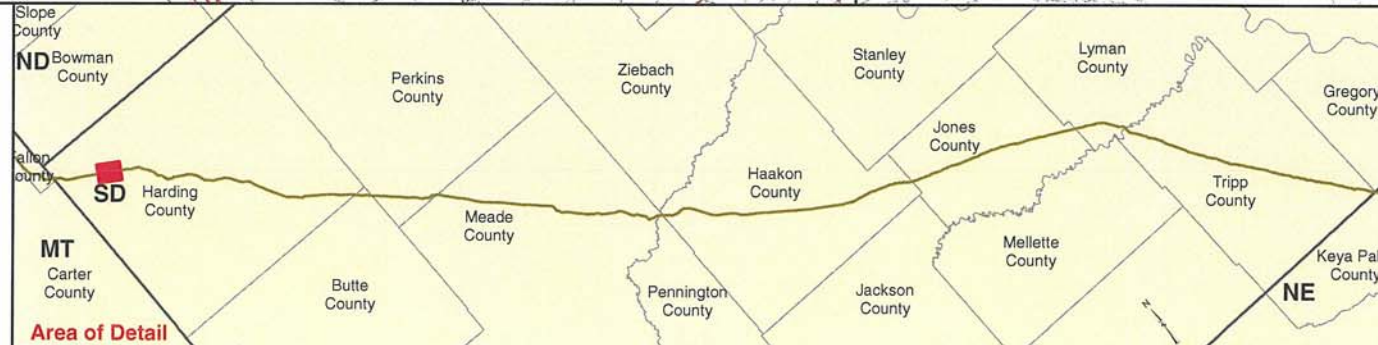
**MAP 02 OF 58**





### Legend

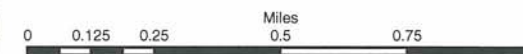
- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station



SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT

MAPBOOK 2  
SOIL MAP UNITS

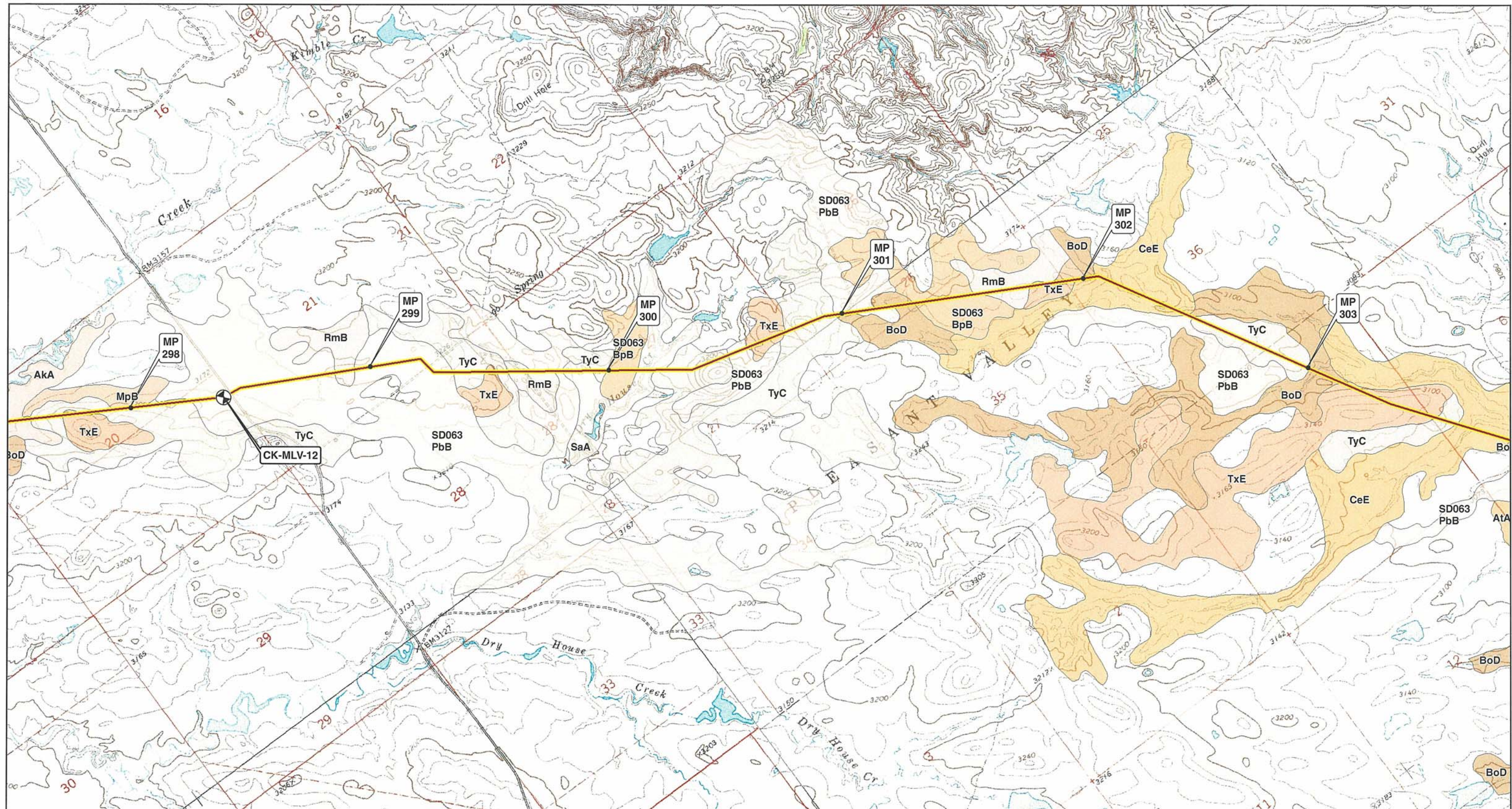
MAP 03 OF 58



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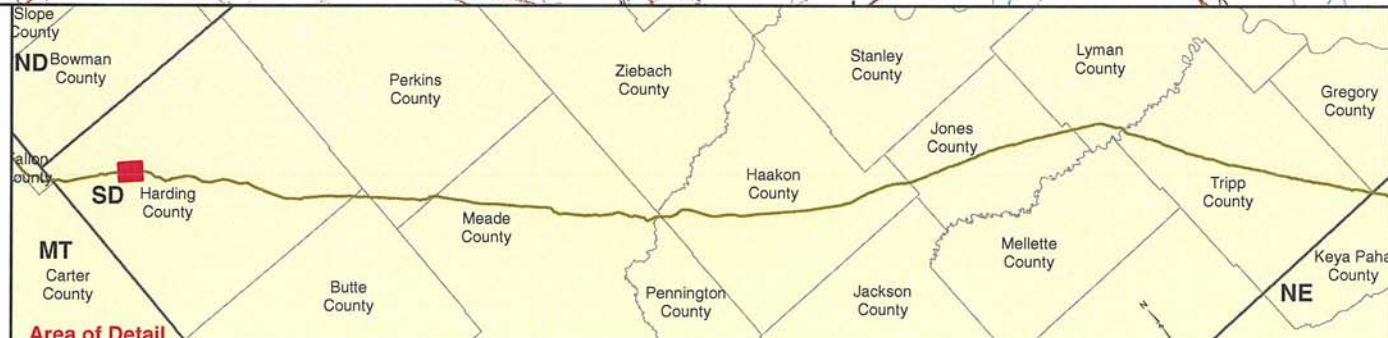








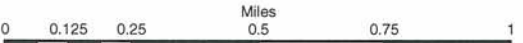


**Legend**

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station







Scale 1:24,000

**SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT**

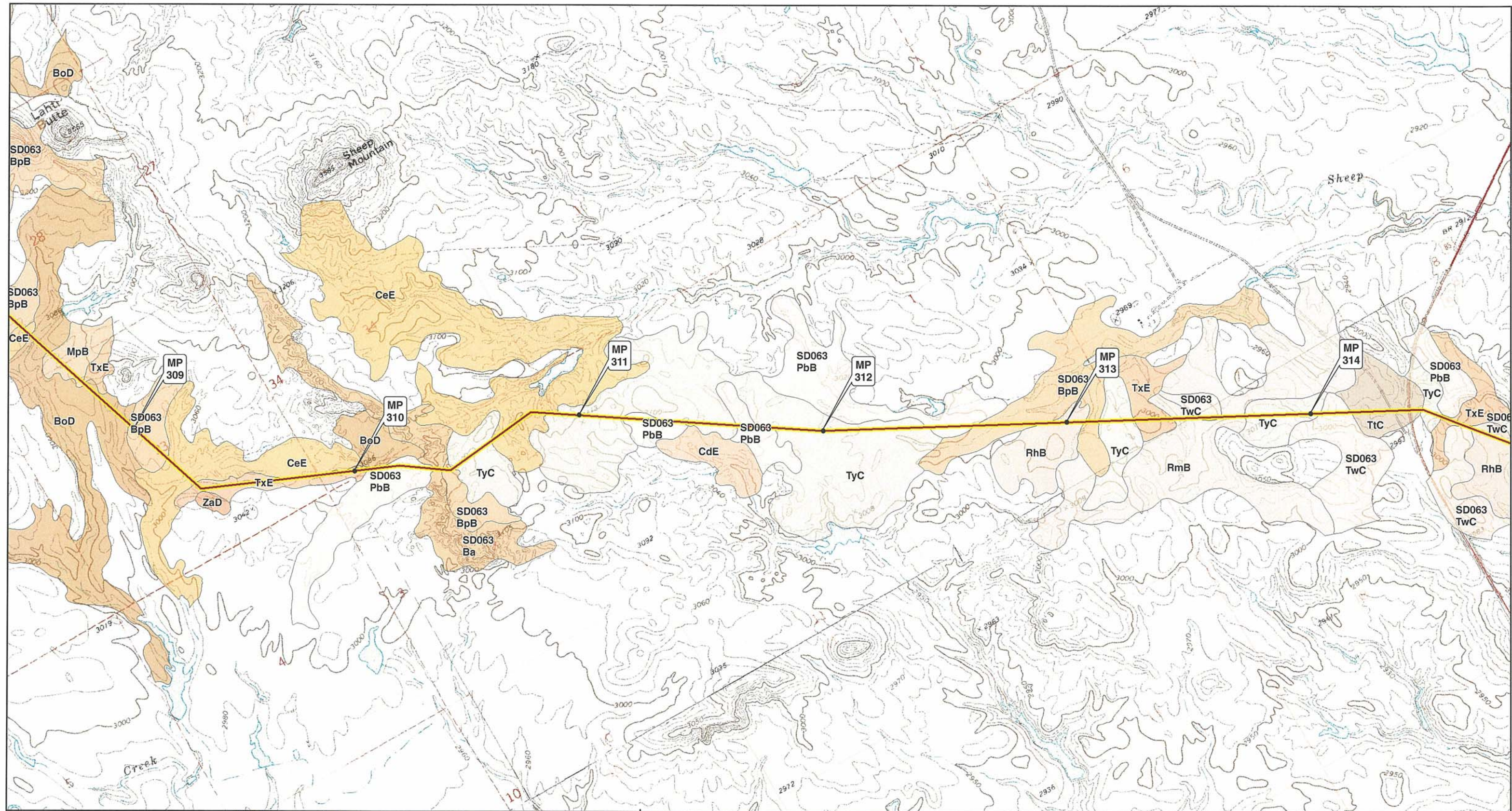
**MAPBOOK 2  
SOIL MAP UNITS**

**MAP 04 OF 58**



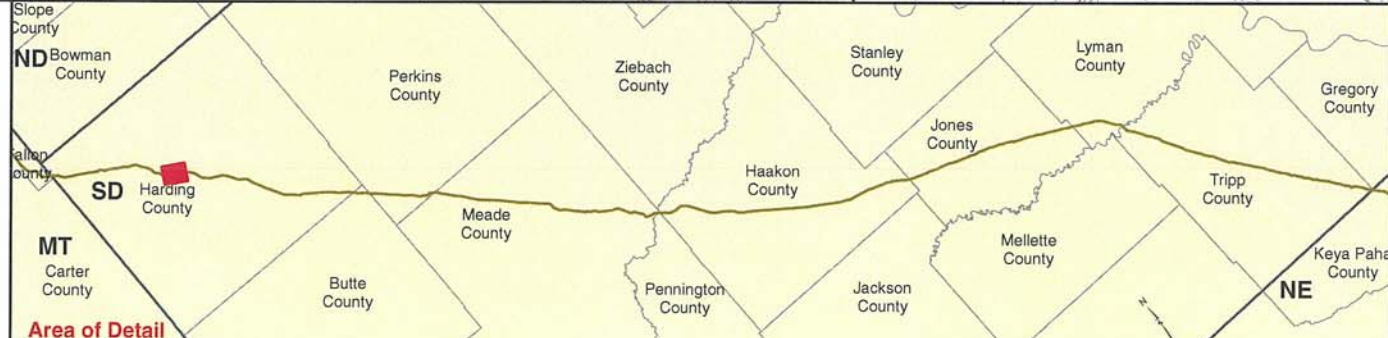






**Legend**

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station



**TransCanada**  
*In business to deliver*

**ConocoPhillips**

0 0.125 0.25 0.5 0.75 1  
Miles

Scale 1:24,000

0 0.25 0.5 1 1.5 2  
Kilometers

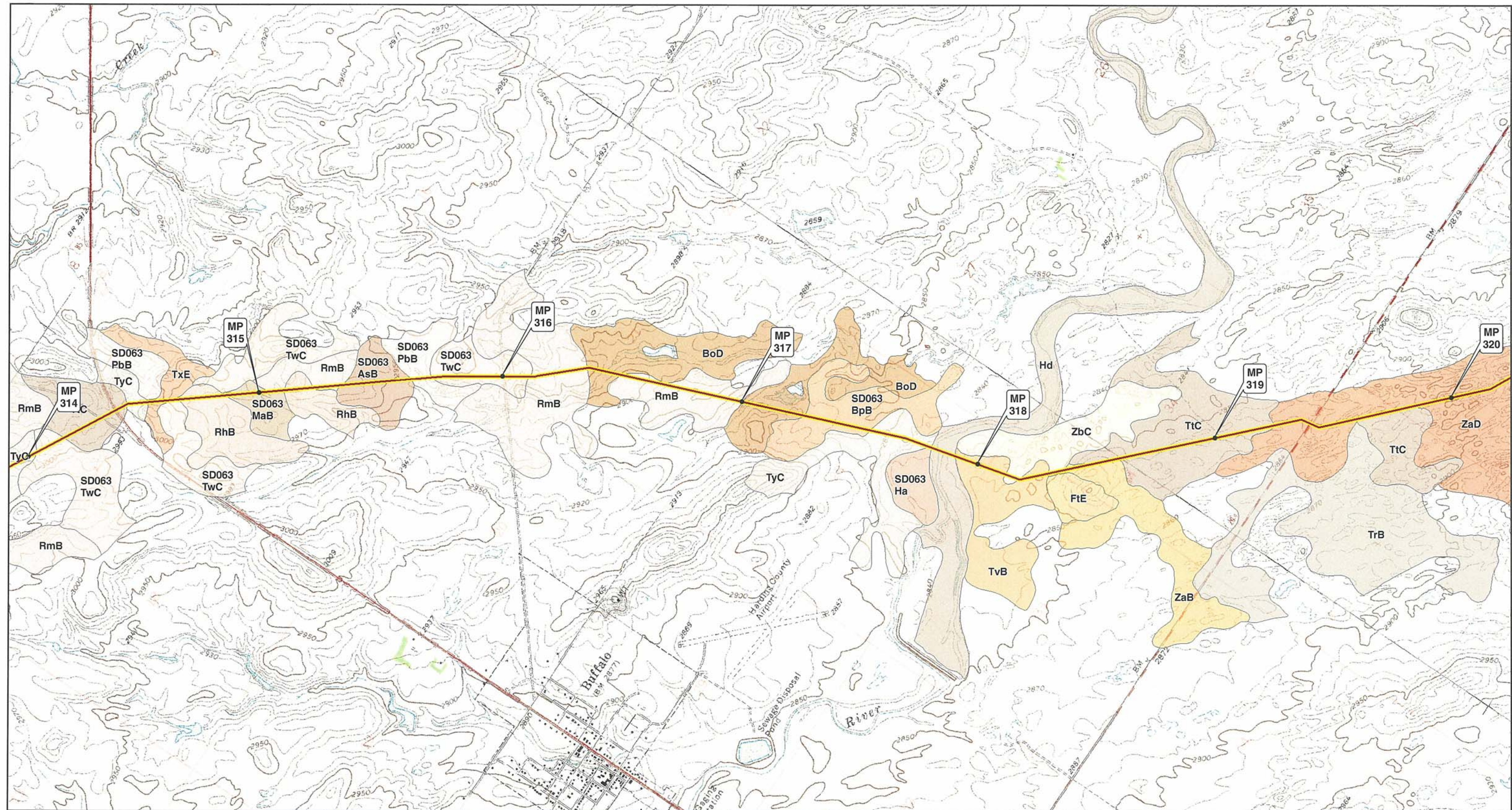
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**SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT**

**MAPBOOK 2  
SOIL MAP UNITS**

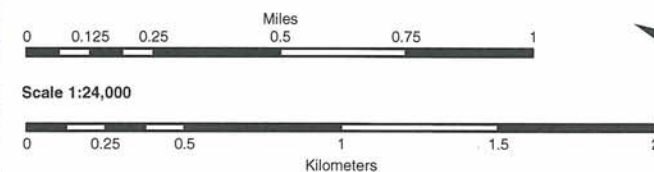
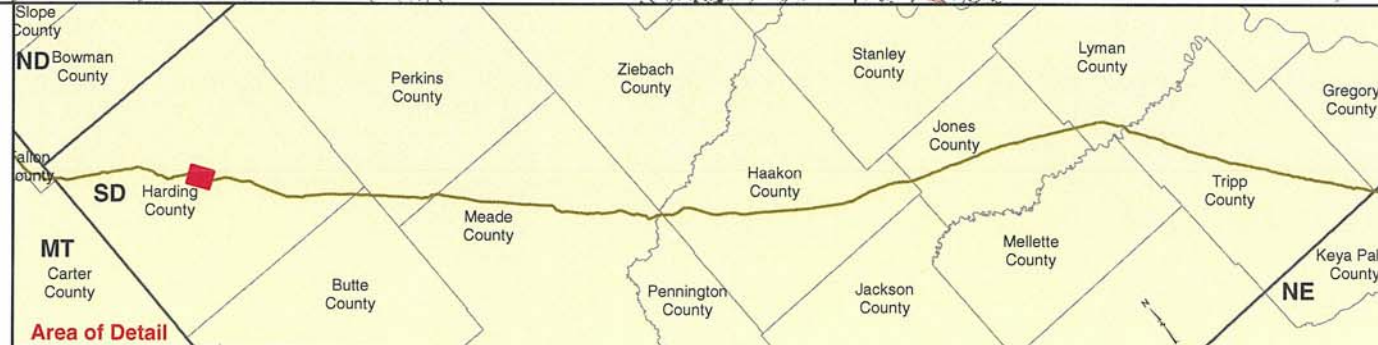
**MAP 06 OF 58**





# Legend

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station

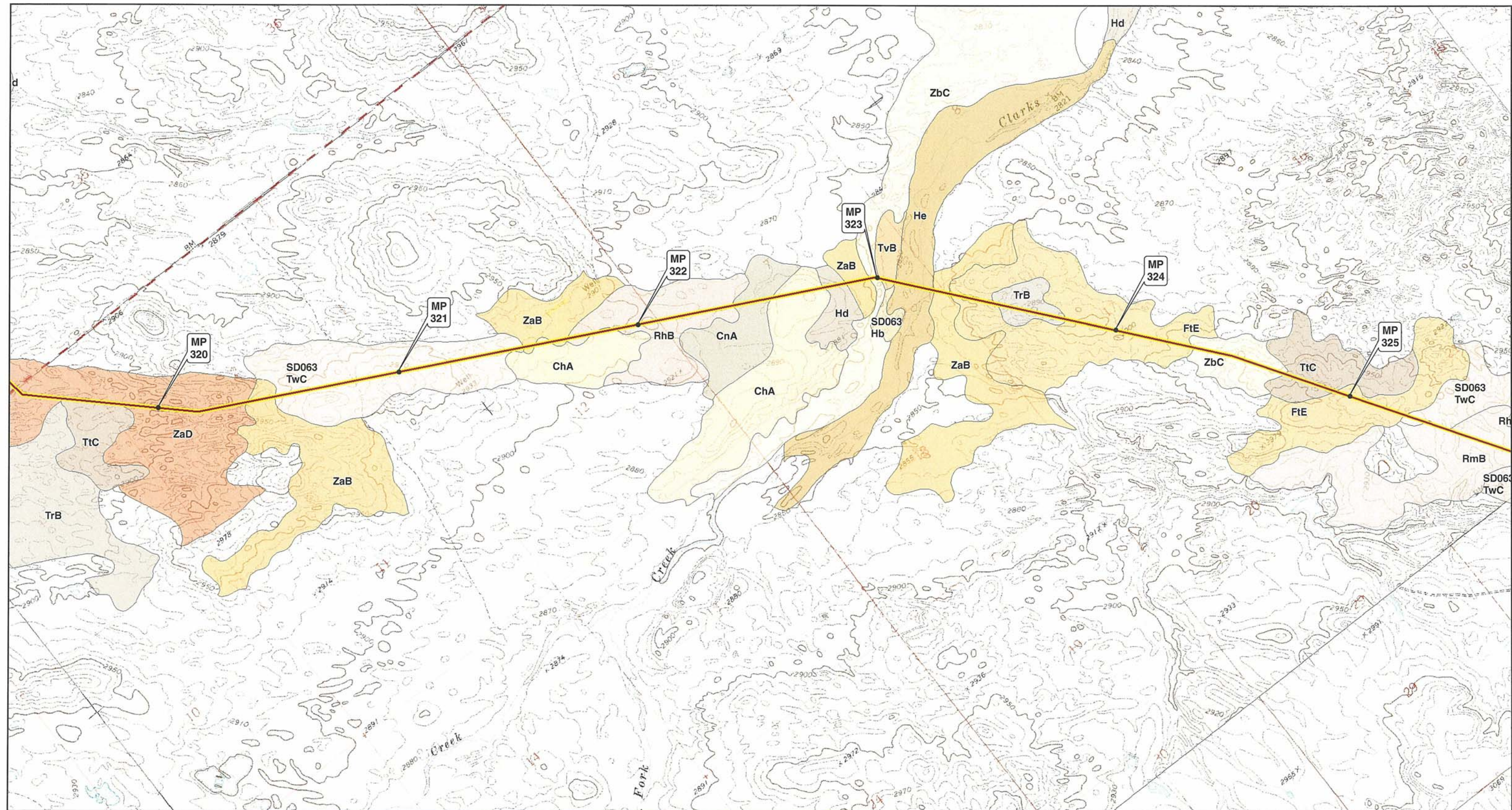


SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT

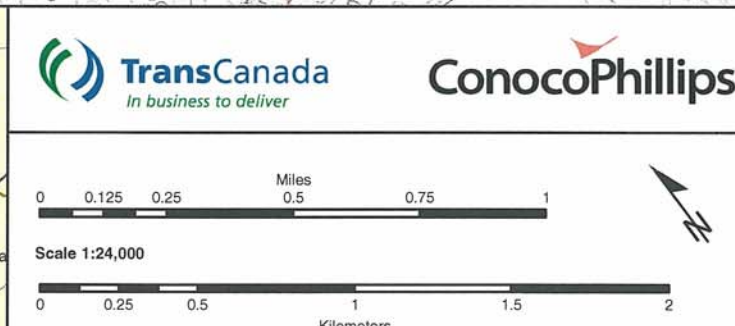
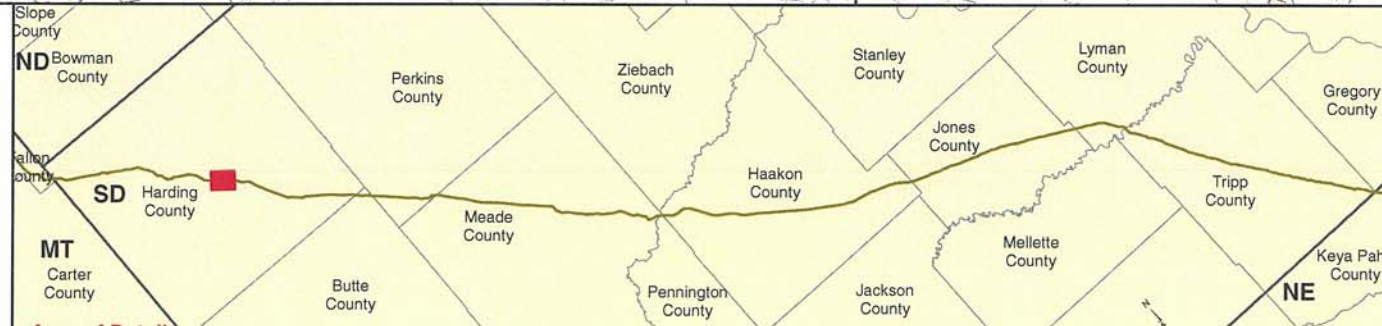
MAPBOOK 2  
SOIL MAP UNITS

MAP 07 OF 58





- Legend**
- Milepost
  - ⊗ Valve
  - Steele City Segment
  - Pump Station

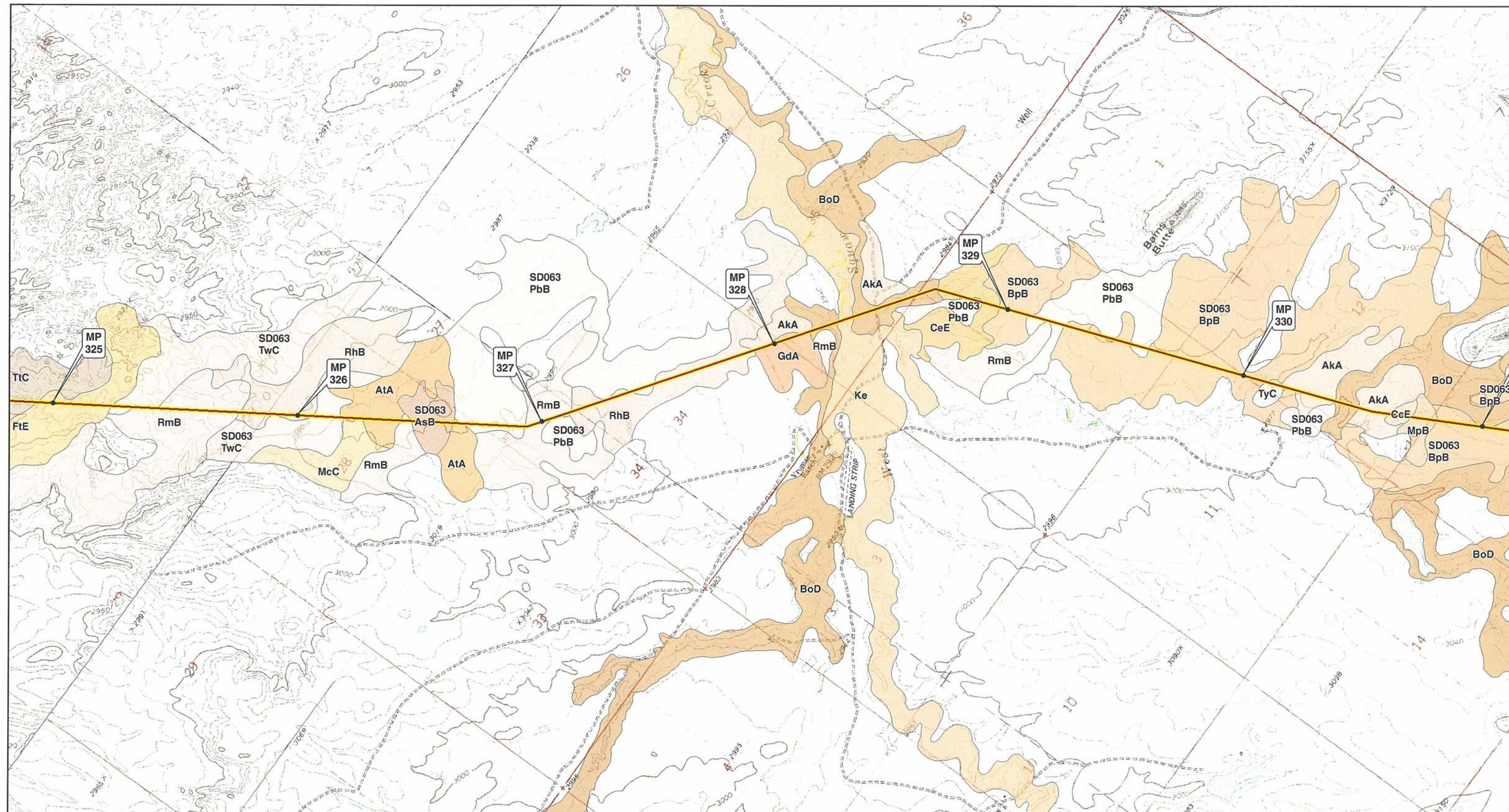


**SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT**

**MAPBOOK 2  
SOIL MAP UNITS**

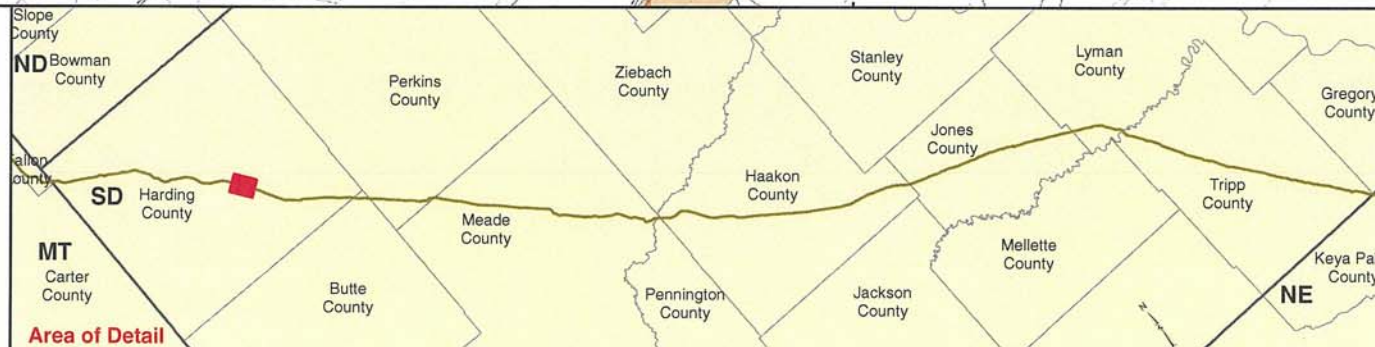
**MAP 08 OF 58**





## Legend

- Milepost
- ⊗ Valve
- Steele City Segment
- Pump Station



SOUTH DAKOTA STUDY AREA  
KEYSTONE XL PROJECT

MAPBOOK 2  
SOIL MAP UNITS

MAP 09 OF 58



Scale 1:24,000

