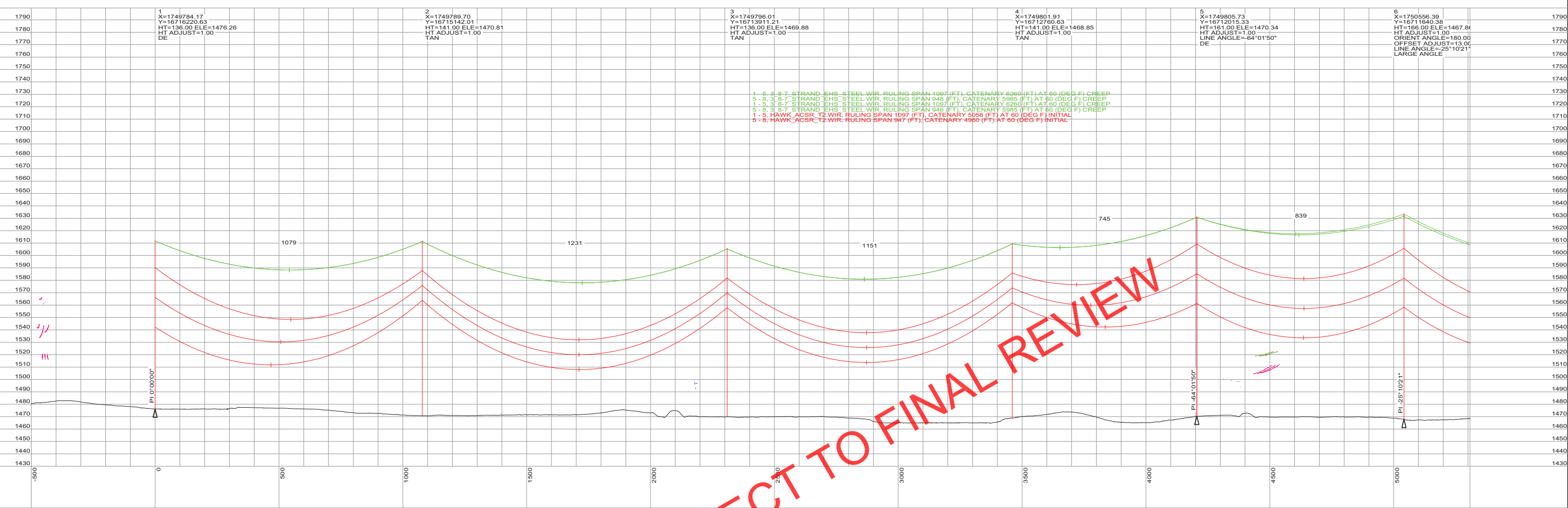


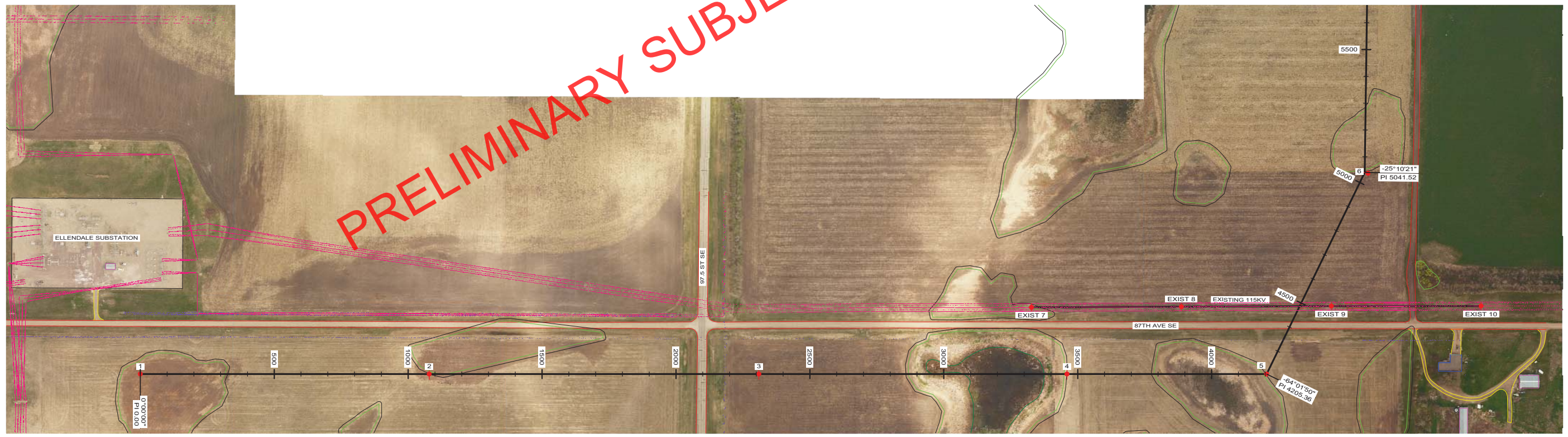
APPENDIX B

PLAN AND PROFILE

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PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



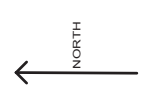
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F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

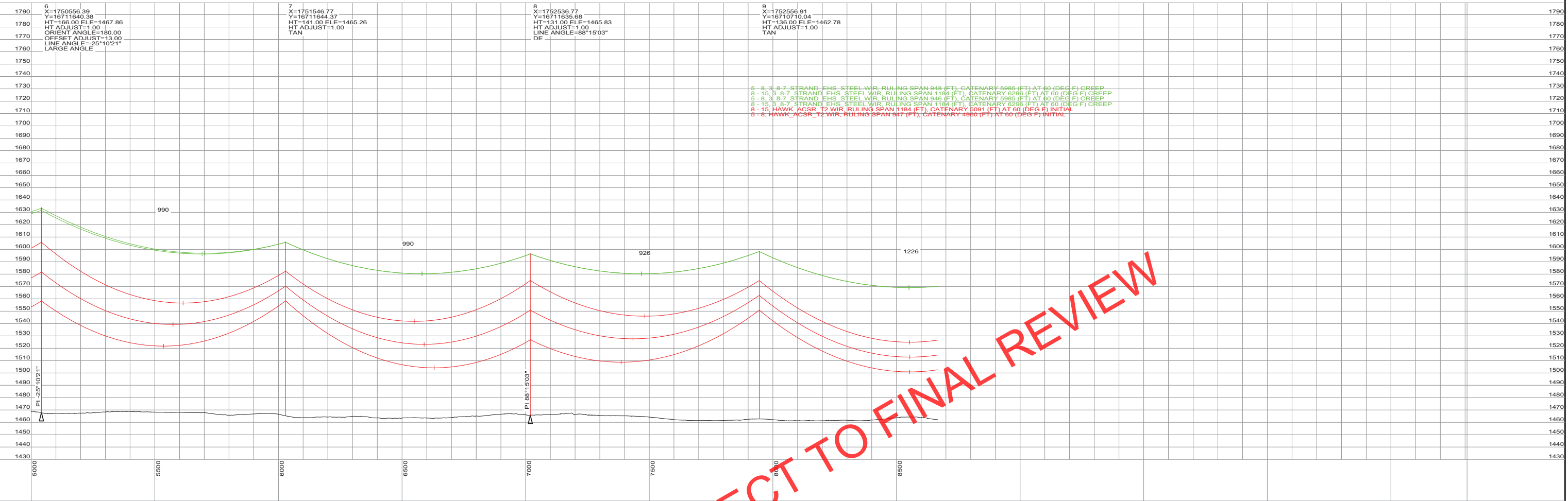
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CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR SHOWN: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



DWG. NO.
P1-1
REVISION: F
127156



6 - 8, 3 8-7 STRAND EHS STEEL WIR, RULING SPAN 948 (FT), CATENARY 6986 (FT) AT 60 (DEG F) CREEP
 8 - 15, 3 8-7 STRAND EHS STEEL WIR, RULING SPAN 1184 (FT), CATENARY 6296 (FT) AT 60 (DEG F) CREEP
 5 - 8, 3 8-7 STRAND EHS STEEL WIR, RULING SPAN 946 (FT), CATENARY 5985 (FT) AT 60 (DEG F) CREEP
 8 - 15, 3 8-7 STRAND EHS STEEL WIR, RULING SPAN 1184 (FT), CATENARY 6296 (FT) AT 60 (DEG F) CREEP
 8 - 15, HAWK ACSR 12 WIR, RULING SPAN 1184 (FT), CATENARY 5091 (FT) AT 60 (DEG F) INITIAL
 5 - 8, HAWK ACSR 12 WIR, RULING SPAN 947 (FT), CATENARY 4960 (FT) AT 60 (DEG F) INITIAL

PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	

BSS E
Big Stone South to Ellendale

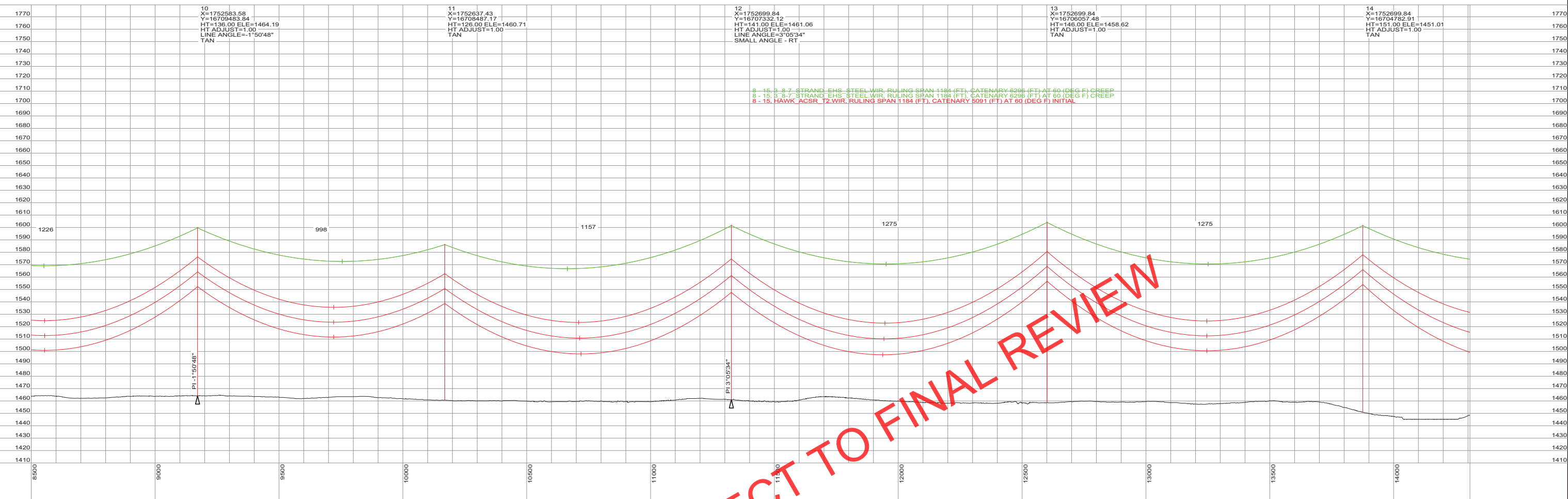
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

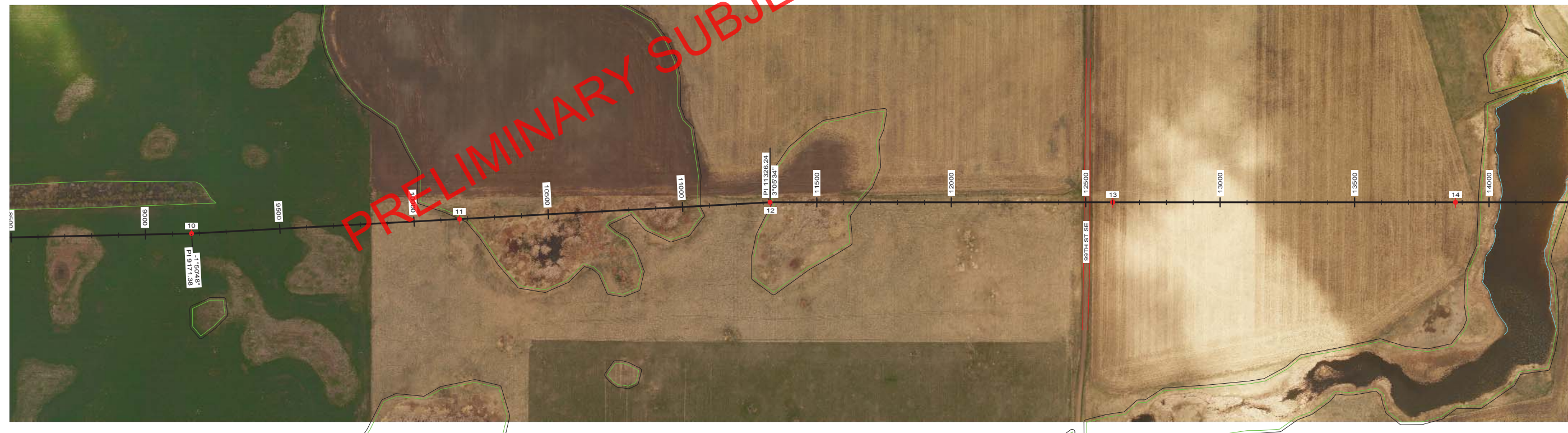
40.0 FT. VERT. SCALE

NORTH

DWG. NO.
P1-2
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13		DESIGN TENSION: 18% @ 0 F, FINAL	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13		SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13		DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13		MIN. GROUND CLEARANCE: 30 FT	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:	CONDUCTOR SHOWN: 212 F, MAX SAG	

DATE	DESIGN DATA
10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
10/04/13	DESIGN TENSION: 18% @ 0 F, FINAL
10/04/13	SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
10/04/13	DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
	MIN. GROUND CLEARANCE: 30 FT
	CONDUCTOR SHOWN: 212 F, MAX SAG
	COORDINATE SYSTEM: UTM ZONE 14N, US FT



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

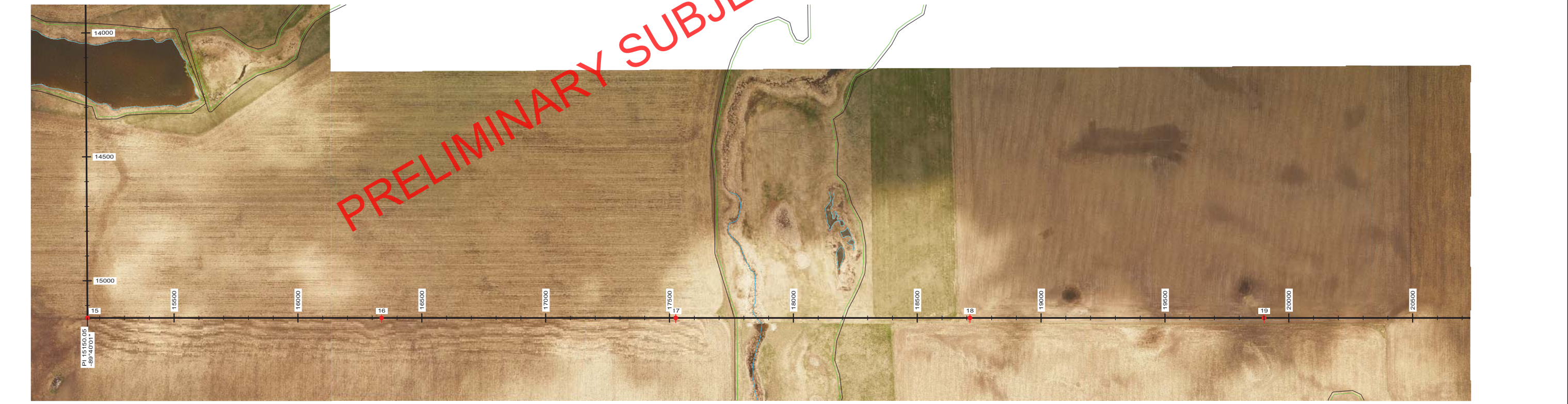
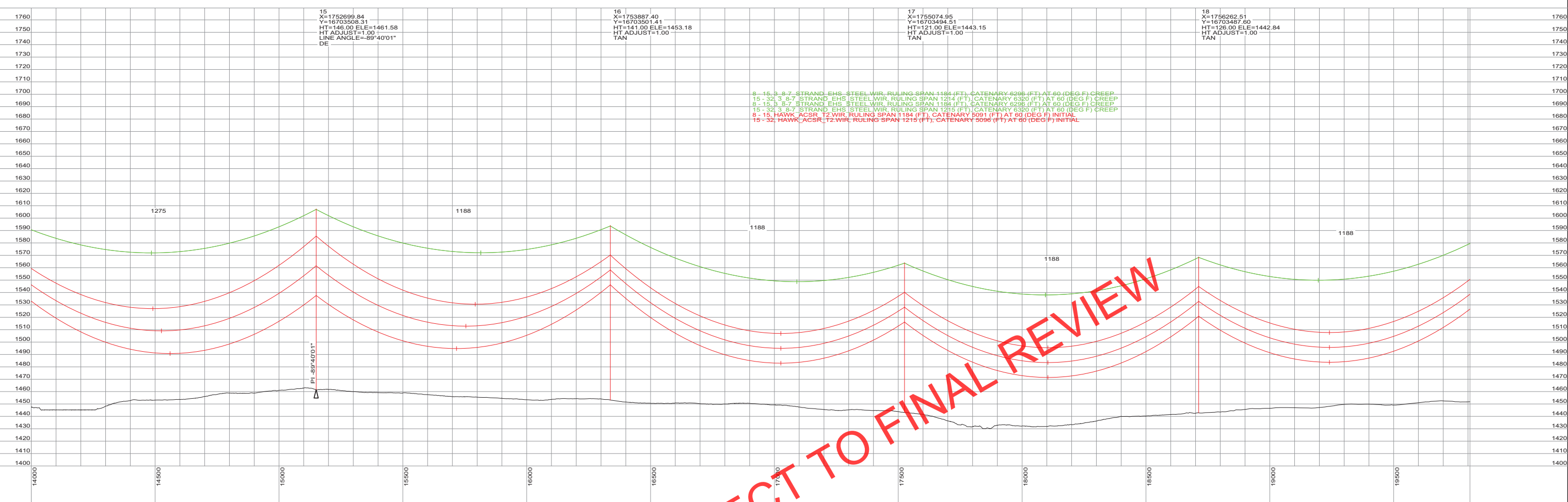
200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-3
REVISION: F

127156



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013



REV	DESCRIPTION	DWN	DGN	CHK	DATE
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

DESIGN DATA
CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR SHOWN: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



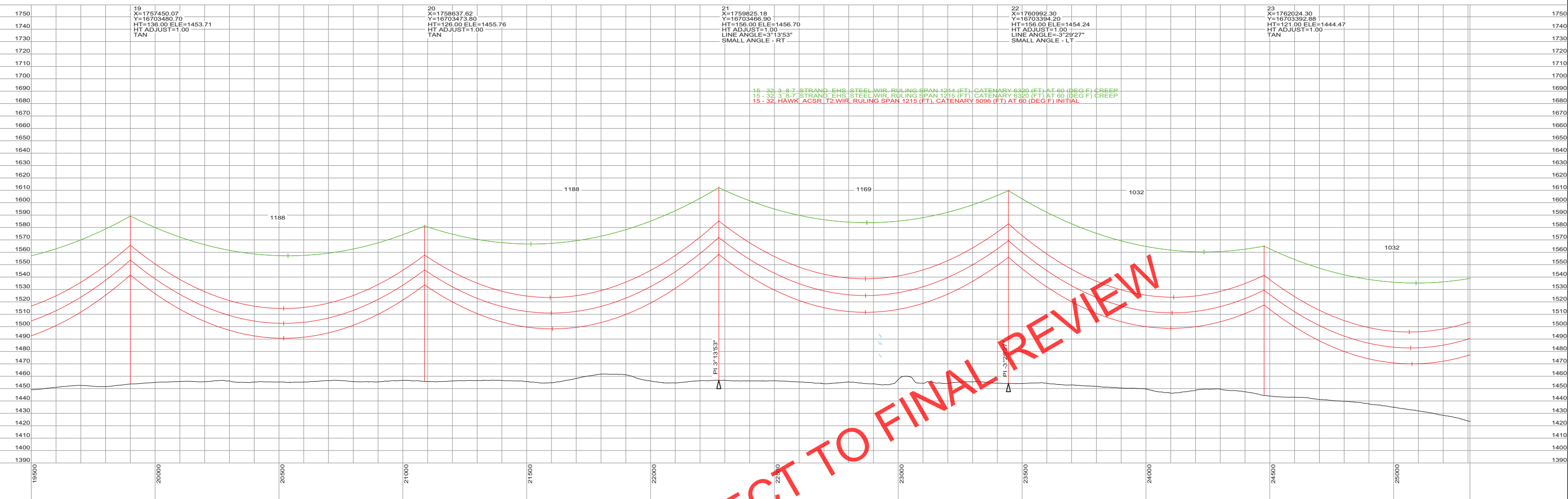
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-4
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**

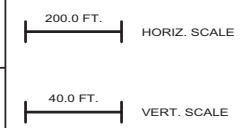


REVISIONS					
REV	DESCRIPTION	DWN	DGN	CHK	DATE
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

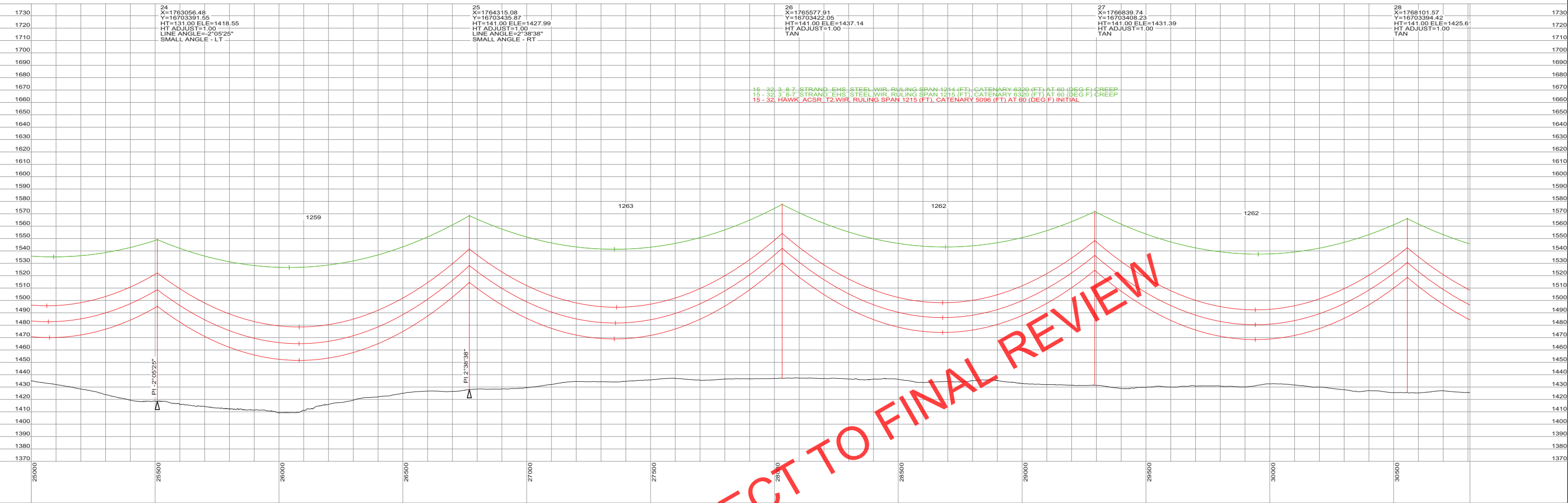
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DESIGN BY:	JRC	10/04/13	
CHECKED BY:	SMH	10/04/13	
APPROVED BY:			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



DWG. NO.
P1-5
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW 10/04/2013

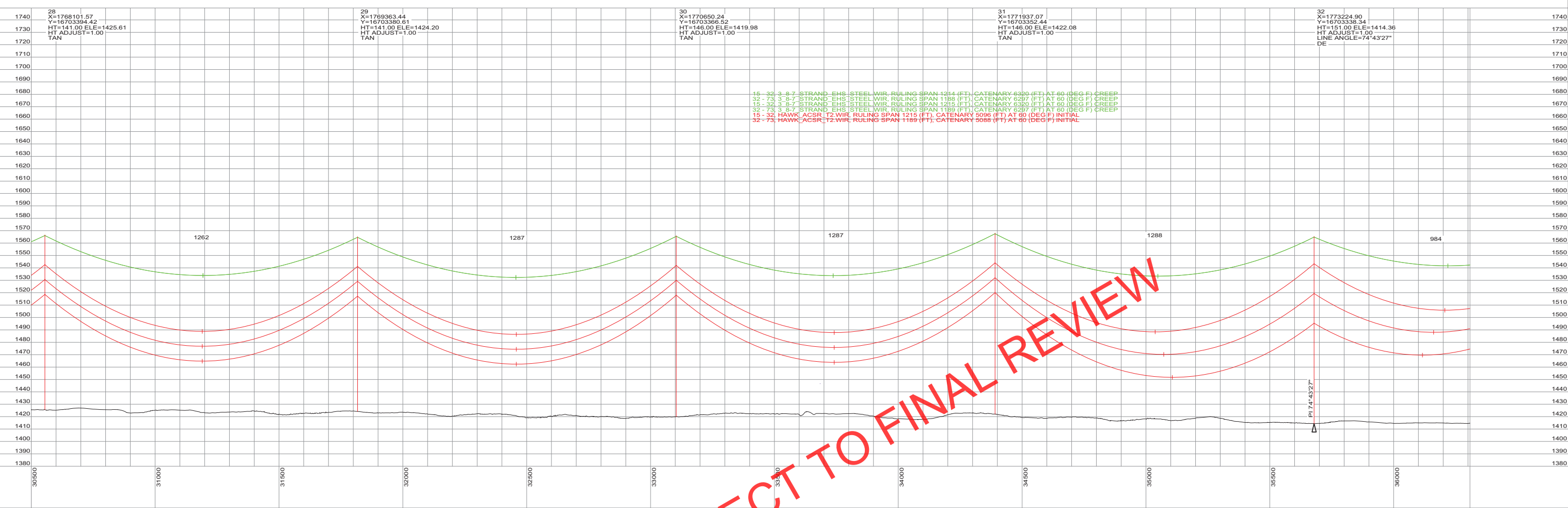
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:

**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

NORTH

DWG. NO. P1-6
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



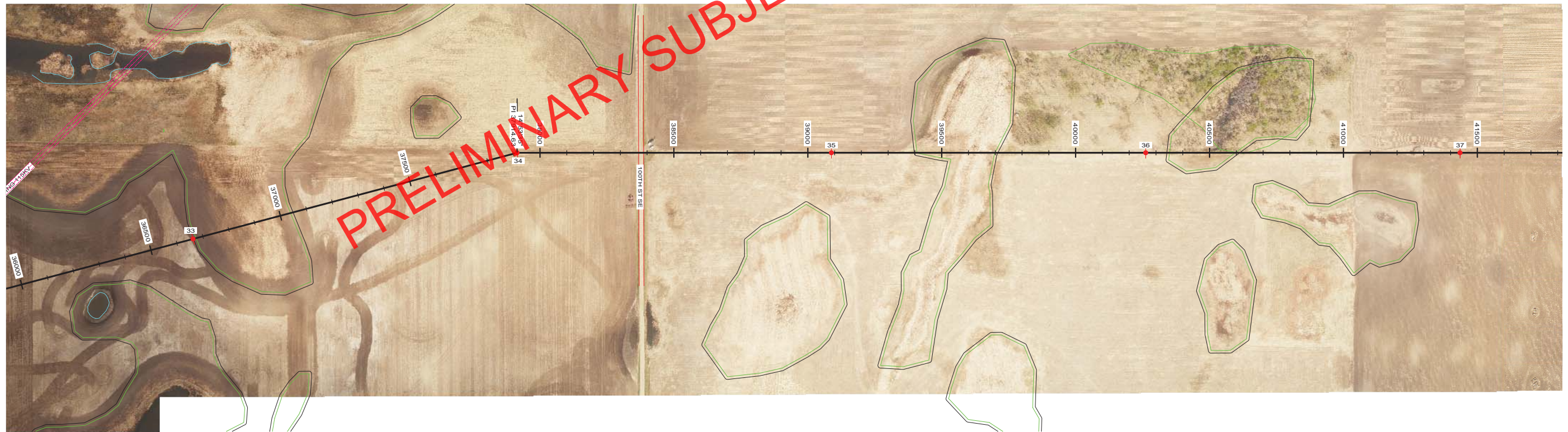
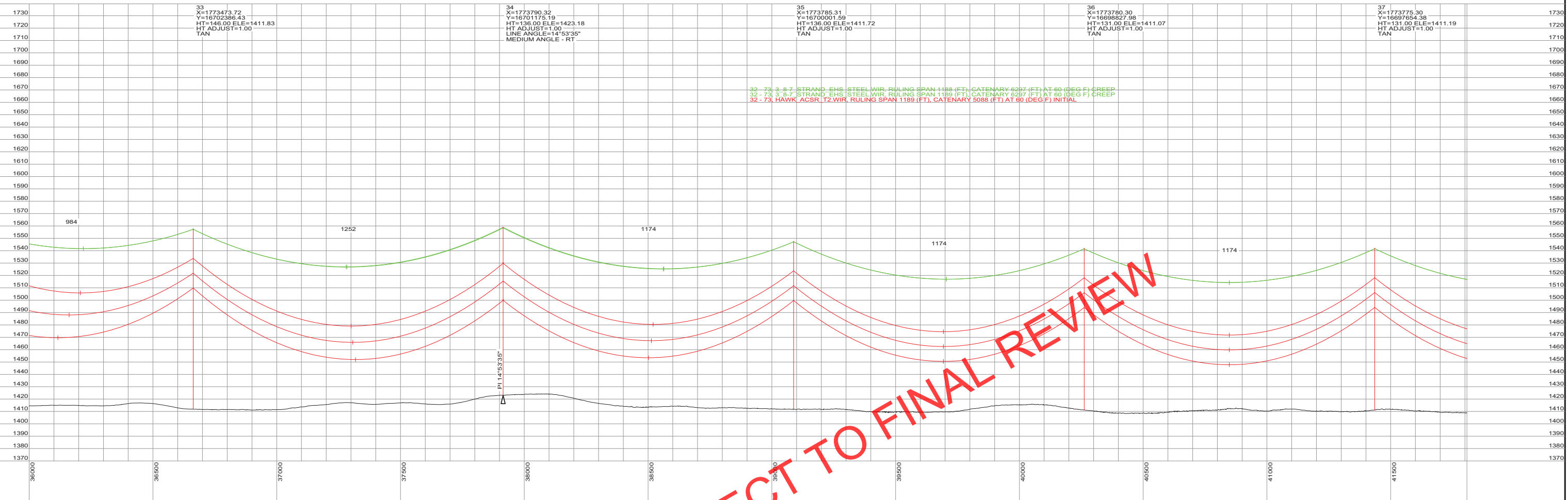
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13		DESIGN TENSION: 18% @ 0 F, FINAL	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13		SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13		DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13		MIN. GROUND CLEARANCE: 30 FT	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:	CONDUCTOR SHOWN: 212 F, MAX SAG	
							COORDINATE SYSTEM: UTM ZONE 14N, US FT	

BSS E
Big Stone South to Ellendale

**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



DWG. NO.
P1-7
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
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B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	

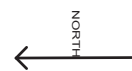
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DESIGN BY: JRC	10/04/13	DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG
CHECKED BY: SMH	10/04/13	COORDINATE SYSTEM: UTM ZONE 14N, US FT



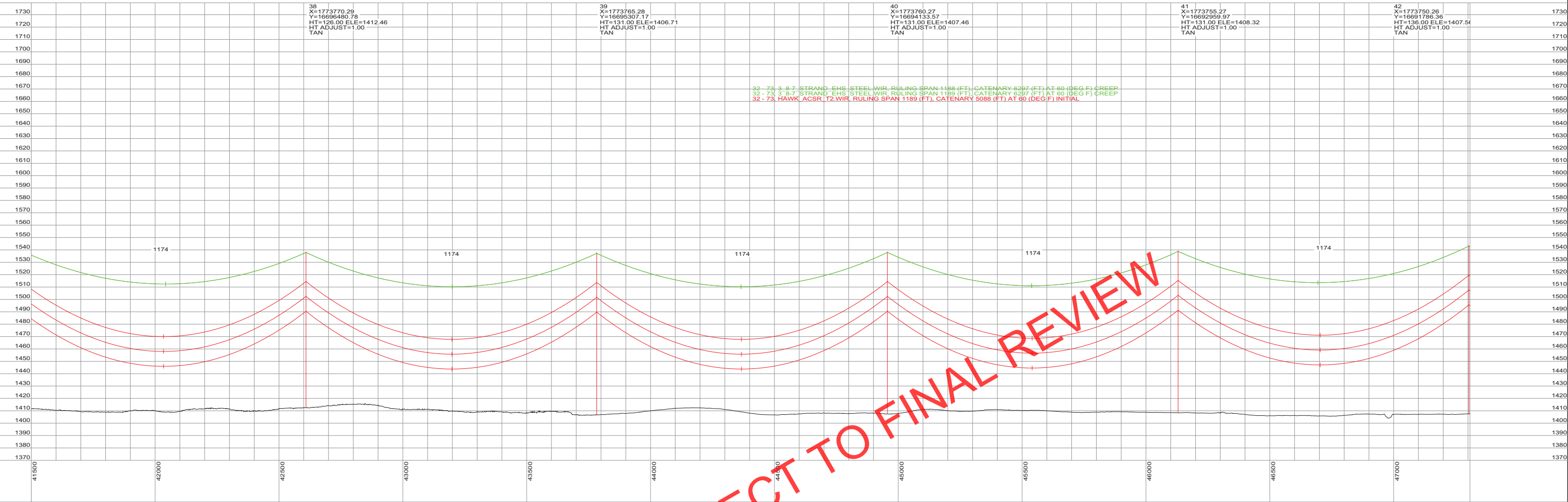
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



**DWG. NO.
P1-8
REVISION: F
127156**



32 - 73 3 # 7 STRAND EHS STEEL WIR, RULING SPAN 1188 (FT), CATENARY 6287 (FT) AT 60 (DEG F) CREEP
 32 - 73 3 # 7 STRAND EHS STEEL WIR, RULING SPAN 1189 (FT), CATENARY 6287 (FT) AT 60 (DEG F) CREEP
 32 - 73 HAWK ACSR T2 WIR, RULING SPAN 1189 (FT), CATENARY 5088 (FT) AT 60 (DEG F) INITIAL

PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



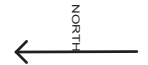
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



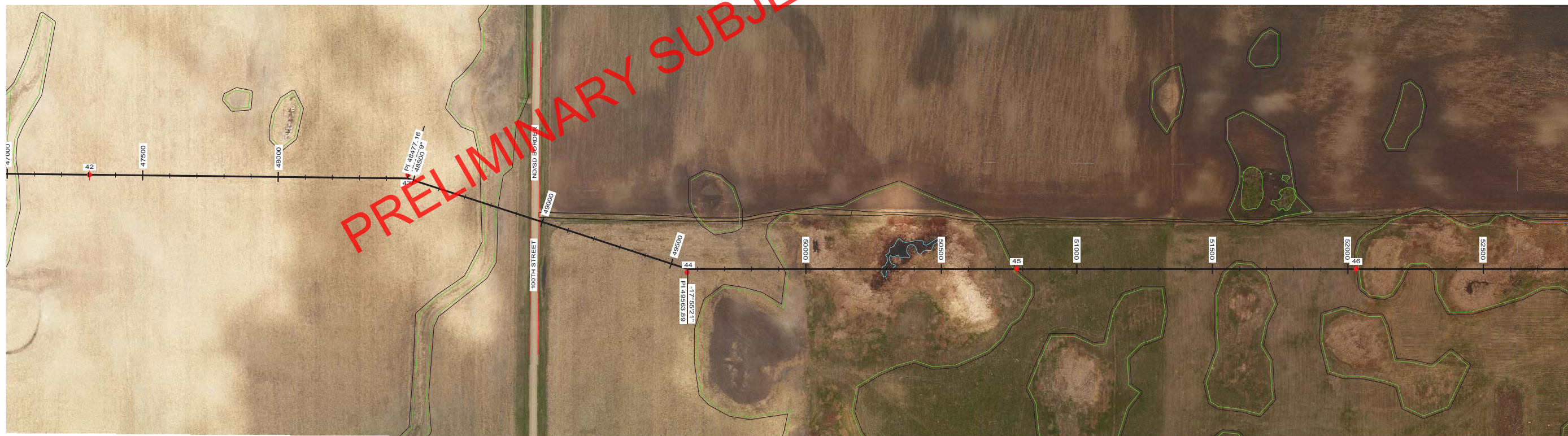
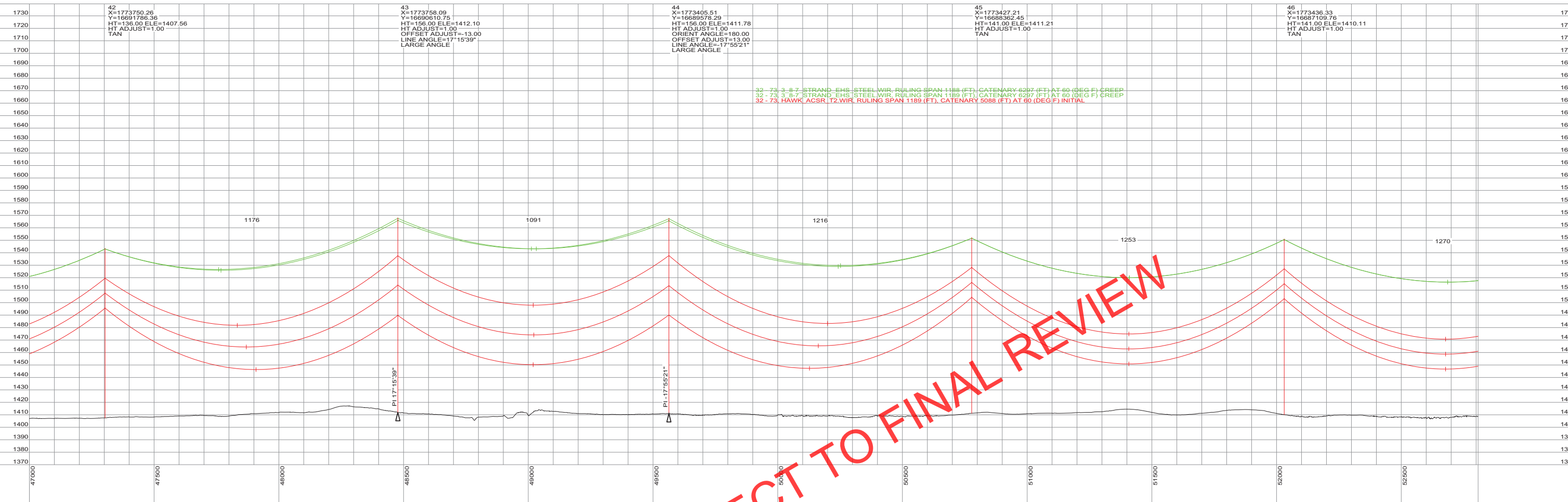
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



**DWG. NO.
P1-9
REVISION: F
127156**



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013



REVISIONS				
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH 09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH 09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH 08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH 06/28/13
REV	DESCRIPTION	DWN	DGN	CHK DATE

APPROVALS		DATE
DRAWN BY:	JRC	10/04/13
DESIGN BY:	JRC	10/04/13
CHECKED BY:	SMH	10/04/13
APPROVED BY:		

DESIGN DATA	
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DESIGN TENSION:	18% @ 0 F, FINAL
SHIELD WIRE:	2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION:	75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE:	30 FT
CONDUCTOR CLEARANCE:	212 F, MAX SAG
COORDINATE SYSTEM:	UTM ZONE 14N, US FT



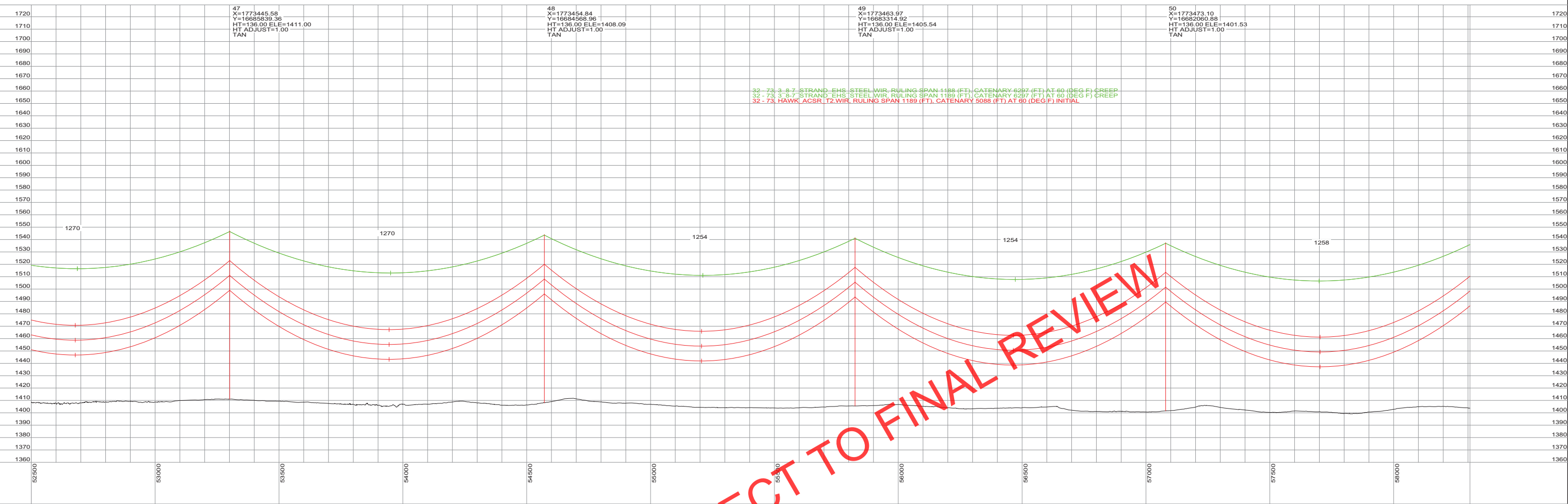
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-10
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
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E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



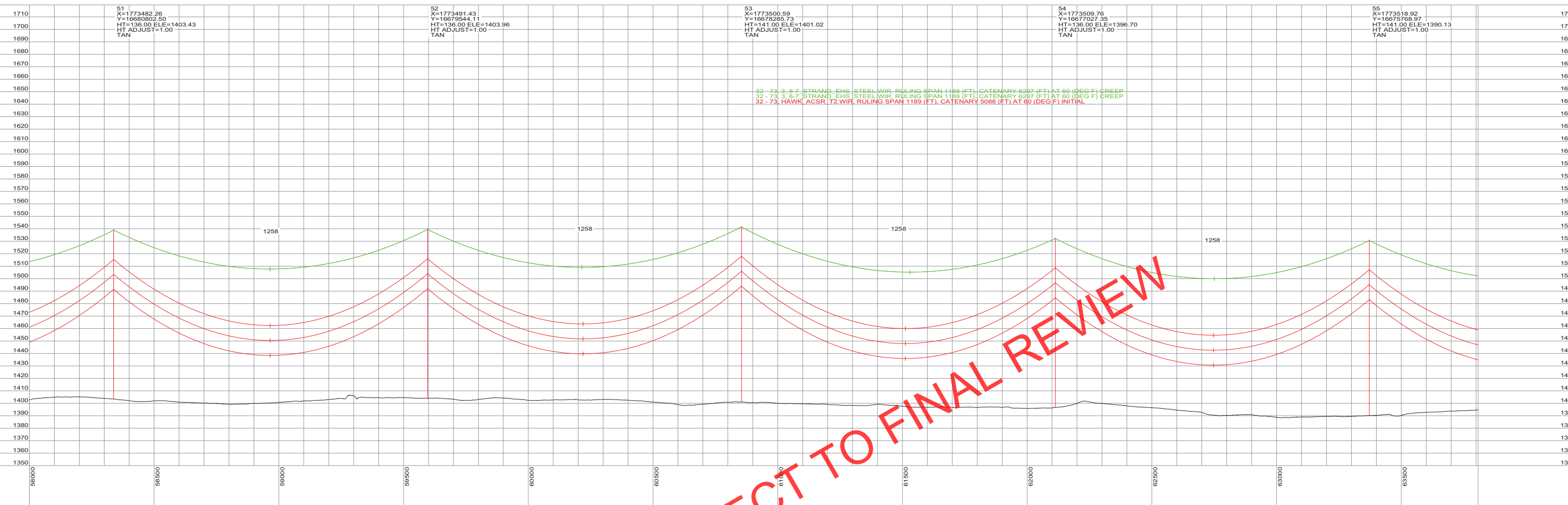
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



**DWG. NO.
P1-11
REVISION: F
127156**



51
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Y=16680802.50
HT=136.00 ELE=1403.43
HT ADJUST=1.00
TAN

52
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Y=16679544.11
HT=136.00 ELE=1403.96
HT ADJUST=1.00
TAN

53
X=1773500.59
Y=16678285.73
HT=141.00 ELE=1401.02
HT ADJUST=1.00
TAN

54
X=1773509.76
Y=16677027.35
HT=136.00 ELE=1396.70
HT ADJUST=1.00
TAN

55
X=1773518.92
Y=16675768.97
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HT ADJUST=1.00
TAN

32 - 73, 3 # 7, STRAND EHS, STEEL WIR, RULING SPAN 1188 (FT), CATENARY 6297 (FT) AT 60 (DEG F) CREEP
32 - 73, 3 # 7, STRAND EHS, STEEL WIR, RULING SPAN 1189 (FT), CATENARY 6297 (FT) AT 60 (DEG F) CREEP
32 - 73, HAWK ACSR, T2 WIR, RULING SPAN 1189 (FT), CATENARY 5088 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013



REVISIONS				
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH 10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH 09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH 09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH 08/22/13
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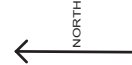
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DESIGN BY:	JRC	10/04/13	
CHECKED BY:	SMH	10/04/13	
APPROVED BY:			



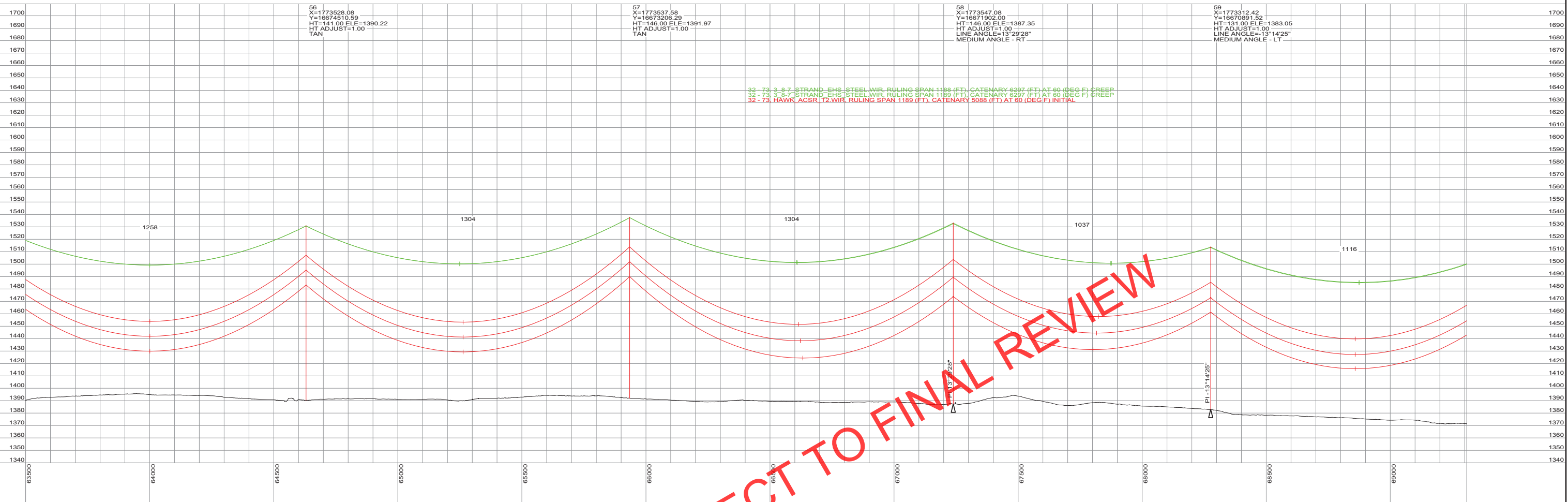
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

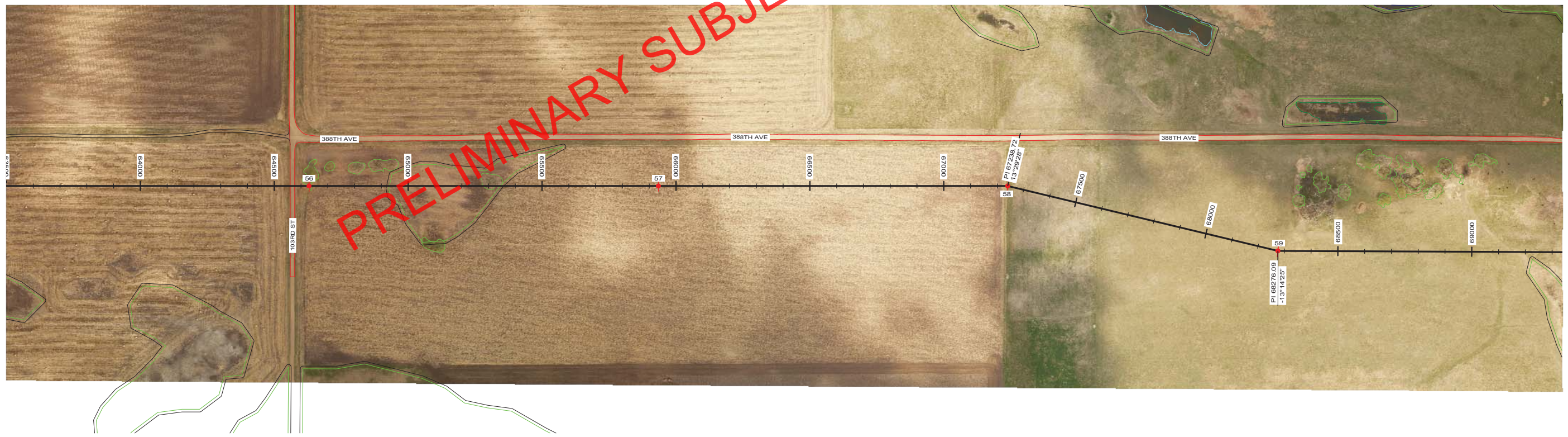
40.0 FT. VERT. SCALE



DWG. NO.
P1-12
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



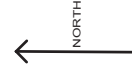
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

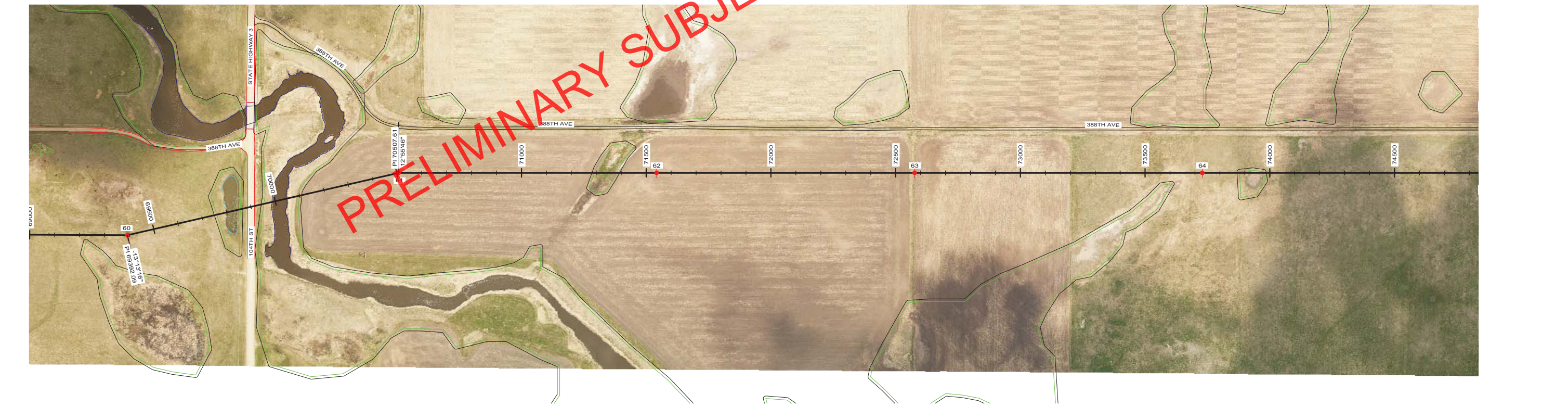
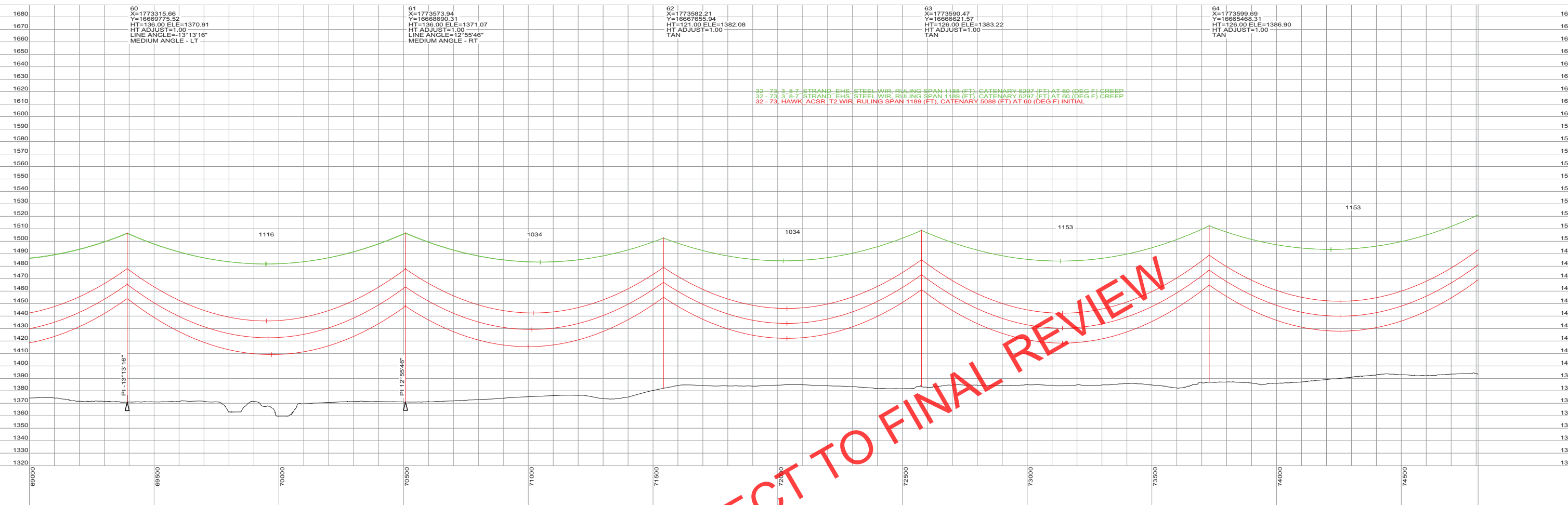
200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-13
REVISION: F

127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

BSS E
Big Stone South to Ellendale

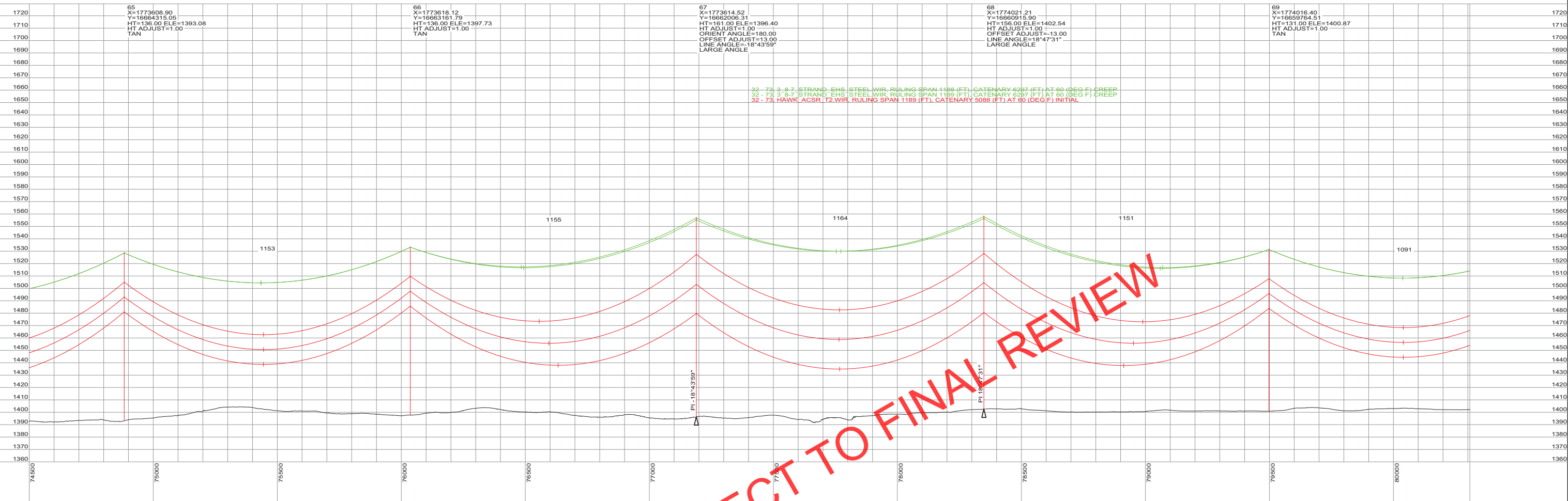
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE

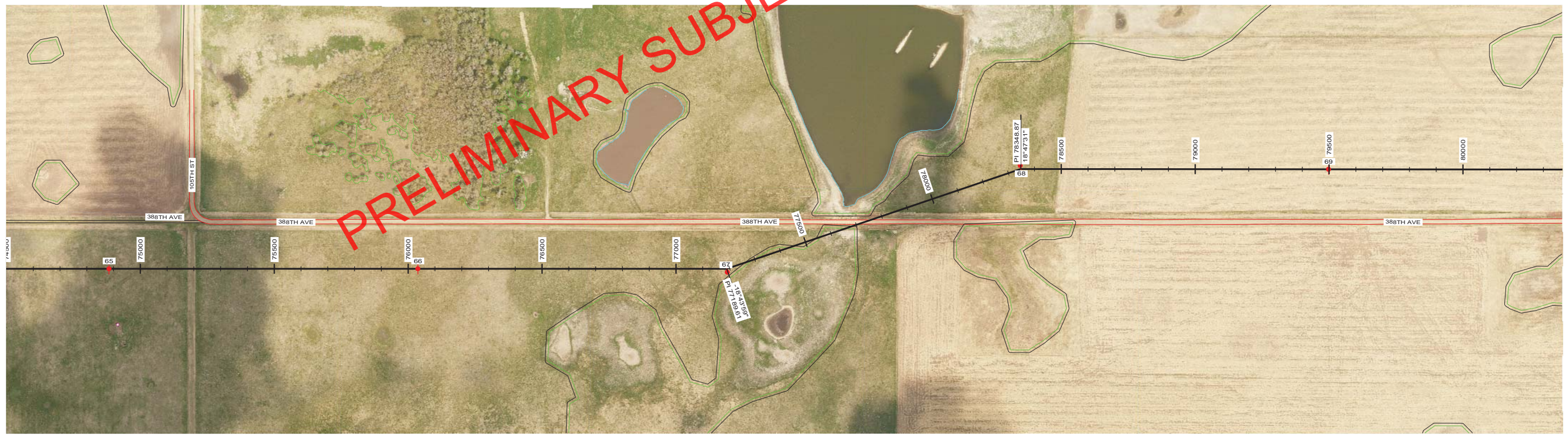
NORTH

DWG. NO.
P1-14
REVISION: F
127156



32 - 73 3 - 8.7 STRAND EHS STEEL WIR, RULING SPAN 1188 (FT), CATENARY 6287 (FT) AT 60 (DEG F) CREEP
 32 - 73 3 - 8.7 STRAND EHS STEEL WIR, RULING SPAN 1189 (FT), CATENARY 6287 (FT) AT 60 (DEG F) CREEP
 32 - 73 HAWK ACSR T2 WIR, RULING SPAN 1189 (FT), CATENARY 5088 (FT) AT 60 (DEG F) INITIAL

PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

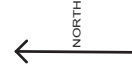
DESIGN DATA
CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR CLEARANCE: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



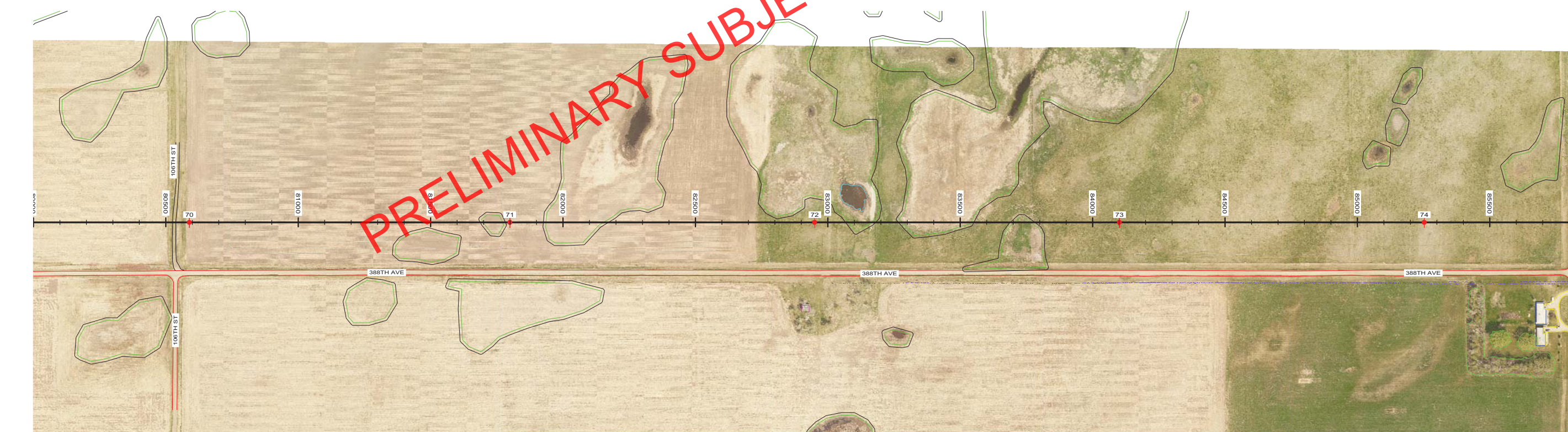
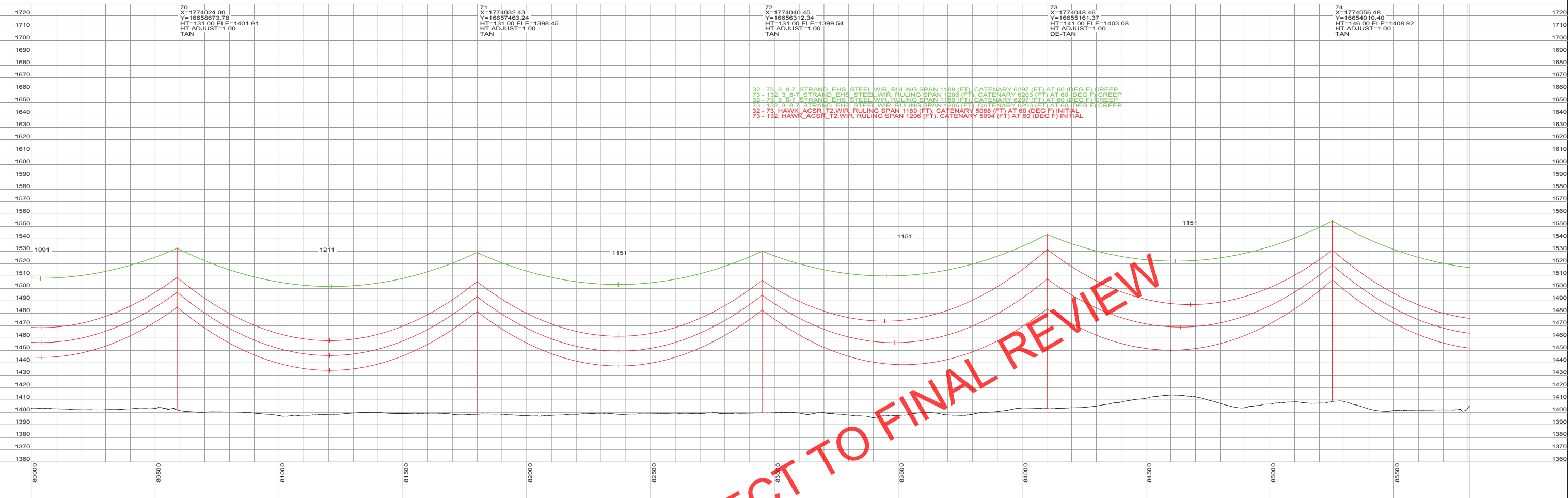
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-15
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**

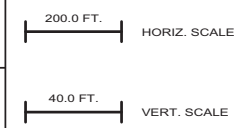


REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

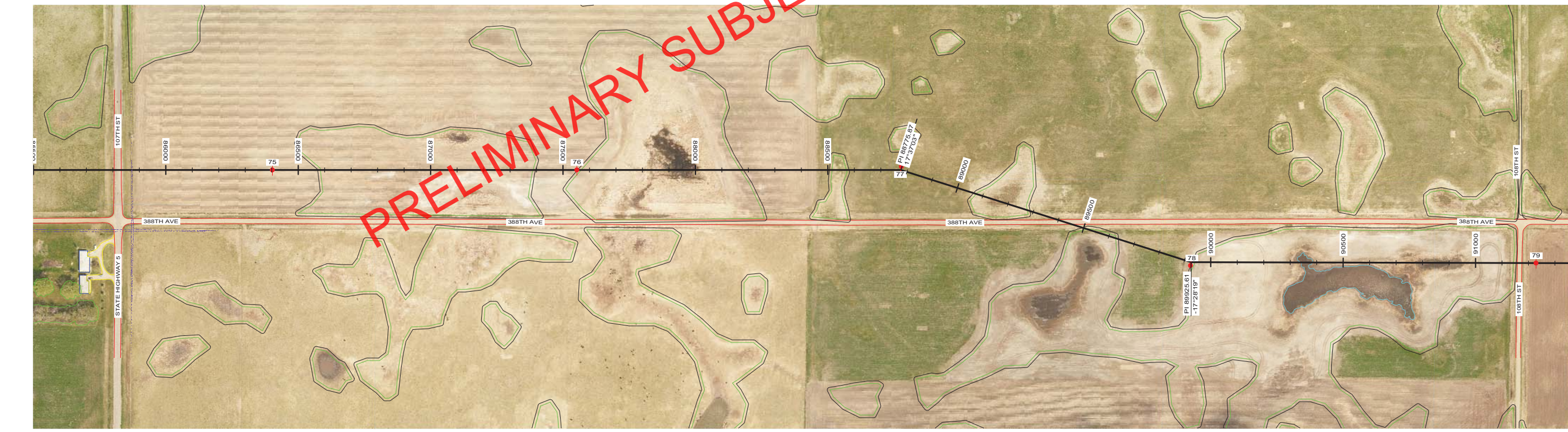
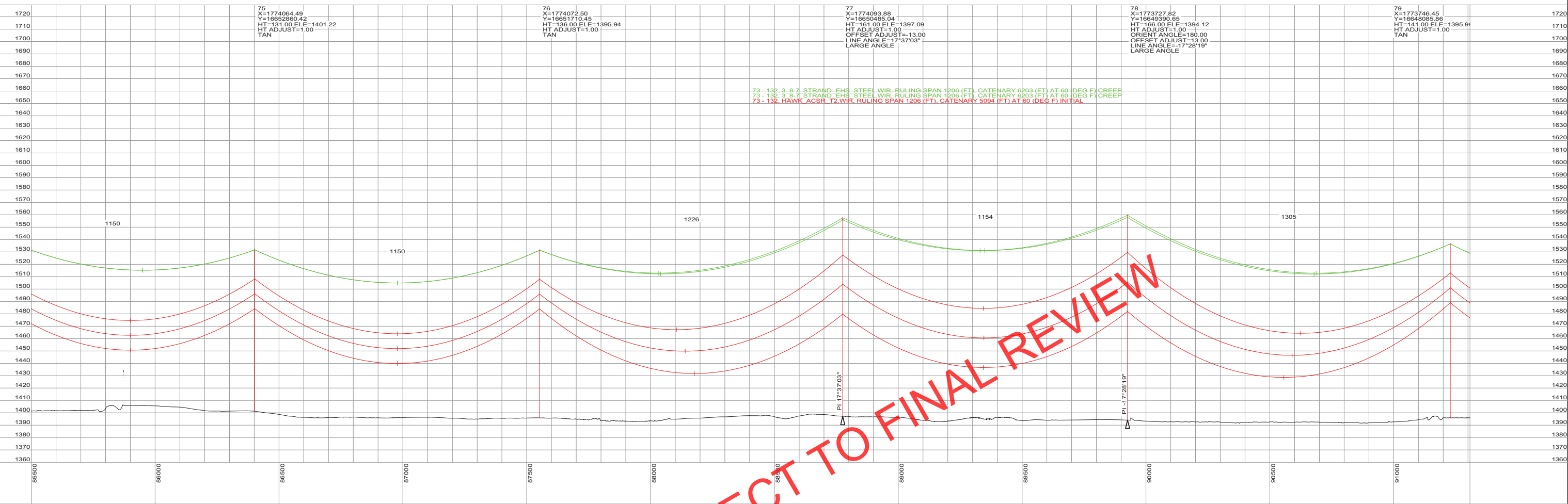
APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY: JRC	10/04/13	
CHECKED BY: SMH	10/04/13	
APPROVED BY:		



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-16
REVISION: F
127156**



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	

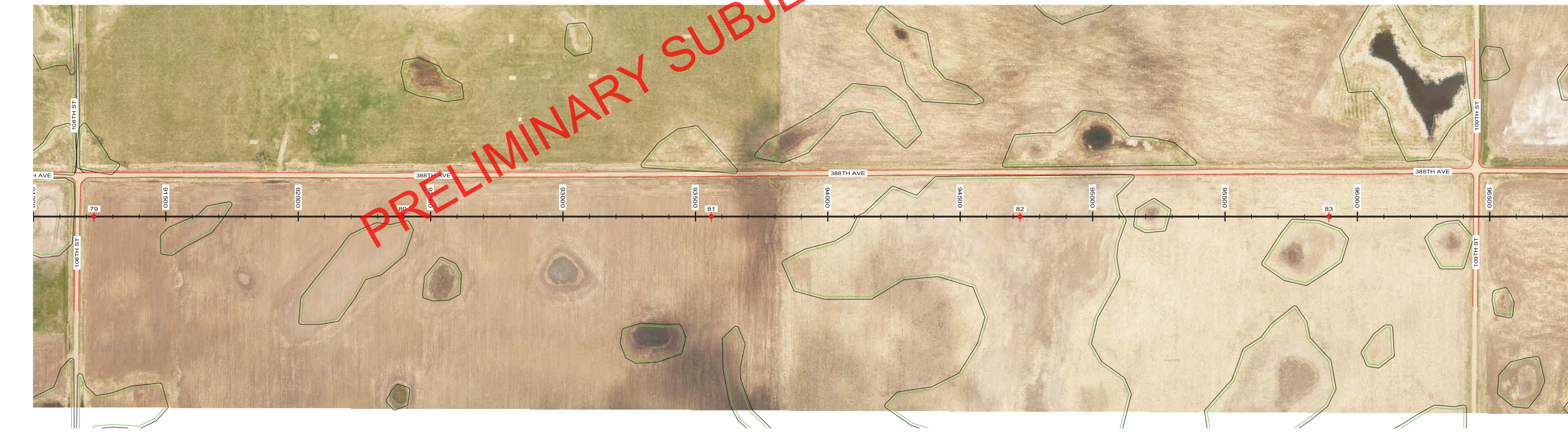
APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY: JRC	10/04/13	
CHECKED BY: SMH	10/04/13	
APPROVED BY:		



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-17
REVISION: F
127156**



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

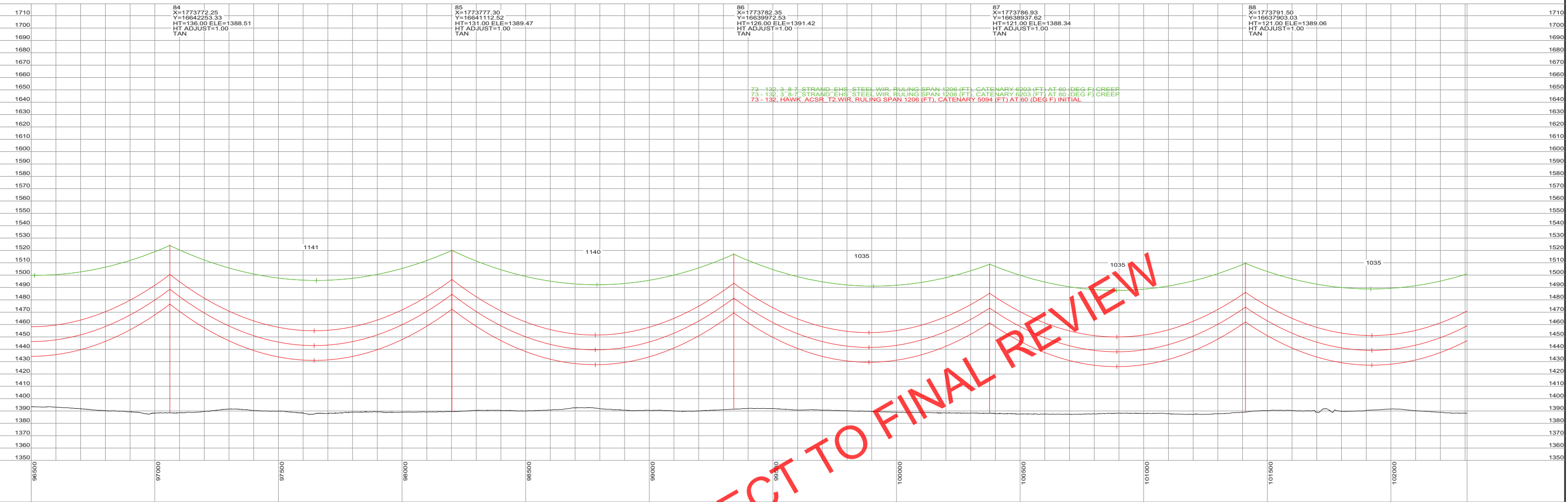
200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-18
REVISION: F

127156



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Y=16842253.33
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HT ADJUST=1.00
TAN

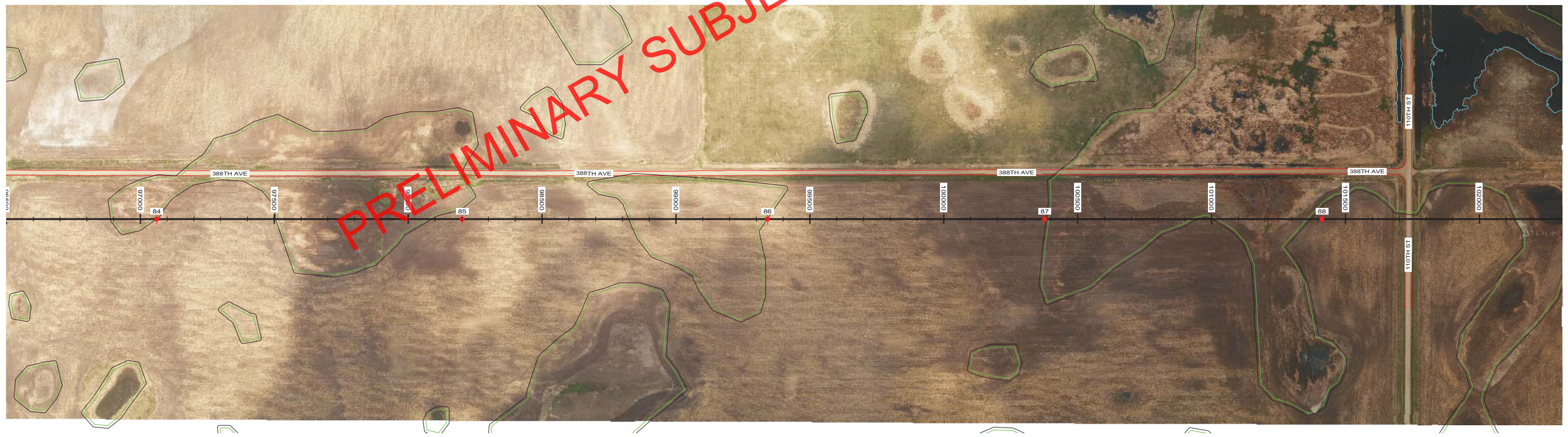
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HT=131.00 ELE=1389.47
HT ADJUST=1.00
TAN

86
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Y=16839972.53
HT=126.00 ELE=1391.42
HT ADJUST=1.00
TAN

87
X=1773786.93
Y=16838937.92
HT=121.00 ELE=1388.34
HT ADJUST=1.00
TAN

88
X=1773791.50
Y=16837903.03
HT=121.00 ELE=1389.06
HT ADJUST=1.00
TAN

73 - 132, 3 - 8-7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
73 - 132, 3 - 8-7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
73 - 132, HAWK ACSR T2 WIR, RULING SPAN 1206 (FT), CATENARY 5094 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013



REVISIONS				
REV	DESCRIPTION	DWN	DGN	CHK
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH

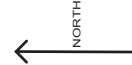
APPROVALS		DATE	DESIGN DATA
DRAWN BY:	JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY:	JRC	10/04/13	
CHECKED BY:	SMH	10/04/13	
APPROVED BY:			



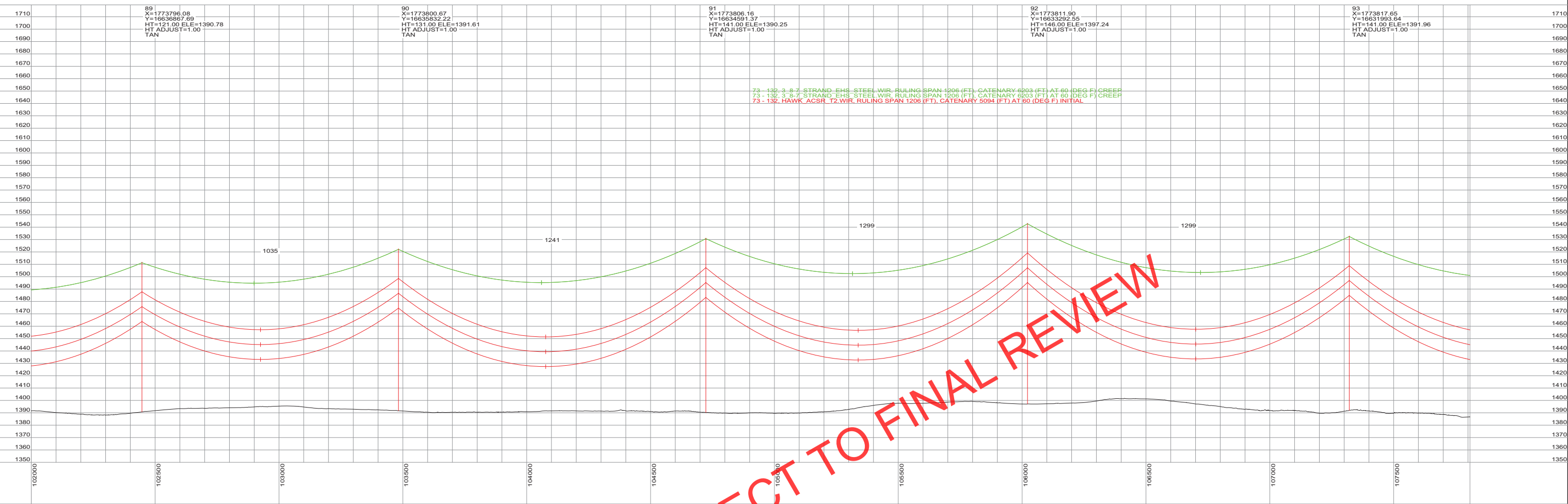
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-19
REVISION: F
127156



73 - 132, 3-8-7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
 73 - 132, 3-8-7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
 73 - 132, HAWK ACSR T2 WIR, RULING SPAN 1206 (FT), CATENARY 5094 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
 SUBJECT TO
 FINAL REVIEW
 10/04/2013



REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	

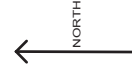
APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY: JRC	10/04/13	
CHECKED BY: SMH	10/04/13	
APPROVED BY:		



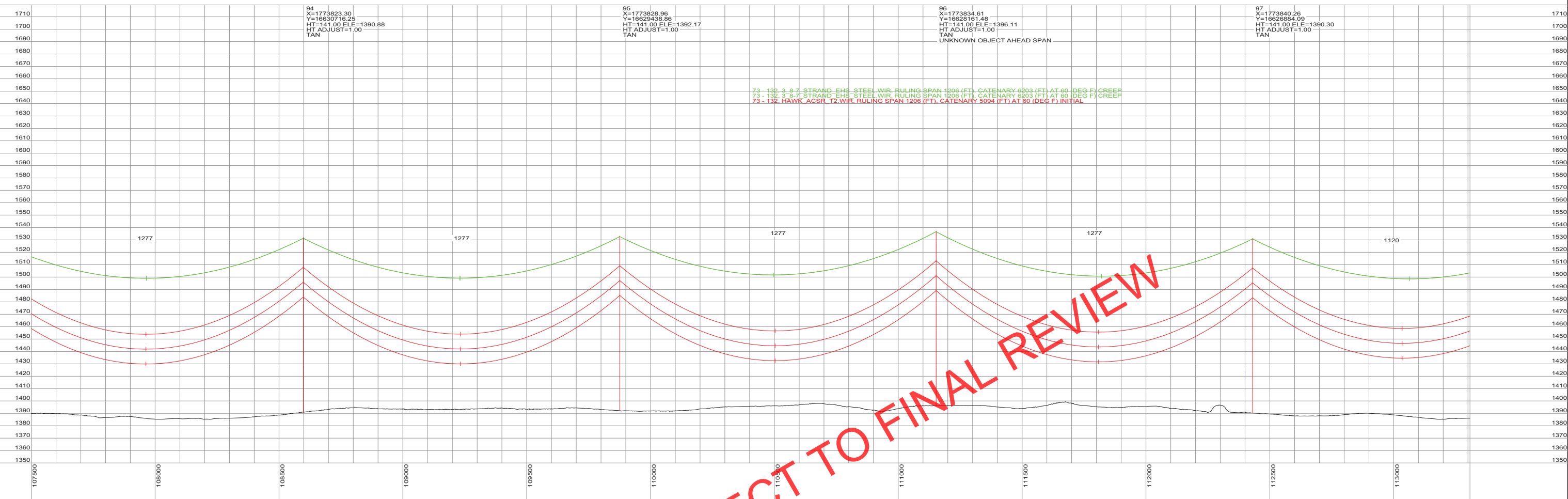
BIG STONE SOUTH - ELLENDALE
 345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
 P1-20
 REVISION: F
 127156



94 X=1773823.30 Y=16630718.25 HT=141.00 ELE=1390.88 HT_ADJUST=1.00 TAN
 95 X=1773828.96 Y=16629438.96 HT=141.00 ELE=1392.17 HT_ADJUST=1.00 TAN
 96 X=1773834.61 Y=16628161.48 HT=141.00 ELE=1396.11 HT_ADJUST=1.00 TAN UNKNOWN OBJECT AHEAD SPAN
 97 X=1773840.26 Y=16626884.09 HT=141.00 ELE=1390.30 HT_ADJUST=1.00 TAN

73 - 132, 3 - 8 - 7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
 73 - 132, 3 - 8 - 7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
 73 - 132, HAWK ACSR T2 WIR, RULING SPAN 1206 (FT), CATENARY 5094 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
 SUBJECT TO
 FINAL REVIEW
 10/04/2013



REVISIONS					APPROVALS	DATE	DESIGN DATA	
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



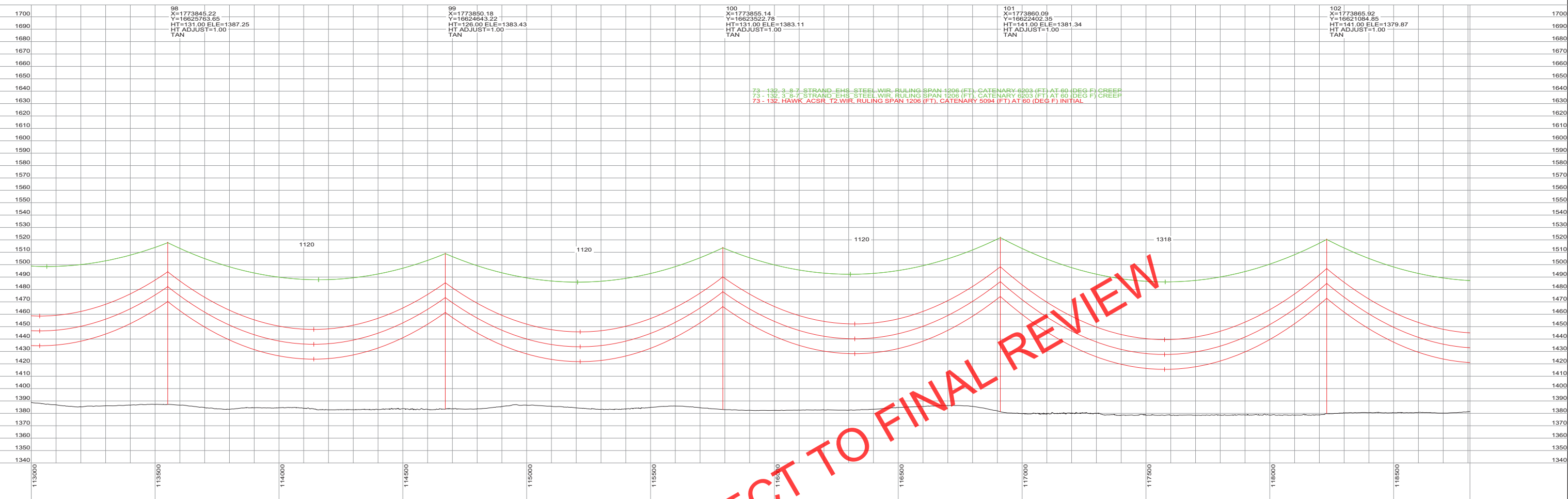
BIG STONE SOUTH - ELLENDALE
 345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
 P1-21
 REVISION: F
 127156



98
X=1773845.22
Y=16823783.65
HT=131.00 ELE=1387.25
HT ADJUST=1.00
TAN

99
X=1773850.18
Y=16824643.22
HT=126.00 ELE=1383.43
HT ADJUST=1.00
TAN

100
X=1773855.14
Y=16824402.78
HT=131.00 ELE=1383.11
HT ADJUST=1.00
TAN

101
X=1773860.09
Y=16824002.35
HT=141.00 ELE=1381.34
HT ADJUST=1.00
TAN

102
X=1773865.92
Y=16821084.85
HT=141.00 ELE=1379.87
HT ADJUST=1.00
TAN

73 - 132, 3 - 8 - 7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
73 - 132, 3 - 8 - 7 STRAND EHS STEEL WIR, RULING SPAN 1206 (FT), CATENARY 6203 (FT) AT 60 (DEG F) CREEP
73 - 132, HAWK ACSR T2 WIR, RULING SPAN 1206 (FT), CATENARY 5094 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013



REVISIONS			
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC
D	REISSUED FOR ND REVIEW	JRC	JRC
C	REISSUED FOR ND REVIEW	JRC	JRC
B	ISSUED FOR ND REVIEW	JRC	JRC
REV	DESCRIPTION	DWN	DGN

APPROVALS		DATE
DRAWN BY:	JRC	10/04/13
DESIGN BY:	JRC	10/04/13
CHECKED BY:	SMH	10/04/13
APPROVED BY:		

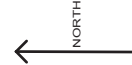
DESIGN DATA	
CONDUCTOR:	(2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION:	18% @ 0 F, FINAL
SHIELD WIRE:	2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION:	75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE:	30 FT
CONDUCTOR SHOWN:	212 F, MAX SAG
COORDINATOR SYSTEM:	UTM ZONE 14N, US FT



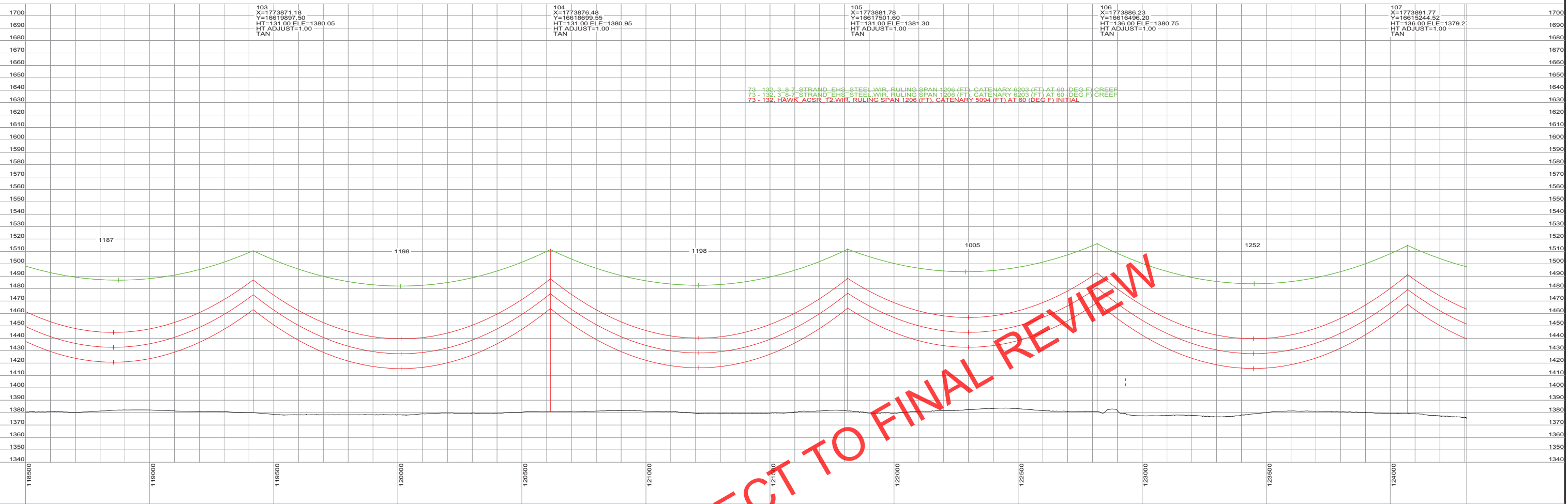
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-22
REVISION: F
127156



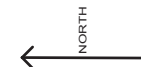
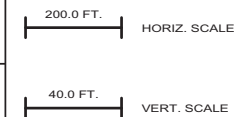
**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



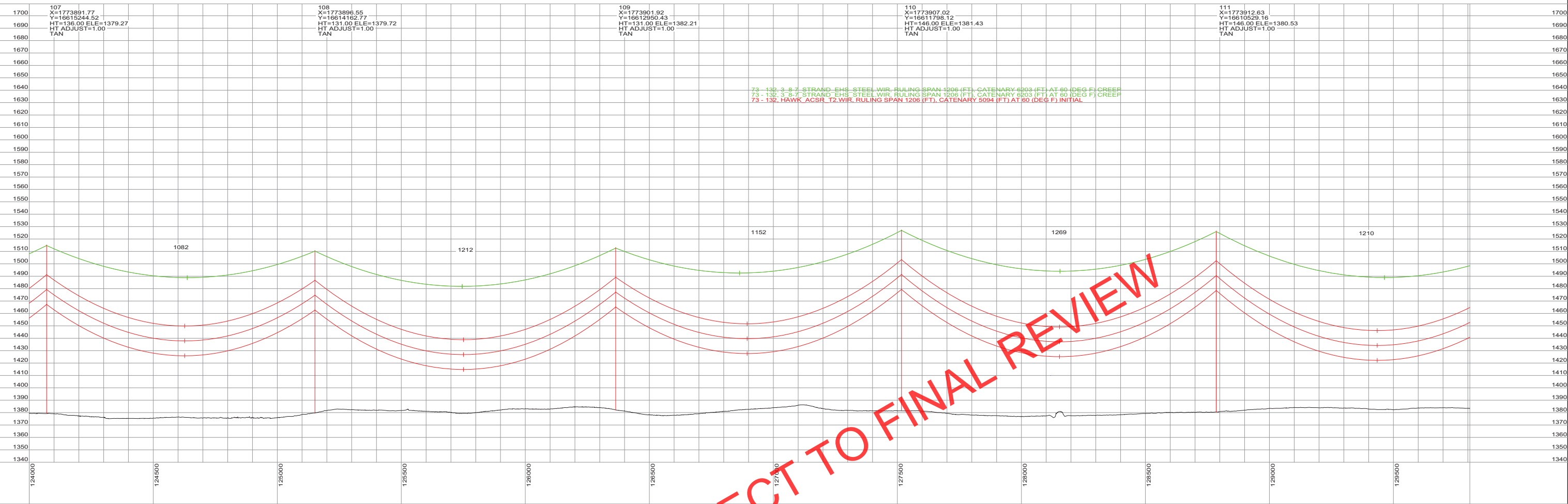
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-23
REVISION: F
127156**



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



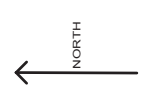
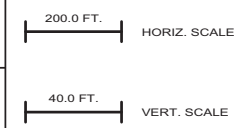
REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
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DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

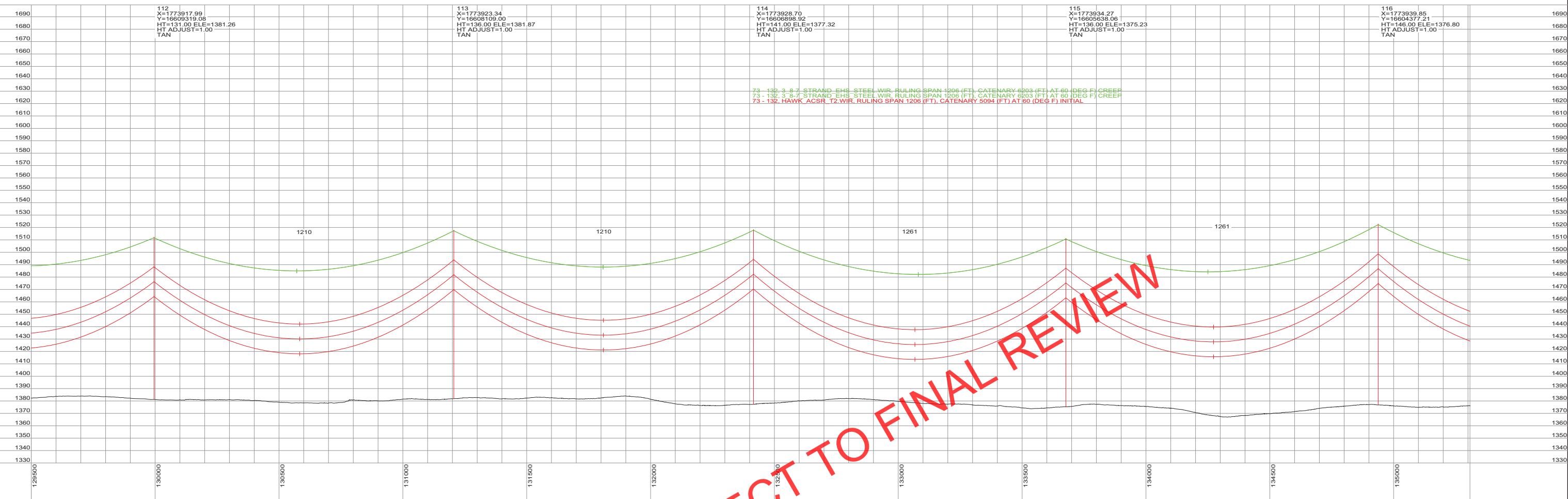
DESIGN DATA
CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR SHOWN: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-24
REVISION: F
127156**



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13		DESIGN TENSION: 18% @ 0 F, FINAL	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13		SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13		DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13		MIN. GROUND CLEARANCE: 30 FT	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:	CONDUCTOR SHOWN: 212 F, MAX SAG	

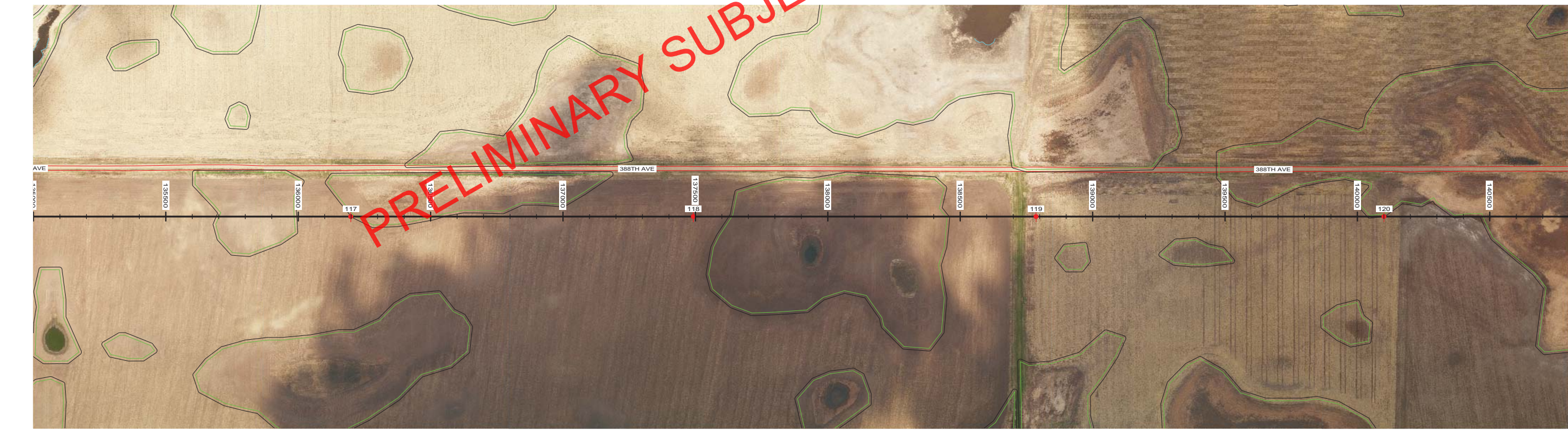
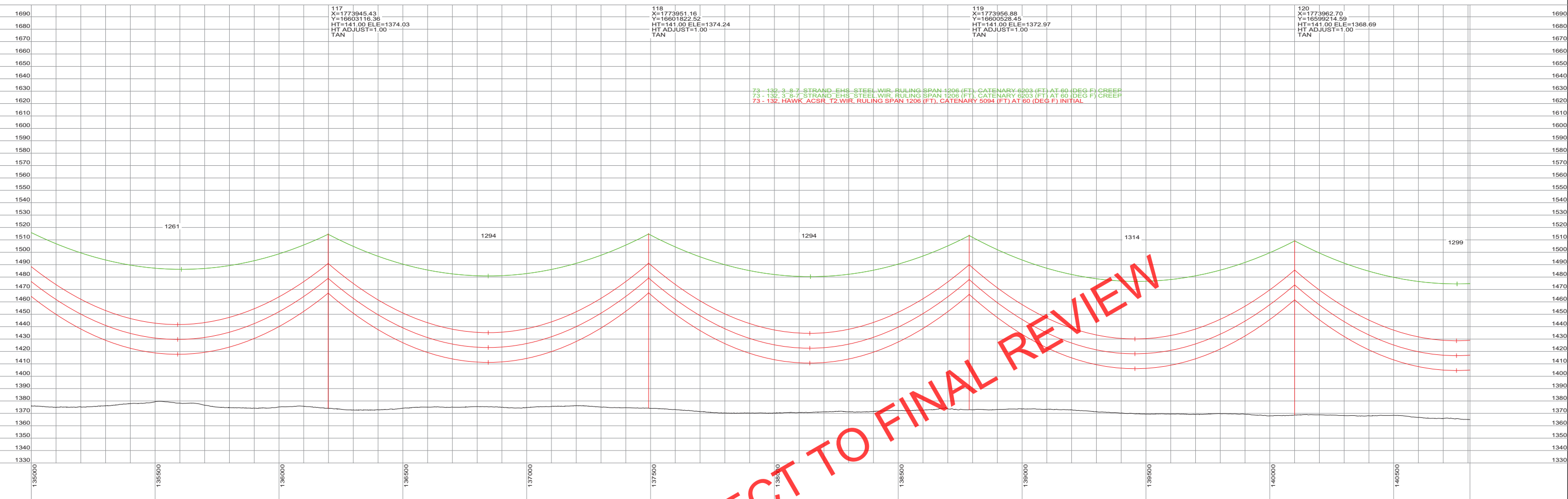
DATE	APPROVALS
10/04/13	DRAWN BY: JRC
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10/04/13	CHECKED BY: SMH
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**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-25
REVISION: F
127156**



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



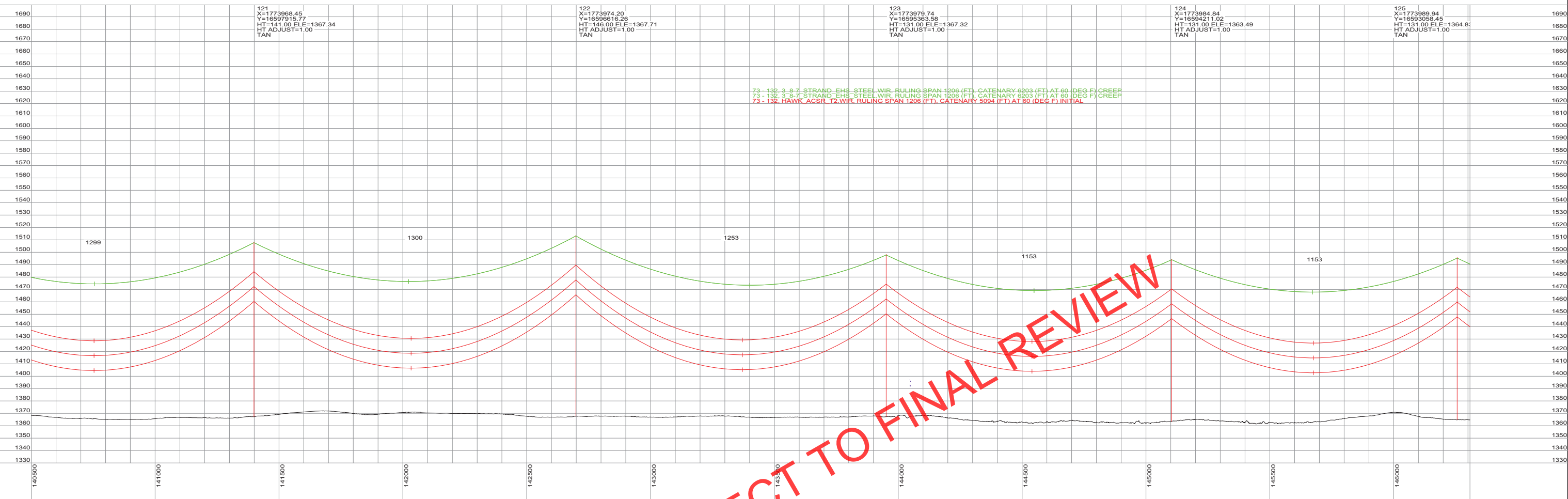
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-26
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



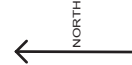
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F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



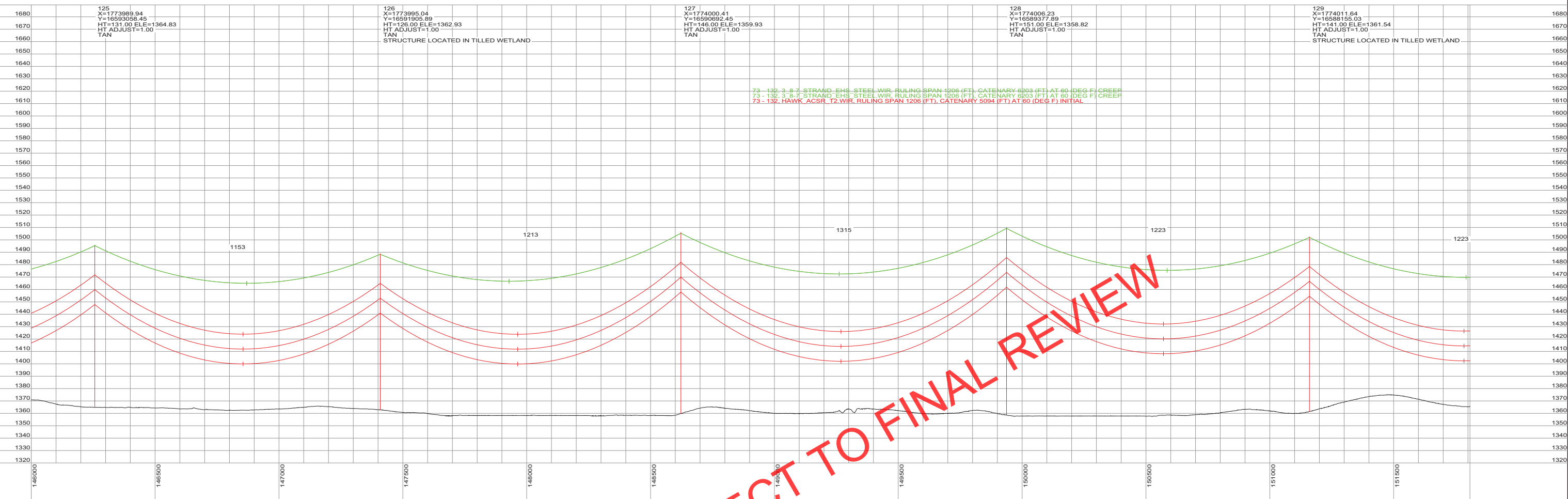
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



**DWG. NO.
P1-27
REVISION: F
127156**



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



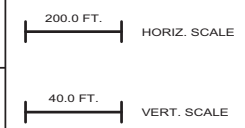
REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
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D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

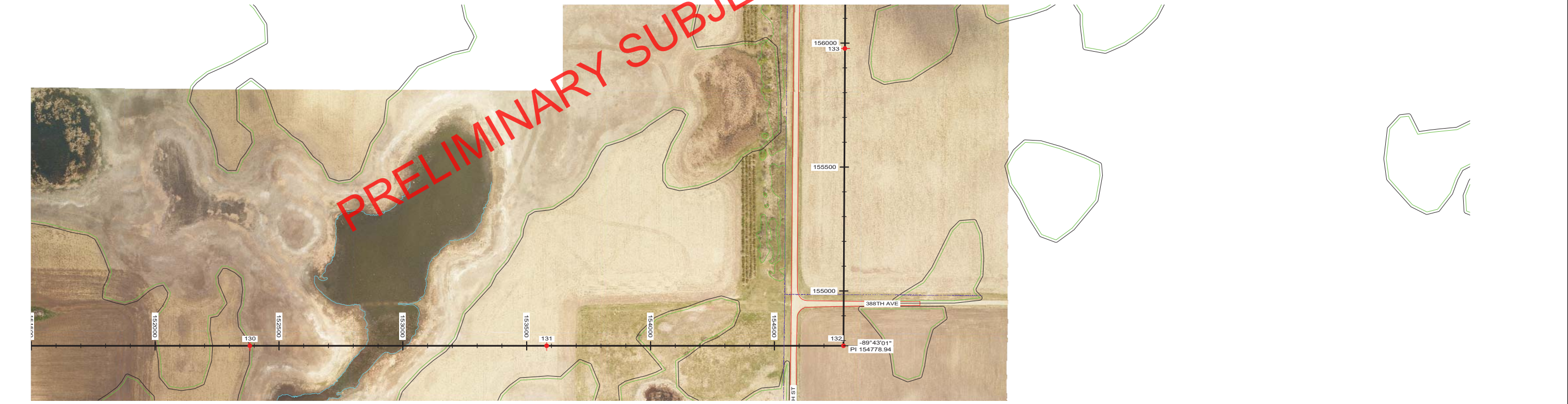
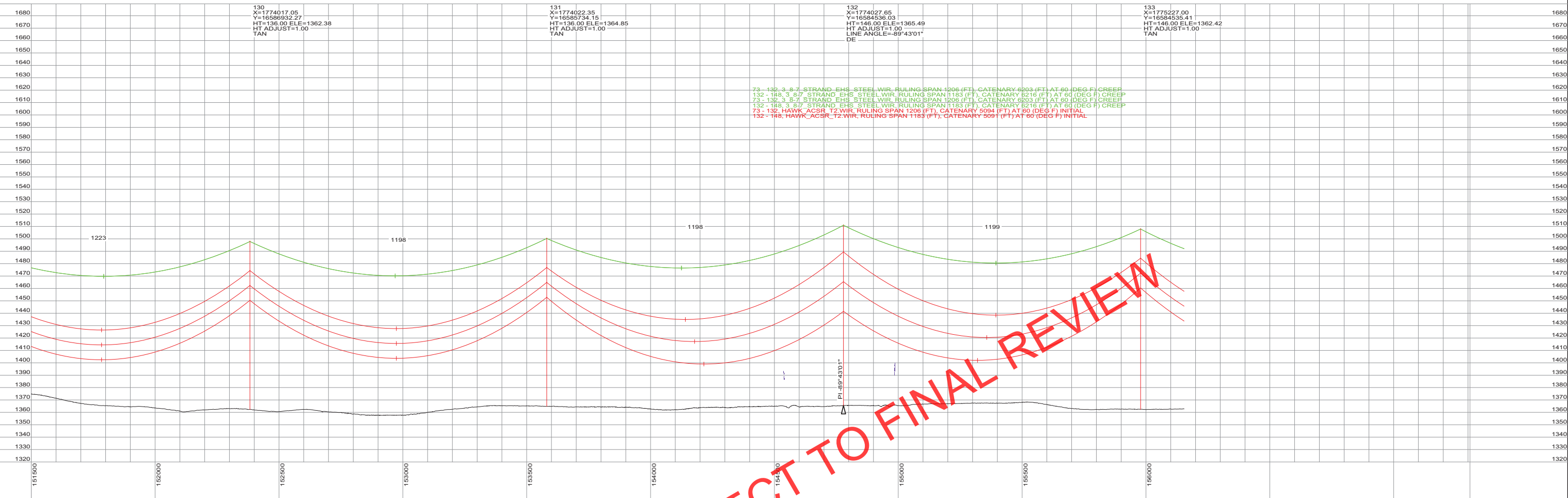
DESIGN DATA
 CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
 DESIGN TENSION: 18% @ 0 F, FINAL
 SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
 DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
 MIN. GROUND CLEARANCE: 30 FT
 CONDUCTOR SHOWN: 212 F, MAX SAG
 COORDINATE SYSTEM: UTM ZONE 14N, US FT



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-28
REVISION: F
127156**



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS				APPROVALS	DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

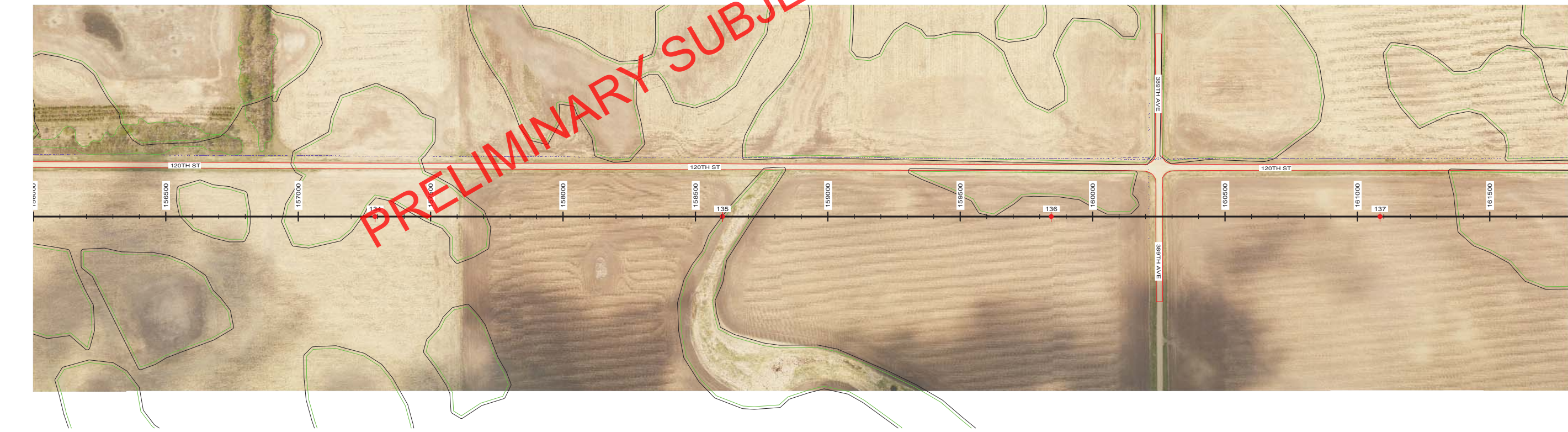
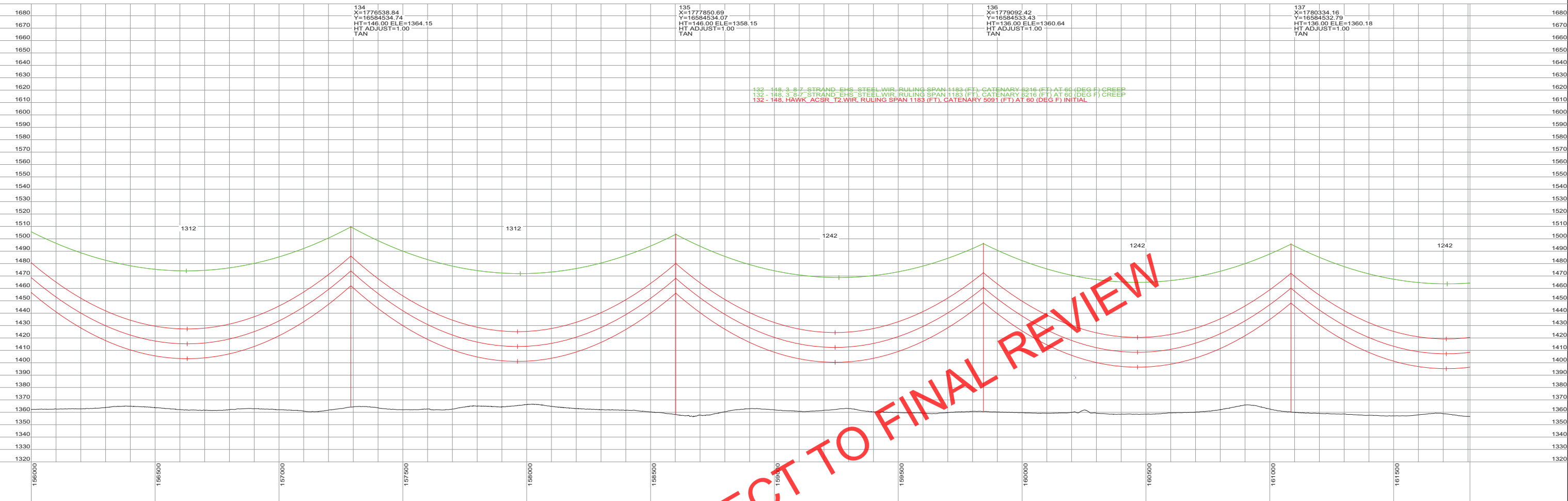
200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-29
REVISION: F

127156



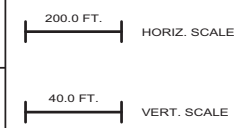
**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



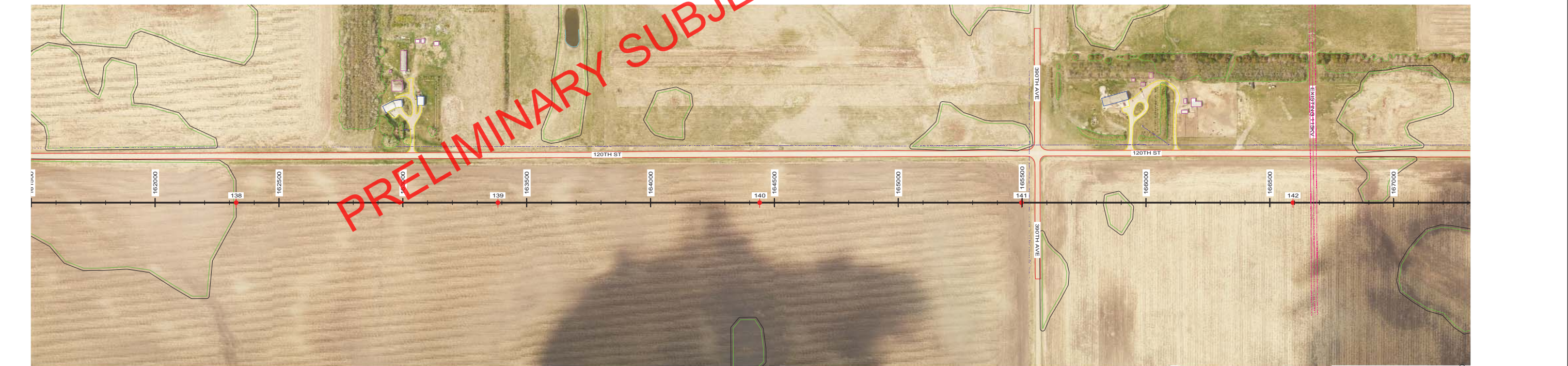
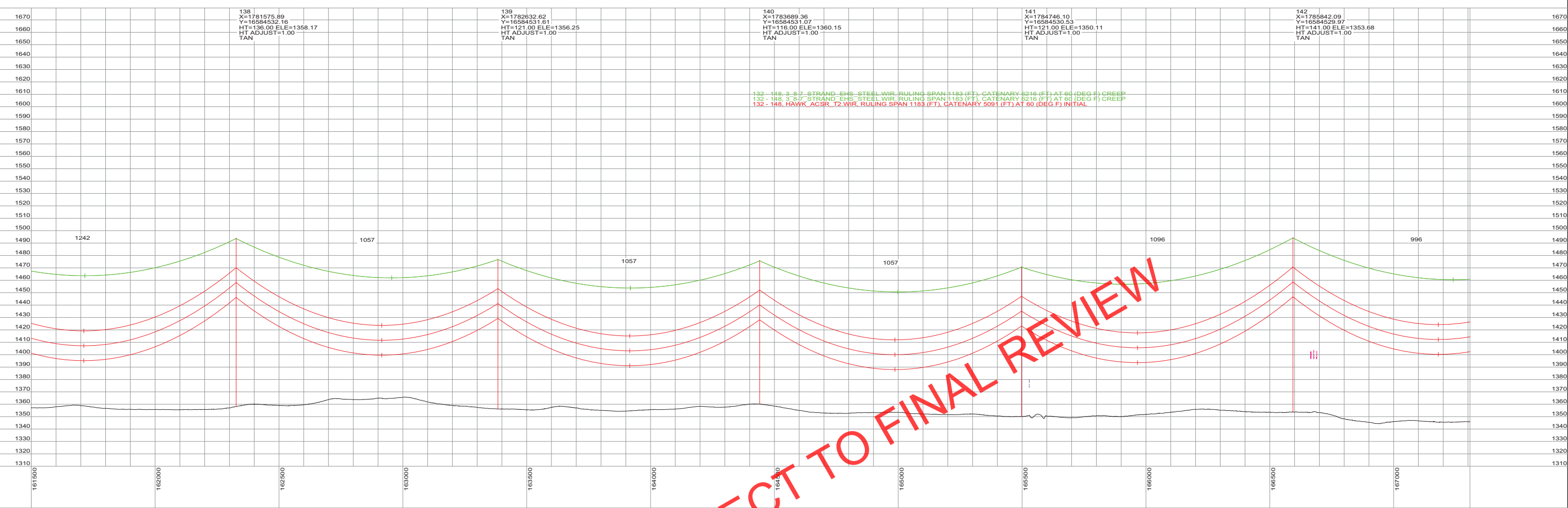
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-30
REVISION: F
127156**



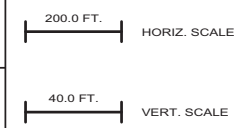
**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



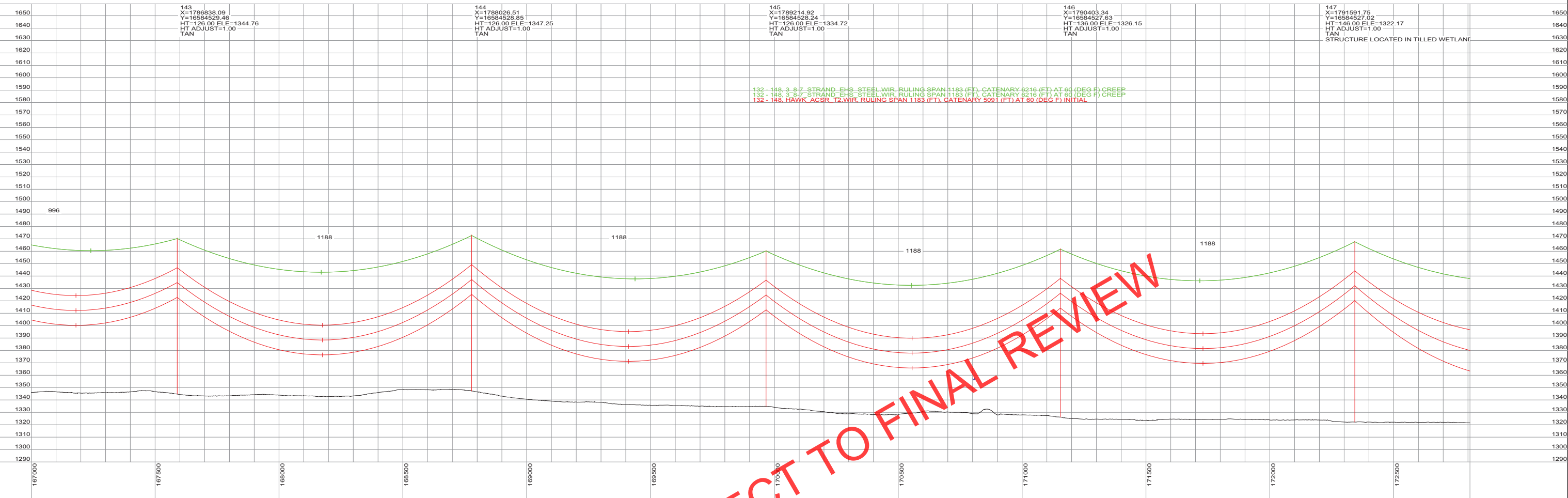
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



**DWG. NO.
P1-31
REVISION: F
127156**



143
X=1786838.09
Y=16584529.48
HT=126.00 ELE=1344.76
HT ADJUST=1.00
TAN

144
X=1788026.51
Y=16584528.85
HT=126.00 ELE=1347.25
HT ADJUST=1.00
TAN

145
X=1789214.92
Y=16584527.24
HT=126.00 ELE=1334.72
HT ADJUST=1.00
TAN

146
X=1790403.34
Y=16584527.83
HT=136.00 ELE=1326.15
HT ADJUST=1.00
TAN

147
X=1791591.75
Y=16584527.02
HT=146.00 ELE=1322.17
HT ADJUST=1.00
TAN
STRUCTURE LOCATED IN TILLED WETLAND

132 - 148, 3 8/7 STRAND EHS STEEL WIR, RULING SPAN 1183 (FT), CATENARY 6216 (FT) AT 60 (DEG F) CREEP
132 - 148, 3 8/7 STRAND EHS STEEL WIR, RULING SPAN 1183 (FT), CATENARY 8216 (FT) AT 60 (DEG F) CREEP
132 - 148, HAWK ACSR T2 WIR, RULING SPAN 1183 (FT), CATENARY 5091 (FT) AT 60 (DEG F) INITIAL



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013

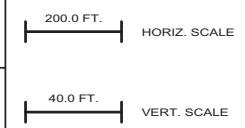


REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13		DESIGN TENSION: 18% @ 0 F, FINAL	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13		SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13		DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13		MIN. GROUND CLEARANCE: 30 FT	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:	CONDUCTOR SHOWN: 212 F, MAX SAG	

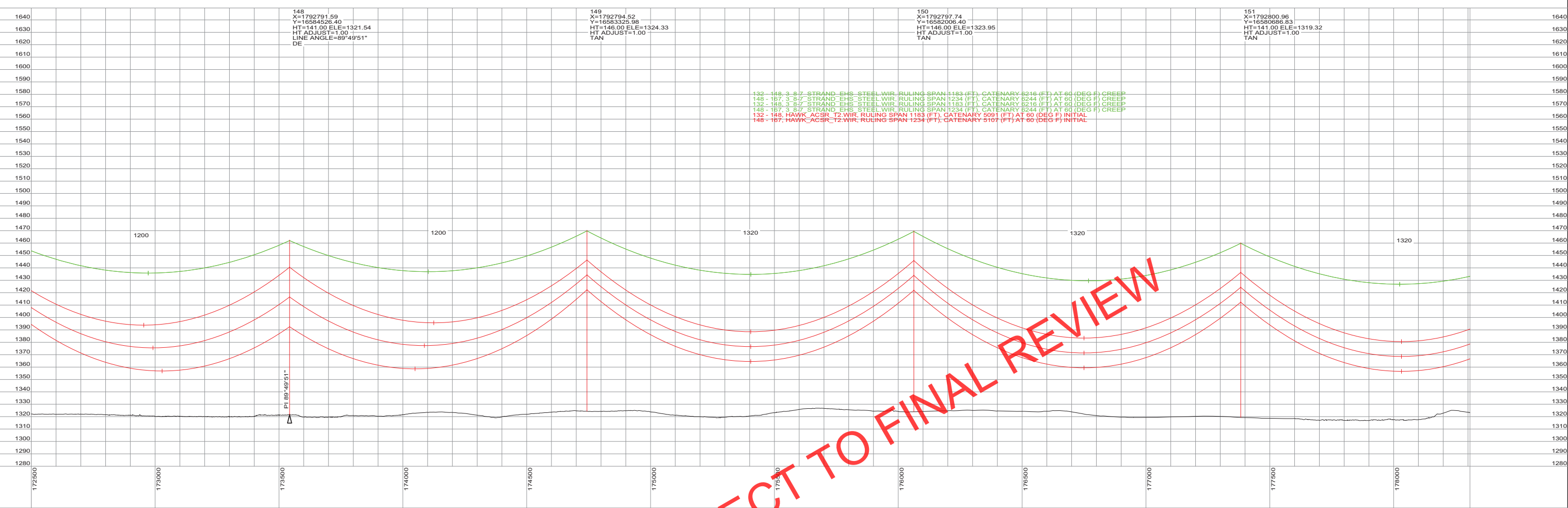
APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN BY: JRC	10/04/13	DESIGN TENSION: 18% @ 0 F, FINAL
CHECKED BY: SMH	10/04/13	SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
APPROVED BY:		DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
		MIN. GROUND CLEARANCE: 30 FT
		CONDUCTOR SHOWN: 212 F, MAX SAG
		COORDINATE SYSTEM: UTM ZONE 14N, US FT



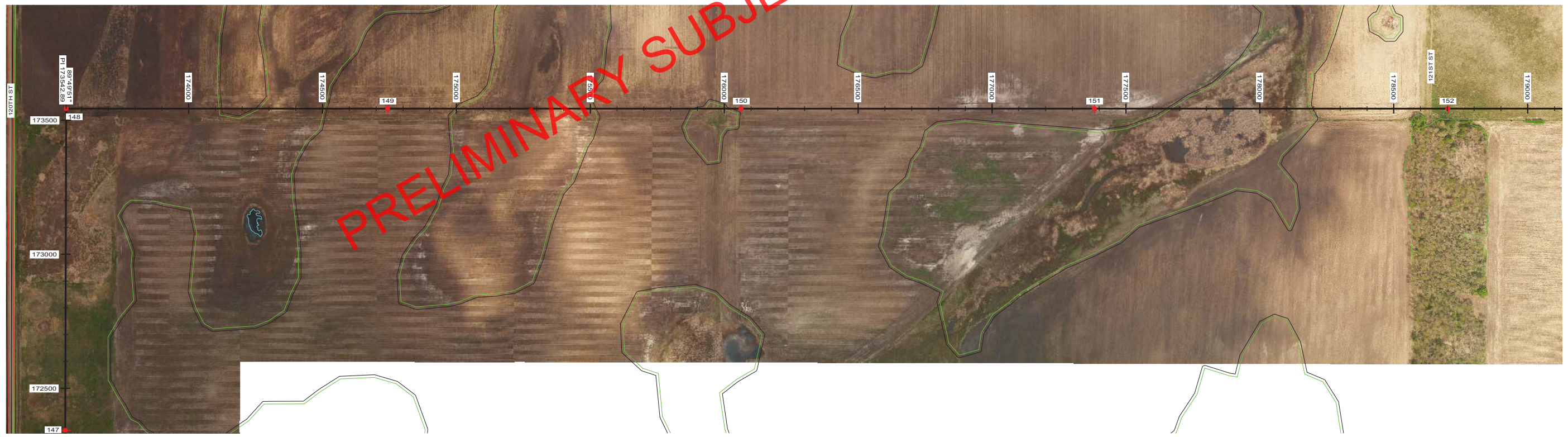
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE



DWG. NO.
P1-32
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY: JRC	10/04/13	
CHECKED BY: SMH	10/04/13	
APPROVED BY:		

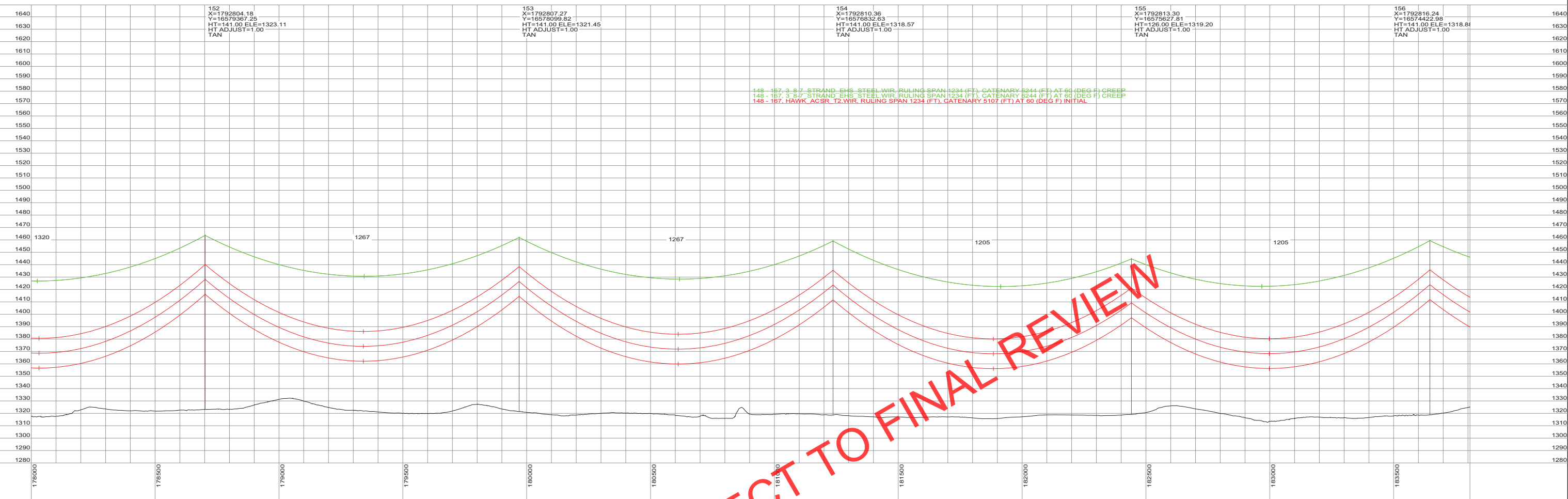


**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



DWG. NO.
P1-33
REVISION: F

127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



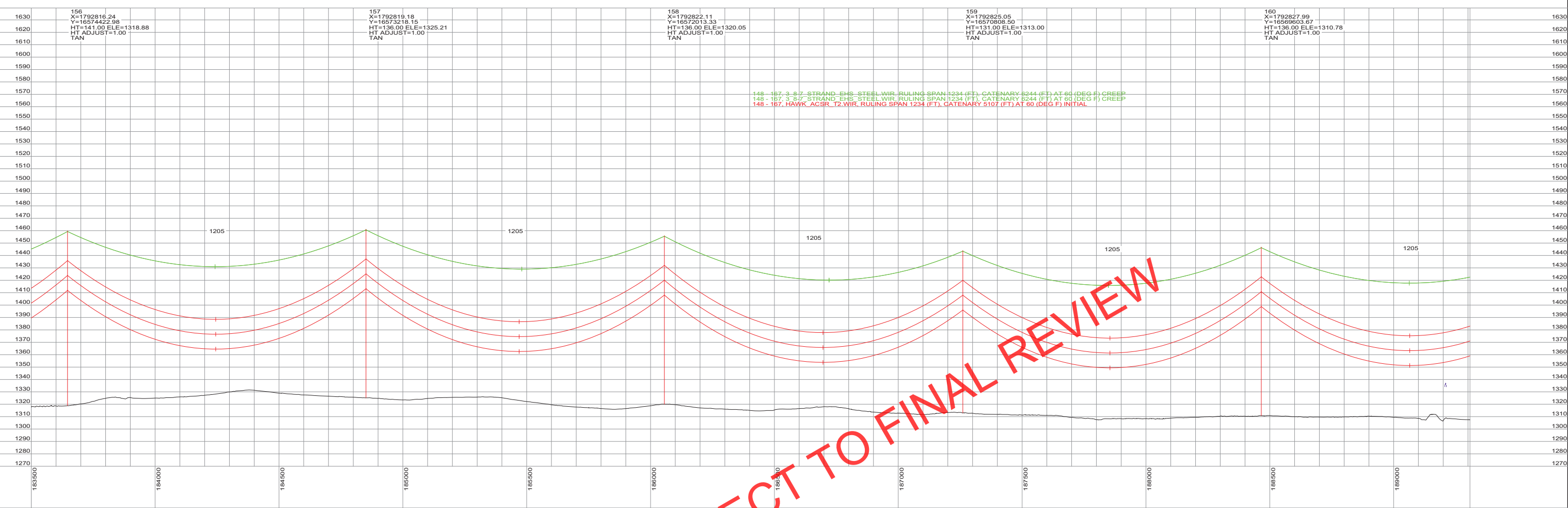
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

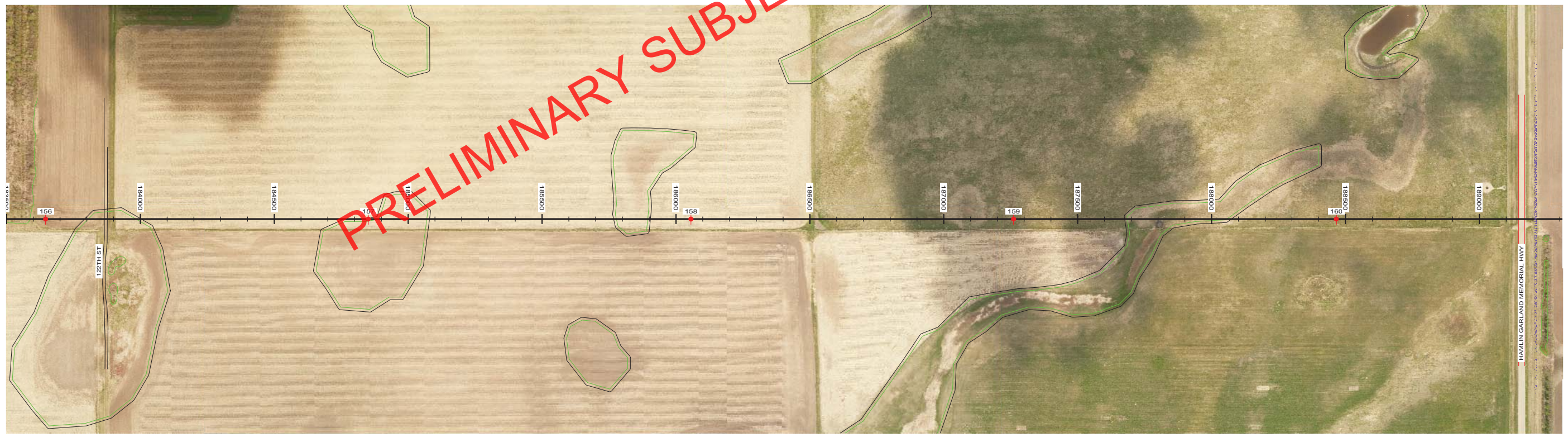
40.0 FT. VERT. SCALE



DWG. NO.
P1-34
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

DESIGN DATA
CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR CLEARANCE: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



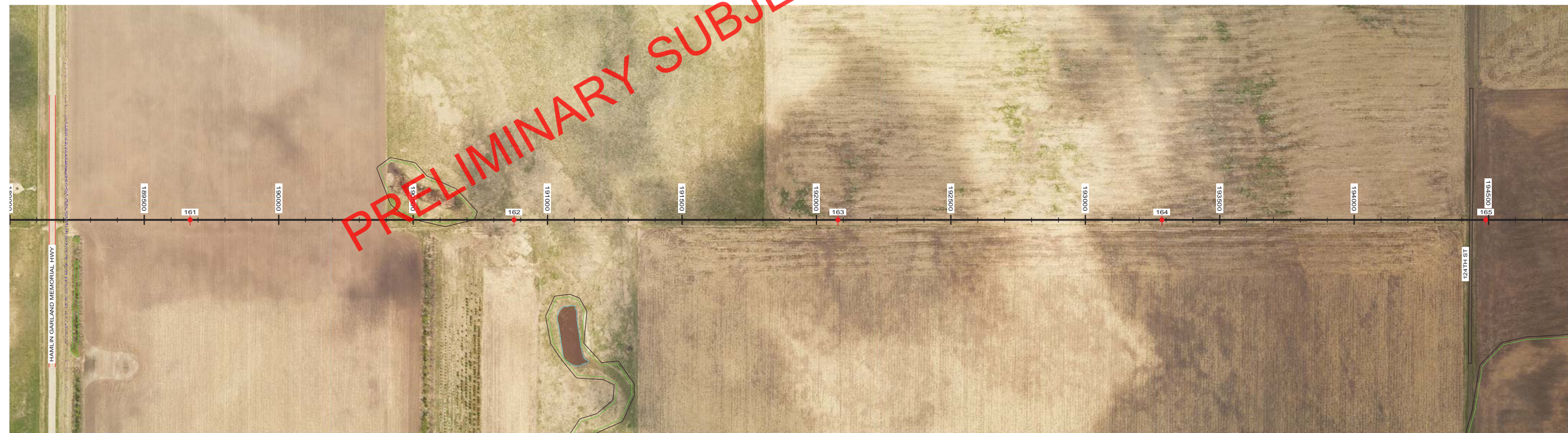
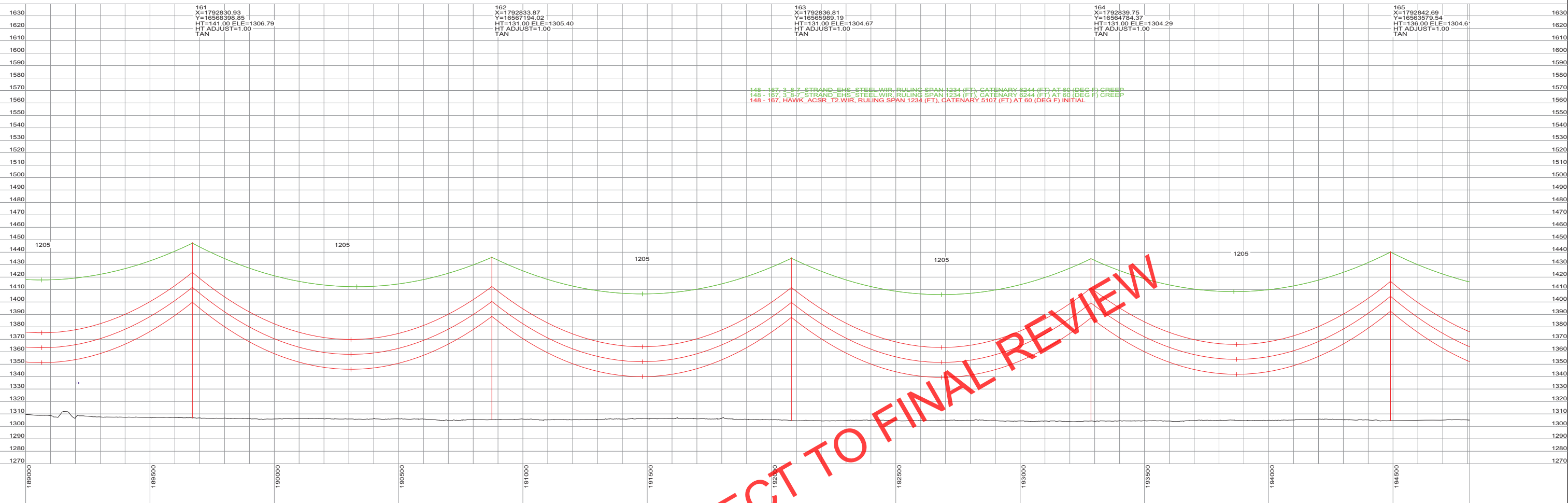
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-35
REVISION: F
127156



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



REVISIONS					APPROVALS	DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:	
REV	DESCRIPTION	DWN	DGN	CHK	DATE		



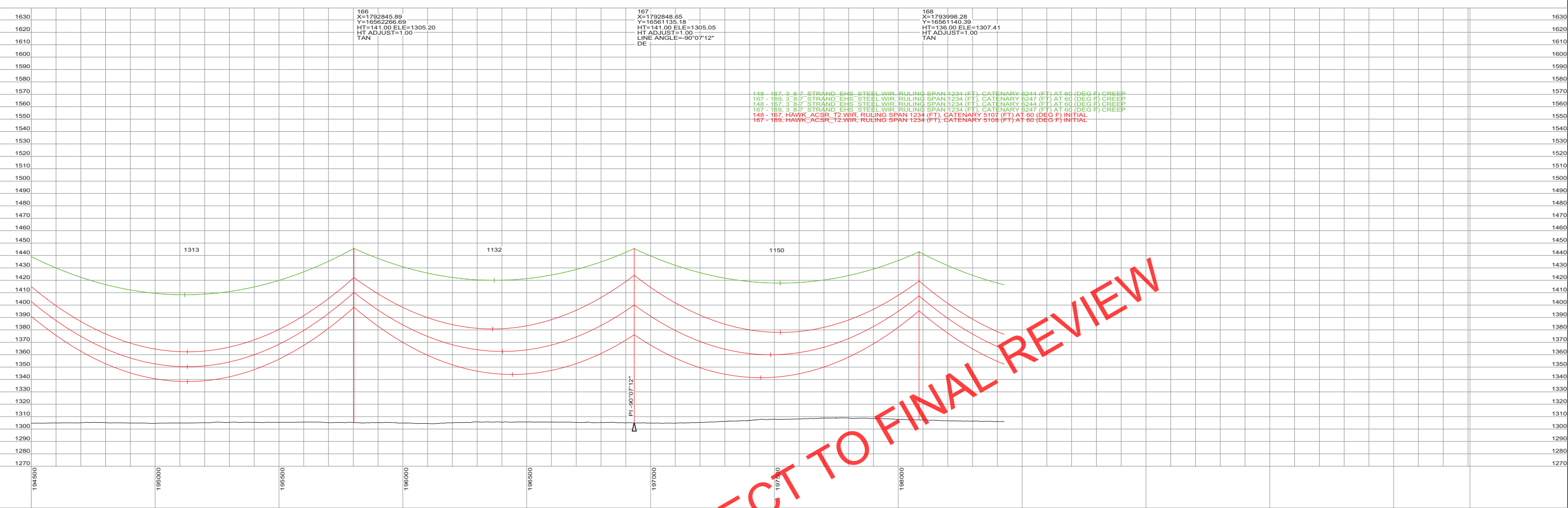
**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE

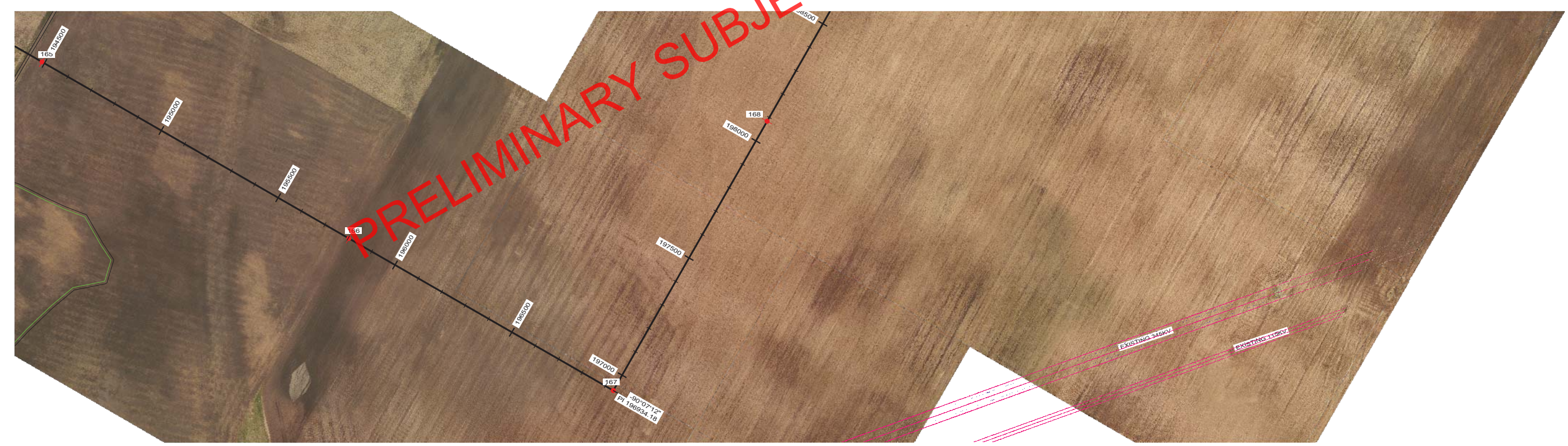
40.0 FT. VERT. SCALE



**DWG. NO.
P1-36
REVISION: F
127156**



PRELIMINARY SUBJECT TO FINAL REVIEW



**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



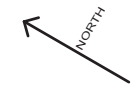
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13			CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC	10/04/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC	10/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH	10/04/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13			
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:		



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

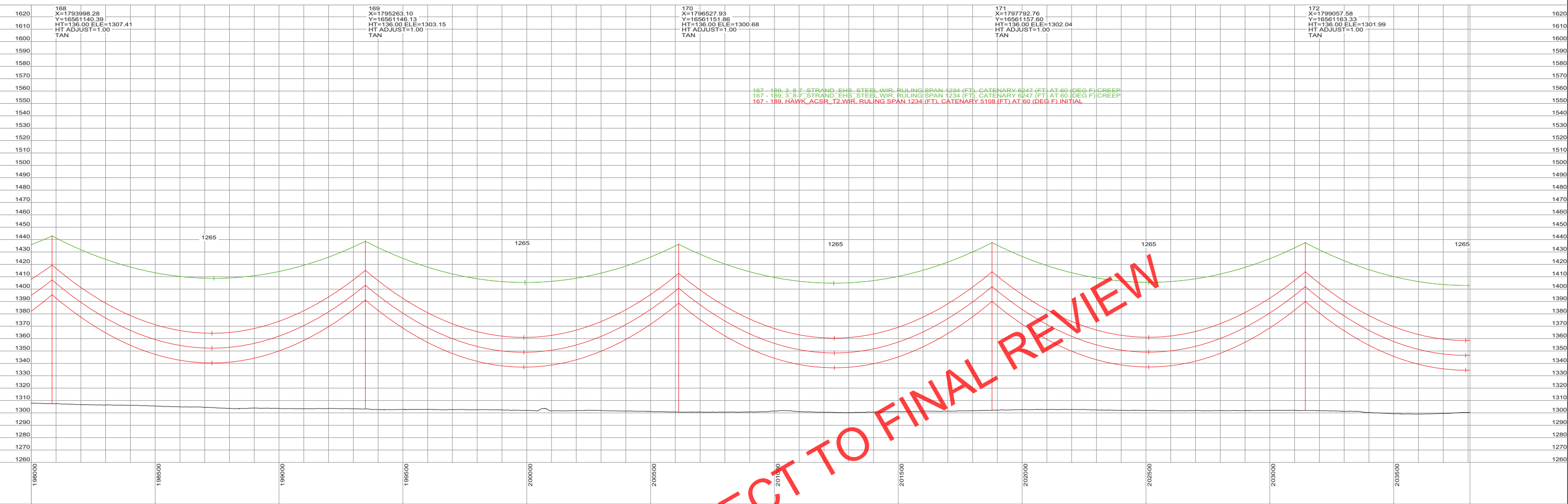
200.0 FT. HORIZ. SCALE

40.0 FT. VERT. SCALE



DWG. NO.
P1-37
REVISION: F

127156



PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013

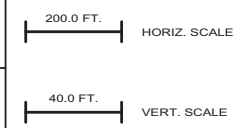


REVISIONS					APPROVALS	DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:	
REV	DESCRIPTION	DWN	DGN	CHK	DATE		

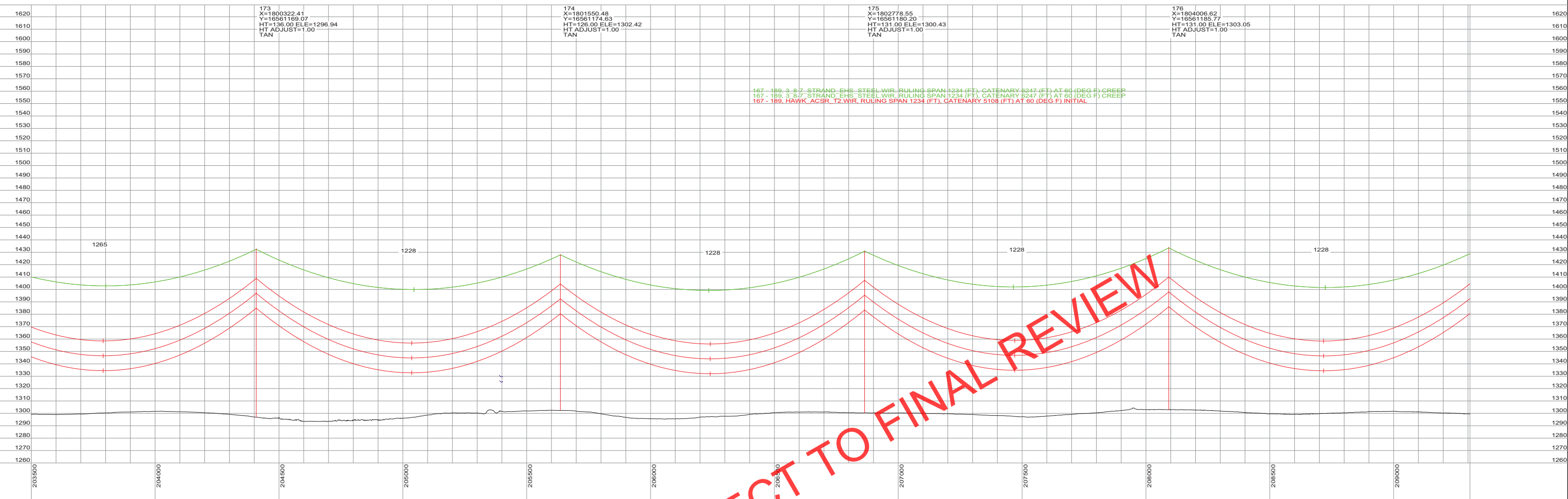
APPROVALS	DATE	DESIGN DATA
DRAWN BY: JRC	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
DESIGN BY: JRC	10/04/13	
CHECKED BY: SMH	10/04/13	
APPROVED BY:		



BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE



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P1-38
REVISION: F
127156



173
X=1800322.41
Y=18561169.07
HT=136.00 ELE=1296.94
HT ADJUST=1.00
TAN

174
X=1801550.48
Y=18561174.63
HT=126.00 ELE=1302.42
HT ADJUST=1.00
TAN

175
X=1802778.55
Y=18561180.20
HT=131.00 ELE=1300.43
HT ADJUST=1.00
TAN

176
X=1804006.62
Y=18561185.77
HT=131.00 ELE=1303.05
HT ADJUST=1.00
TAN

167 - 189, 3 #7 STRAND EHS STEELWIR, RULING SPAN 1234 (FT), CATENARY 6247 (FT) AT 60 (DEG F) CREEP
167 - 189, 3 #7 STRAND EHS STEELWIR, RULING SPAN 1234 (FT), CATENARY 6247 (FT) AT 60 (DEG F) CREEP
167 - 189, HAWK ACSR T2 WIR, RULING SPAN 1234 (FT), CATENARY 5108 (FT) AT 60 (DEG F) INITIAL



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SUBJECT TO
FINAL REVIEW
10/04/2013



REV	DESCRIPTION	DWN	DGN	CHK	DATE
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13

APPROVALS	DATE
DRAWN BY: JRC	10/04/13
DESIGN BY: JRC	10/04/13
CHECKED BY: SMH	10/04/13
APPROVED BY:	

DESIGN DATA
CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR
DESIGN TENSION: 18% @ 0 F, FINAL
SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL
DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP
MIN. GROUND CLEARANCE: 30 FT
CONDUCTOR SHOWN: 212 F, MAX SAG
COORDINATE SYSTEM: UTM ZONE 14N, US FT



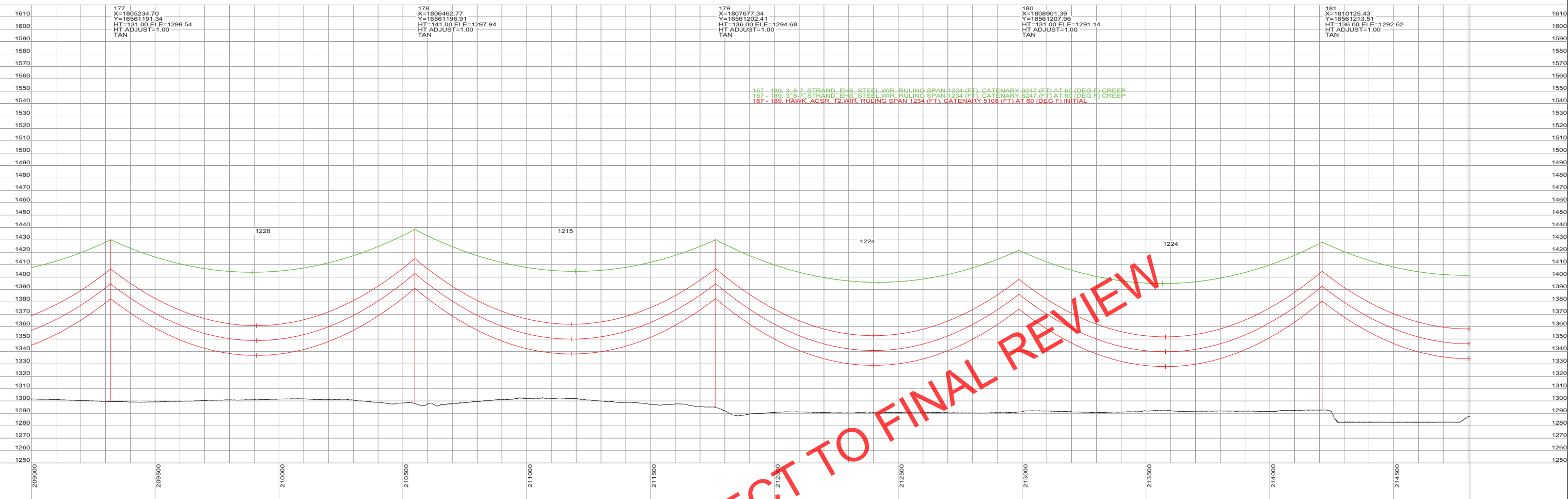
BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE

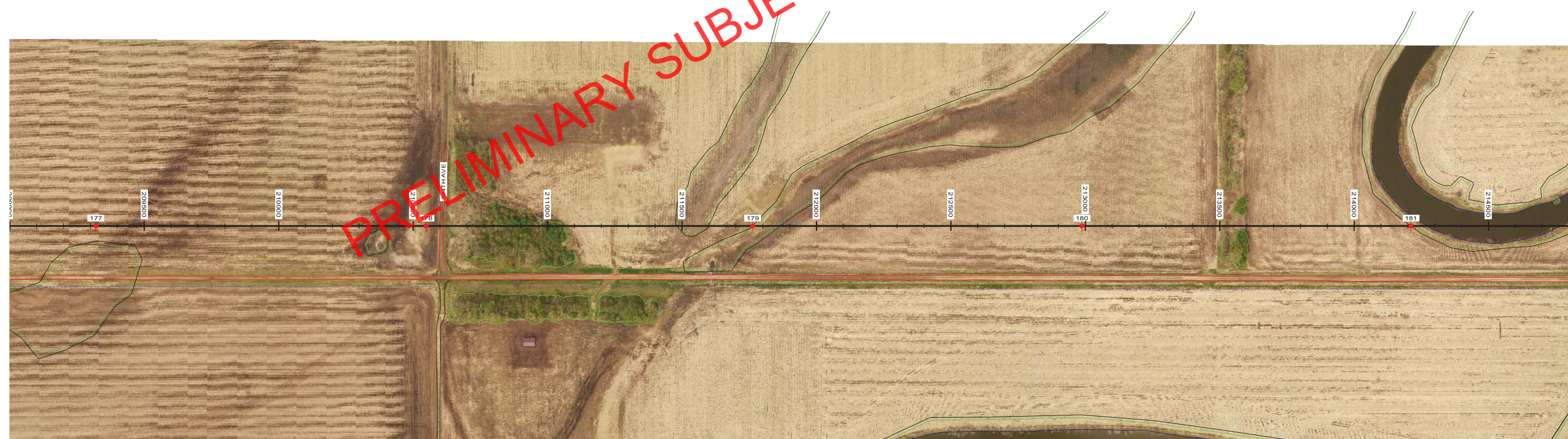
40.0 FT. VERT. SCALE



DWG. NO.
P1-39
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



PRELIMINARY SUBJECT TO FINAL REVIEW 10/04/2013

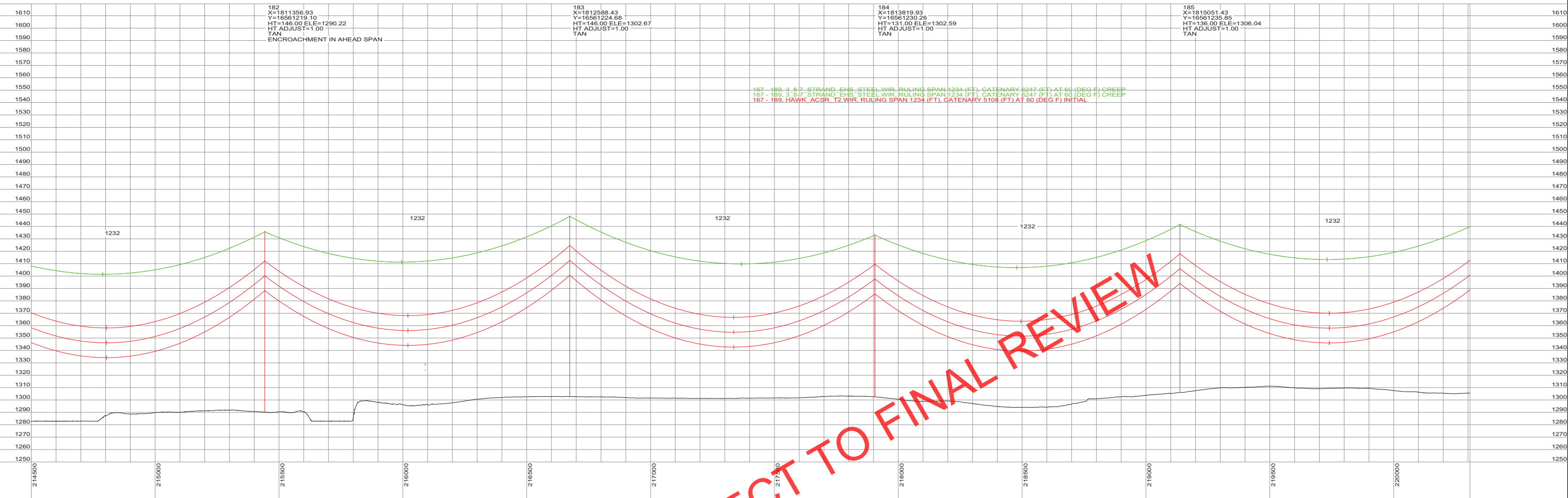
REVISIONS				APPROVALS	DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13	CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	
REV	DESCRIPTION	DWN	DGN	CHK	DATE	APPROVED BY:

**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**

200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

NORTH ↑

DWG. NO. P1-40
REVISION: F
127156



182
X=1811356.93
Y=16561219.10
HT=146.00 ELE=1290.22
HT ADJUST=1.00
TAN
ENCROACHMENT IN AHEAD SPAN

183
X=1812588.43
Y=16561224.68
HT=146.00 ELE=1302.67
HT ADJUST=1.00
TAN

184
X=1813819.93
Y=16561230.28
HT=131.00 ELE=1302.59
HT ADJUST=1.00
TAN

185
X=1815051.43
Y=16561235.85
HT=136.00 ELE=1306.04
HT ADJUST=1.00
TAN

167 - 189 3-8.7 STRAND EHS STEEL WIR, RULING SPAN 1234 (FT), CATENARY 6247 (FT) AT 60 (DEG F) CREEP
167 - 189 3-8.7 STRAND EHS STEEL WIR, RULING SPAN 1234 (FT), CATENARY 6247 (FT) AT 60 (DEG F) CREEP
167 - 189 HAWK ACSR T2 WIR, RULING SPAN 1234 (FT), CATENARY 5108 (FT) AT 60 (DEG F) INITIAL

PRELIMINARY SUBJECT TO FINAL REVIEW



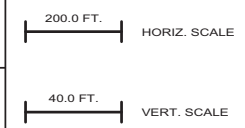
**PRELIMINARY
SUBJECT TO
FINAL REVIEW
10/04/2013**



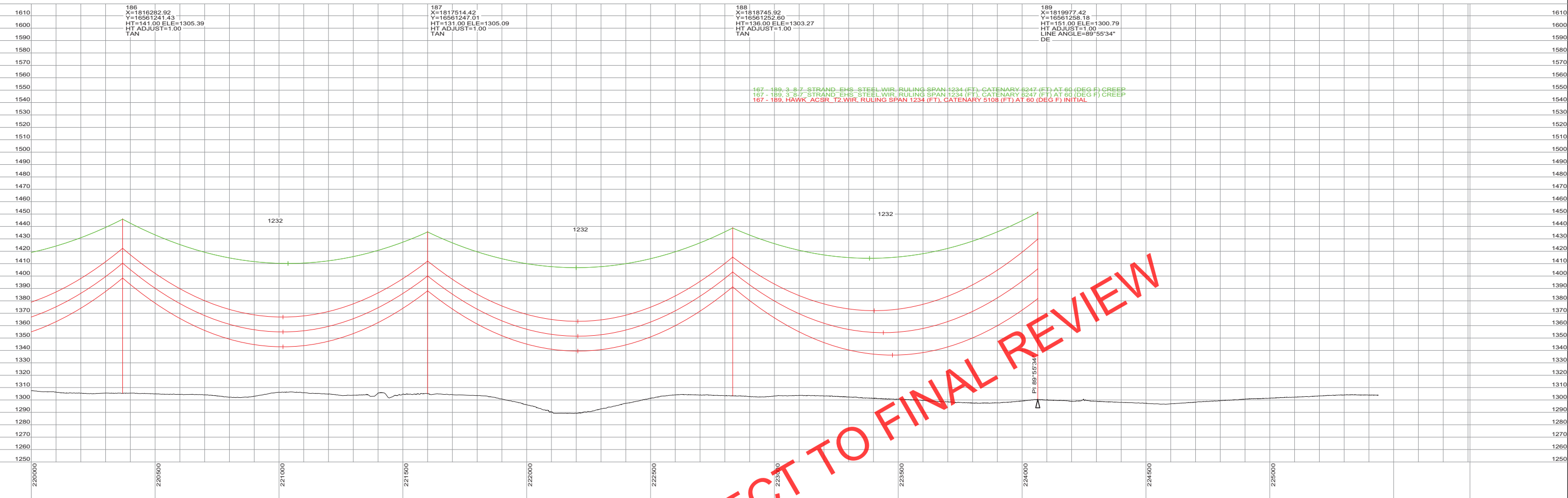
REVISIONS					APPROVALS		DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT	
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC		10/04/13
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC		10/04/13
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH		10/04/13
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:		
REV	DESCRIPTION	DWN	DGN	CHK	DATE			



**BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE**



DWG. NO.
P1-41
REVISION: F
127156



PRELIMINARY SUBJECT TO FINAL REVIEW



PRELIMINARY SUBJECT TO FINAL REVIEW 10/04/2013

REVISIONS					APPROVALS	DATE	DESIGN DATA
F	FOR REVIEW, STR 1-7 REVISED	JRC	JRC	SMH	10/04/13		CONDUCTOR: (2X) 477 KCMIL 26/7 TP HAWK ACSR DESIGN TENSION: 18% @ 0 F, FINAL SHIELD WIRE: 2-3/8" 7 STRAND EHS STEEL DESIGN TENSION: 75% SAG MATCH @ 60 F CREEP MIN. GROUND CLEARANCE: 30 FT CONDUCTOR SHOWN: 212 F, MAX SAG COORDINATE SYSTEM: UTM ZONE 14N, US FT
E	FOR SD REVIEW / NO ND REVISIONS	JRC	JRC	SMH	09/24/13	DRAWN BY: JRC	
D	REISSUED FOR ND REVIEW	JRC	JRC	SMH	09/04/13	DESIGN BY: JRC	
C	REISSUED FOR ND REVIEW	JRC	JRC	SMH	08/22/13	CHECKED BY: SMH	
B	ISSUED FOR ND REVIEW	JRC	JRC	SMH	06/28/13	APPROVED BY:	
REV	DESCRIPTION	DWN	DGN	CHK	DATE		

BIG STONE SOUTH - ELLENDALE
345 KV TRANSMISSION LINE

200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

NORTH ↑

DWG. NO. P1-42
REVISION: F
127156