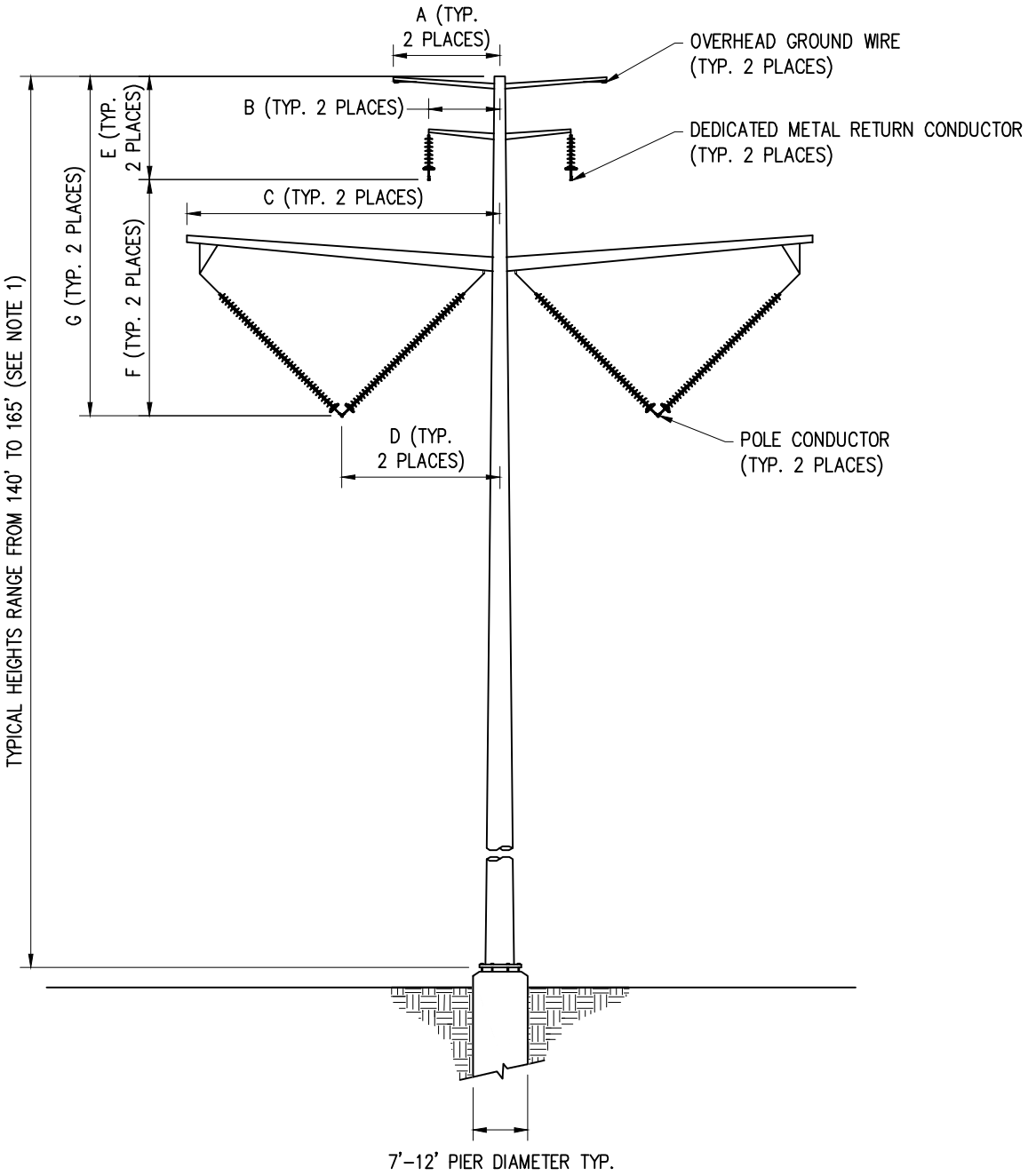
APPENDIX B

Project Figures

Figure B-1. 525-kV HVDC Transmission Line - Tangent Monopole Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	15-25
B	Dedicated Metal Return Conductor Horizontal Offset from Structure Centerline	10-20
C	Pole Conductor Support Arm Length from Structure Centerline	40-50
D	Pole Conductor Horizontal Offset from Structure Centerline	20-30
E	OPGW / Dedicated Metal Return Conductor Vertical Separation at Structure	10-20
F	Dedicated Metal Return Conductor / Pole Conductor Vertical Separation at Structure	30-40
G	OPGW / Pole Conductor Vertical Separation at Structure	40-50

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 140' TO 165'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 100' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

ISSUED FOR REVIEW

"Engineering with Distinction"
ECI ELECTRICAL CONSULTANTS, INC.
BILLINGS, MONTANA

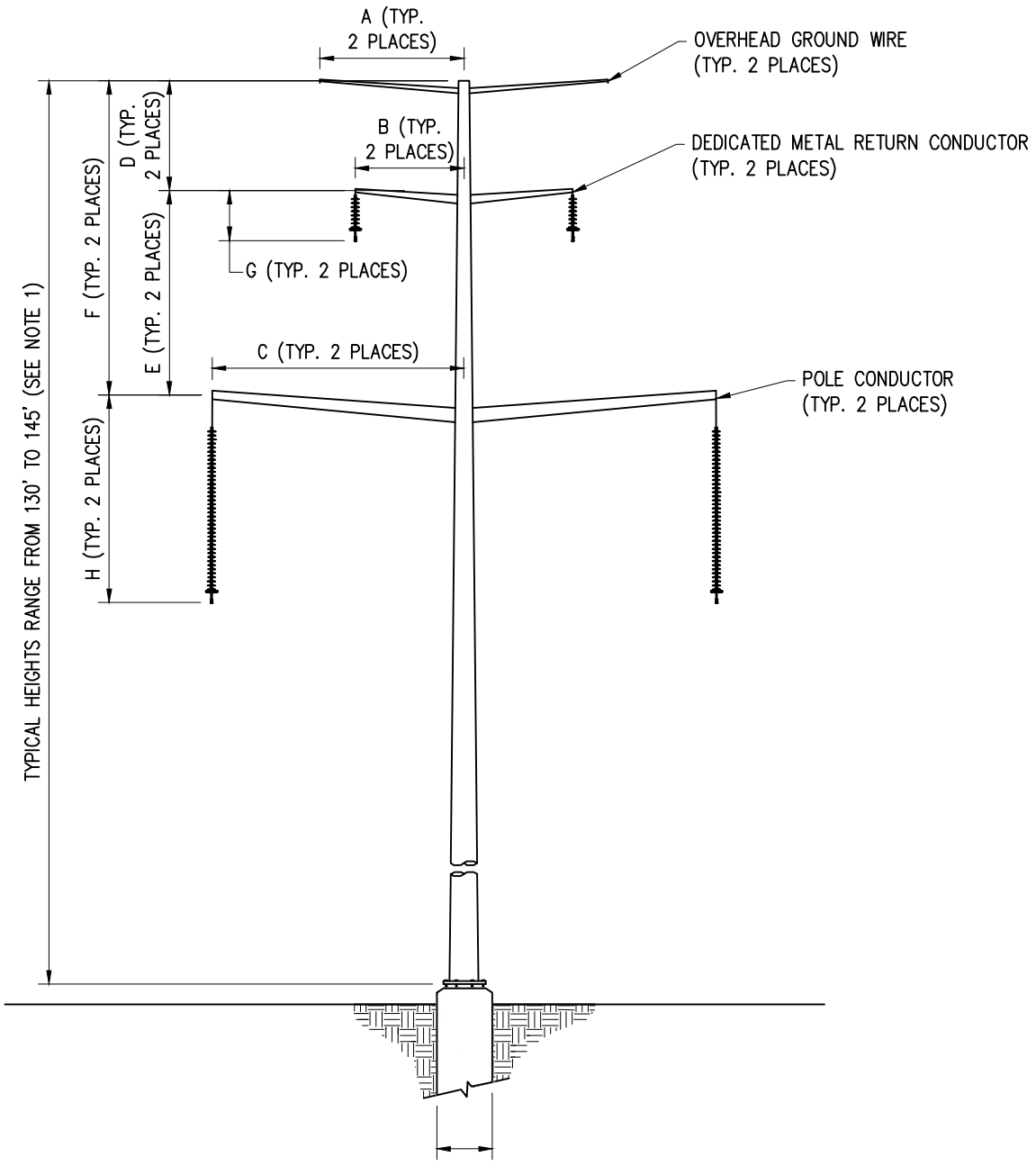
GRID UNITED

ENGINEERING RECORD		DATE
DRAWN	C. ELLIS	06/06/24
DESIGNED	S. REED	06/06/24
CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL MONOPOLE
TYPICAL +/- 525kV HVDC TANGENT

DWG. NAME: NPC-A-T009-501 | REVISION NO : D

Figure B-2. 525-kV HVDC Transmission Line - Deadend Monopole Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	15-25
B	Dedicated Metal Return Conductor Horizontal Offset from Structure Centerline	10-20
C	Pole Conductor Horizontal Offset from Structure Centerline	20-30
D	OPGW / Dedicated Metal Return Conductor Vertical Separation at Structure	10-20
E	Dedicated Metal Return Conductor / Pole Conductor Vertical Separation at Structure	30-40
F	OPGW / Pole Conductor Vertical Separation at Structure	40-50
G	Dedicated Metal Return Conductor Jumper String Length	5-10
H	Pole Conductor Jumper String Length	25-30

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 130' TO 145'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 120' OR AS HIGH AS 195'.

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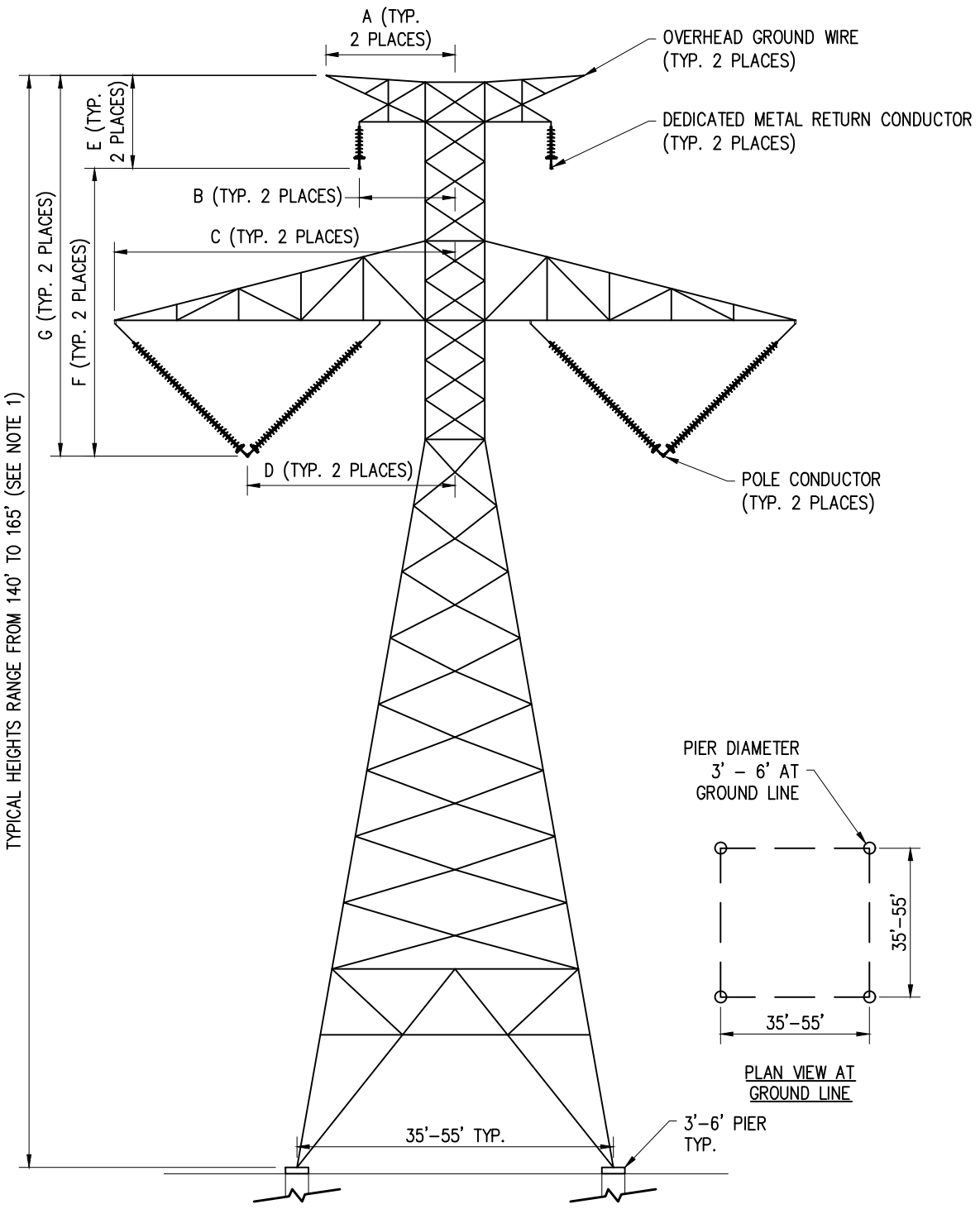
CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL MONOPOLE
TYPICAL +/- 525kV HVDC DEADEND

DWG. NAME: NPC-A-T009-505 | REVISION NO : D

Figure B-3. 525-kV HVDC Transmission Line - Tangent Lattice Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	15-30
B	Dedicated Metal Return Conductor Horizontal Offset from Structure Centerline	10-20
C	Pole Conductor Support Arm Length from Structure Centerline	40-50
D	Pole Conductor Horizontal Offset from Structure Centerline	20-35
E	OPGW / Dedicated Metal Return Conductor Vertical Separation at Structure	10-20
F	Dedicated Metal Return Conductor / Pole Conductor Vertical Separation at Structure	30-40
G	OPGW / Pole Conductor Vertical Separation at Structure	40-50

NOTES:
1. MOST STRUCTURE HEIGHTS RANGE FROM 140' TO 165'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 100' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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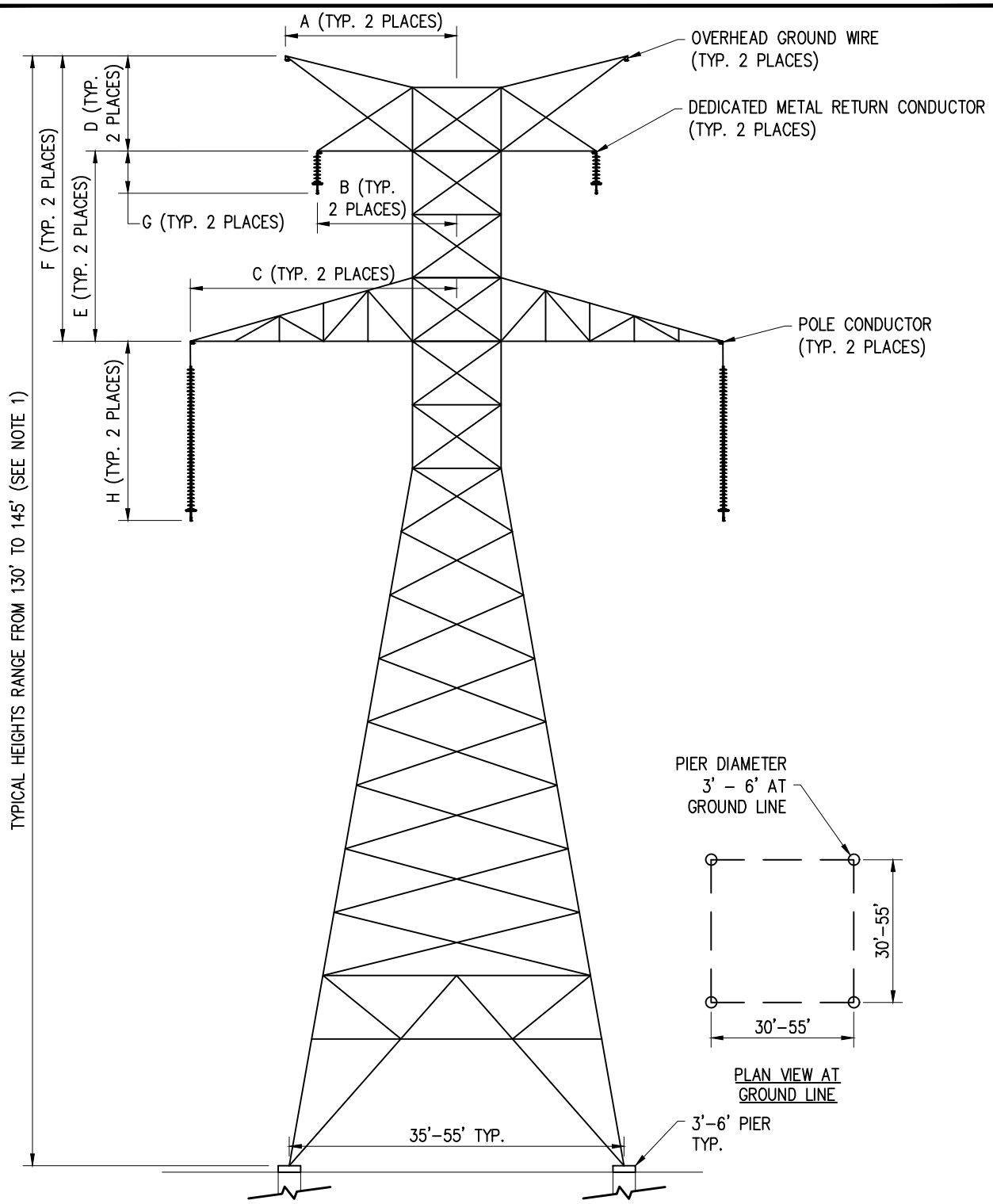
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL LATTICE TOWER
TYPICAL +/- 525kV HVDC TANGENT

DWG. NAME: NPC-A-T009-511 | REVISION NO : D

Figure B-4. 525-kV HVDC Transmission Line - Deadend Lattice Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	15-30
B	Dedicated Metal Return Conductor Horizontal Offset from Structure Centerline	10-20
C	Pole Conductor Horizontal Offset from Structure Centerline	35-50
D	OPGW / Dedicated Metal Return Conductor Vertical Separation at Structure	10-20
E	Dedicated Metal Return Conductor / Pole Conductor Vertical Separation at Structure	30-40
F	OPGW / Pole Conductor Vertical Separation at Structure	40-50
G	Dedicated Metal Return Conductor Jumper String Length	5-10
H	Pole Conductor Jumper String Length	25-30

NOTES:
1. MOST STRUCTURE HEIGHTS RANGE FROM 130' TO 145'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 120' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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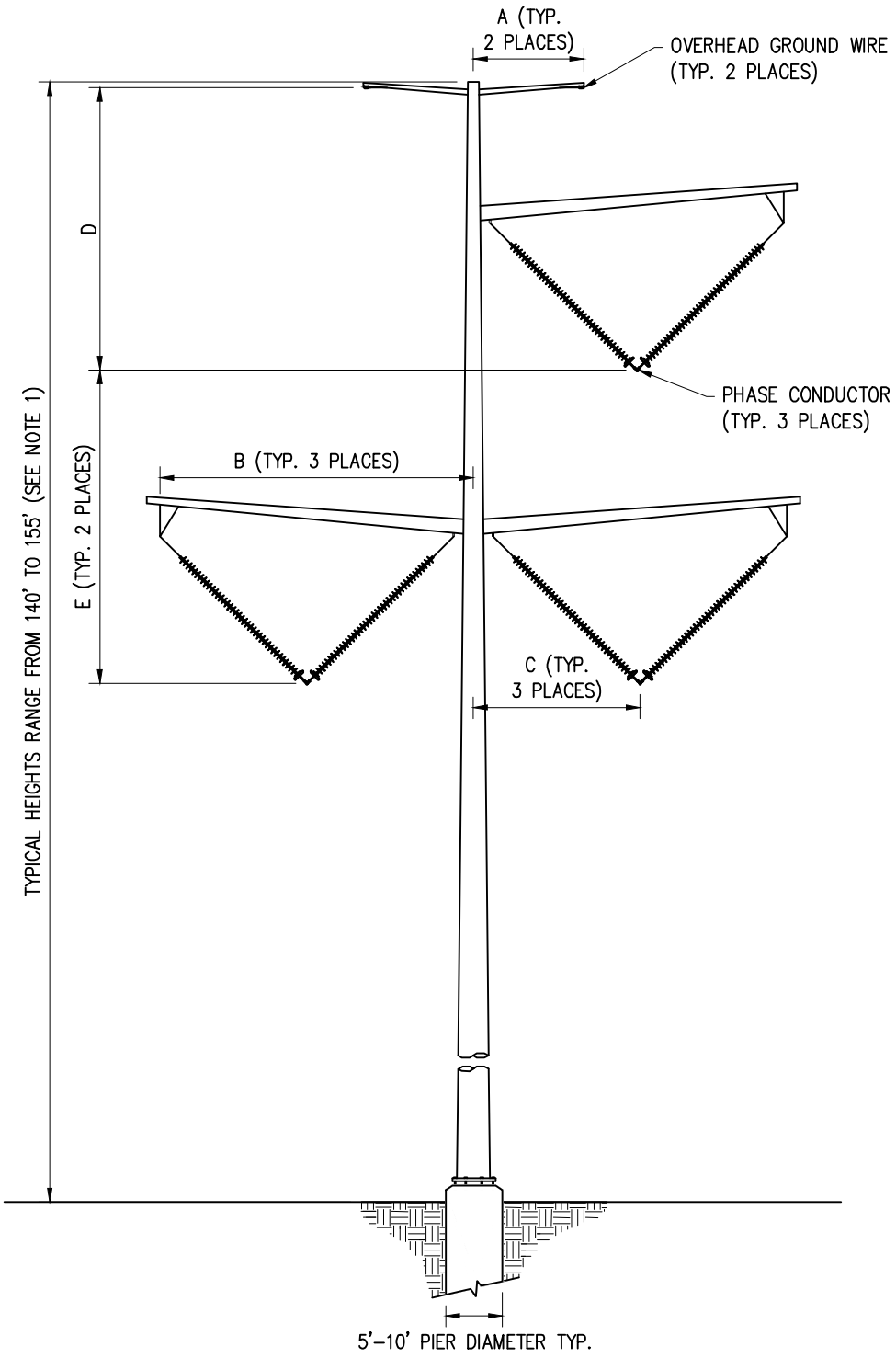
DESIGNED	S. REED	06/06/24
CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL LATTICE TOWER
TYPICAL +/- 525kV HVDC DEADEND

DWG. NAME: NPC-A-T009-515 | REVISION NO : D

Figure B-5. 500-kV Rosebud Transmission Line - Tangent Monopole Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	15-30
B	Phase Conductor Support Arm Length from Structure Centerline	40-50
C	Phase Conductor Horizontal Offset from Structure Centerline	20-35
D	OPGW / Phase Conductor Vertical Separation at Structure	20-35
E	Phase Conductor / Phase Conductor Vertical Separation at Structure	30-45

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 140' TO 155'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 120' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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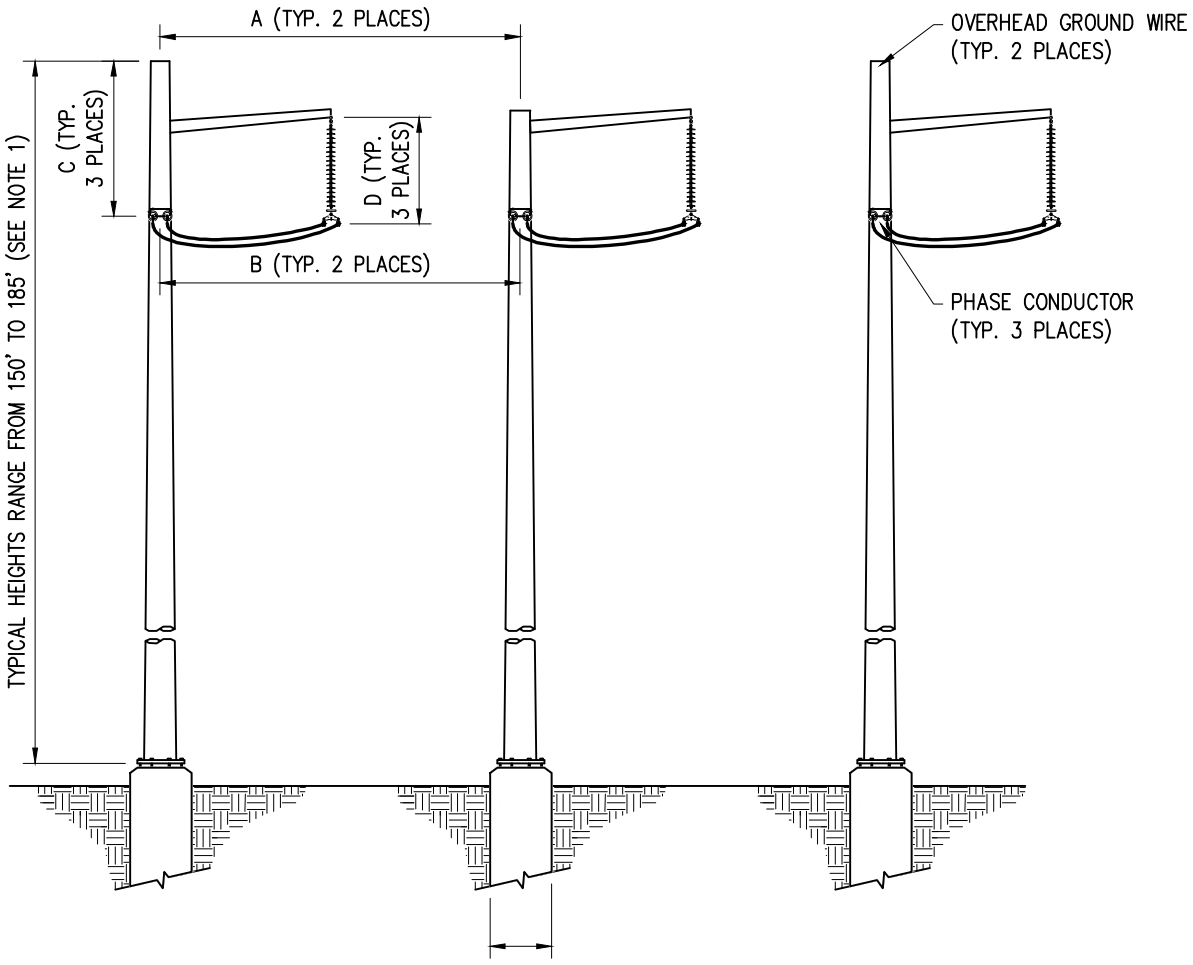
DESIGNED	S. REED	06/06/24
CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL MONOPOLE
TYPICAL 500kV EHV AC TANGENT

DWG. NAME: NPC-A-T009-411 | REVISION NO : C

Figure B-6. 500-kV Rosebud Transmission Line - Deadend Monopole Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	40-55
B	Phase Conductor Horizontal Offset from Structure Centerline	40-55
C	OPGW / Phase Conductor Vertical Separation at Structure	20-30
D	Phase Conductor Jumper String Length	15-25

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 150' TO 185'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 130' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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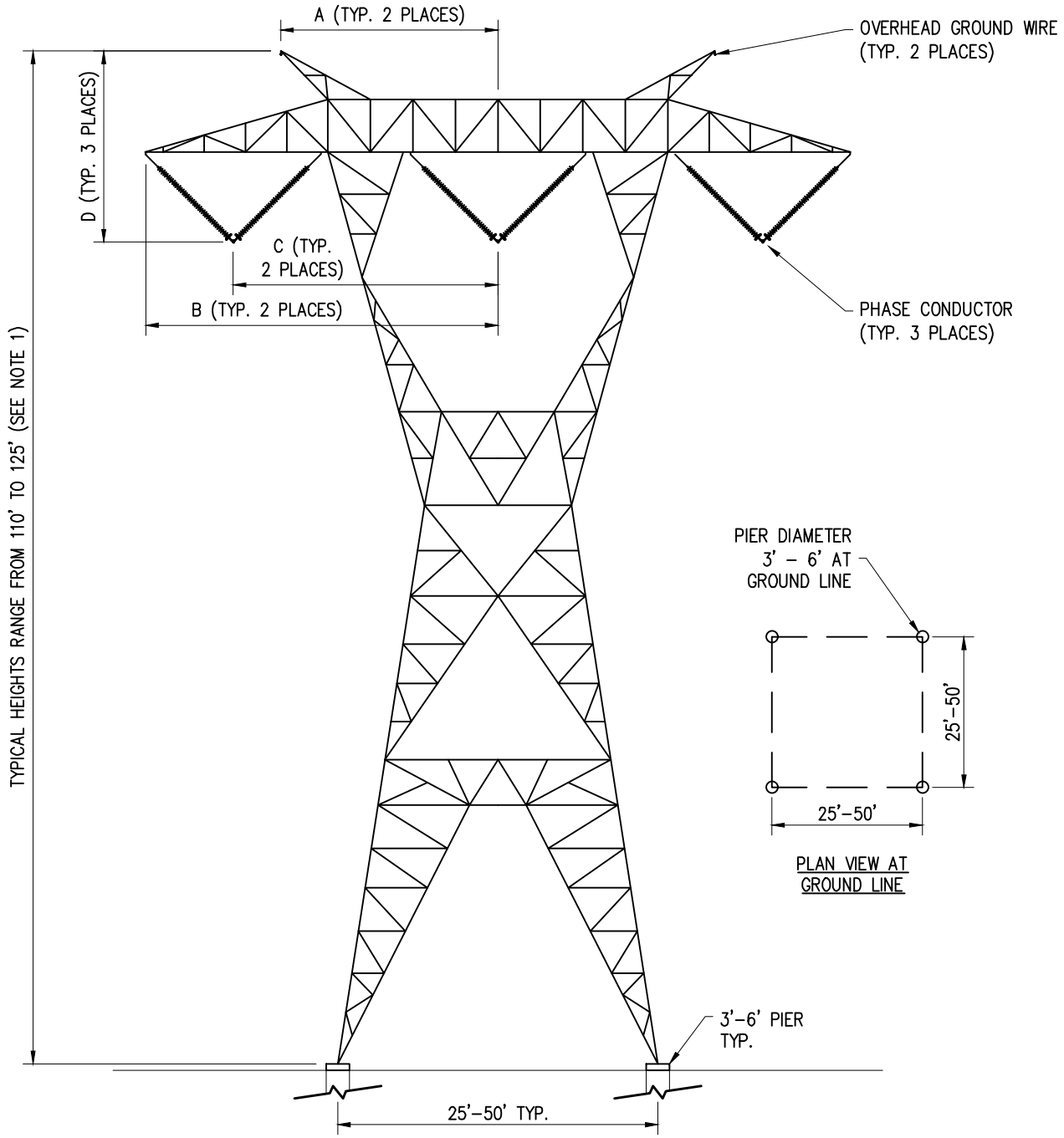
CHECKED	B. MATTHIES	11/15/23
APPROVED	M. HEIKENS	11/15/23
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL MONOPOLE
TYPICAL 500kV EHV AC DEADEND

DWG. NAME: NPC-A-T009-415 | REVISION NO : C

Figure B-7. 500-kV Rosebud Transmission Line - Tangent Lattice Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	20-40
B	Phase Conductor Support Arm Length from Structure Centerline	35-55
C	Phase Conductor Horizontal Offset from Structure Centerline	35-50
D	OPGW / Phase Conductor Vertical Separation at Structure	20-30

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 110' TO 125'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 90' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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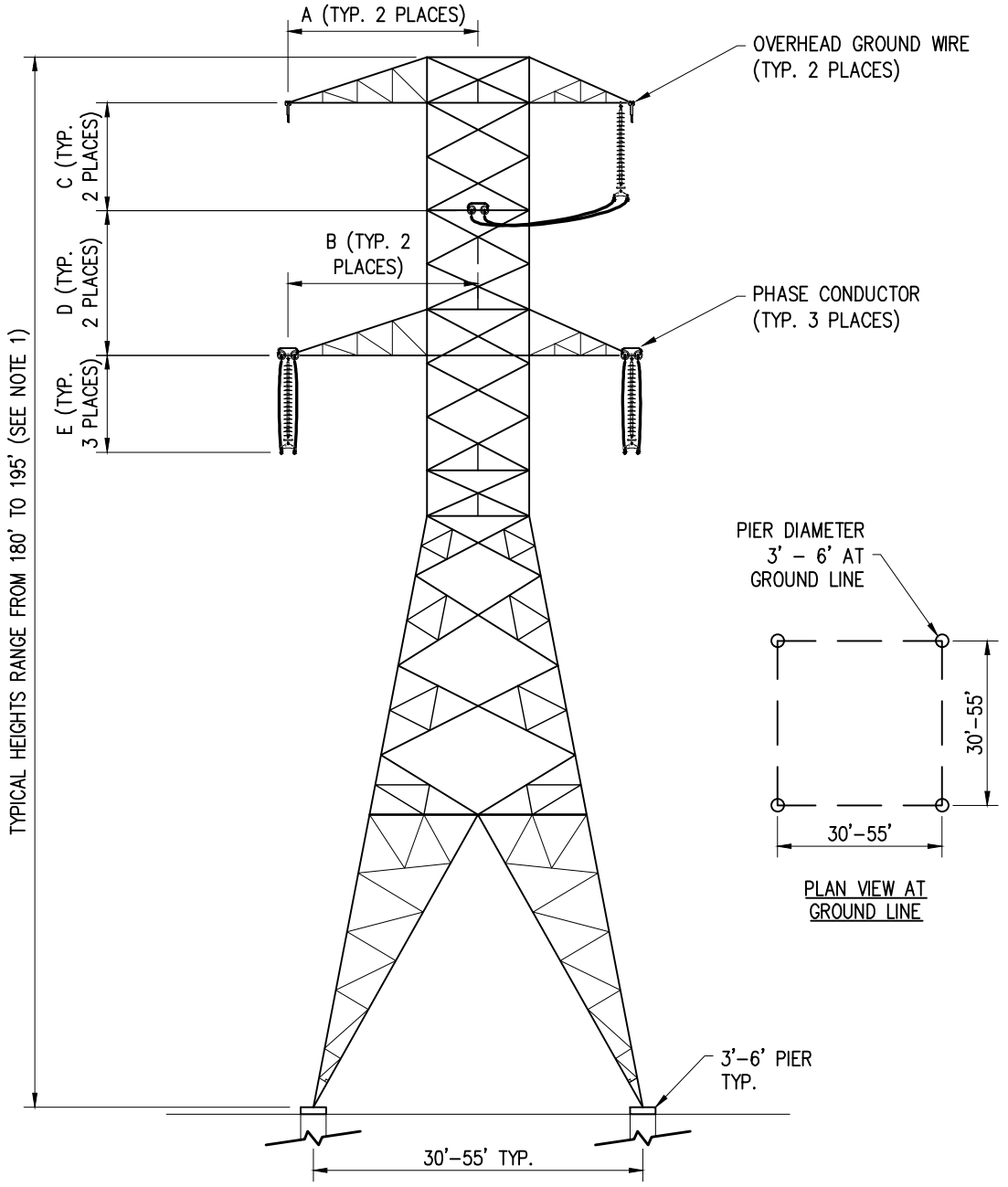
DESIGNED	S. REED	06/06/24
CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL LATTICE TOWER
TYPICAL 500kV EHV AC TANGENT

DWG. NAME: NPC-A-T009-421 | REVISION NO : C

Figure B-8. 500-kV Rosebud Transmission Line - Deadend Lattice Structure



Dimension	Description	Range (ft)
A	OPGW Horizontal Offset from Structure Centerline	30-45
B	Phase Conductor Horizontal Offset from Structure Centerline	30-45
C	OPGW / Phase Conductor Vertical Separation at Structure	20-30
D	Phase Conductor / Phase Conductor Vertical Separation at Structure	25-35
E	Phase Conductor Jumper String Length	15-25

NOTES:

1. MOST STRUCTURE HEIGHTS RANGE FROM 180' TO 195'. HOWEVER, ANTICIPATED STRUCTURE HEIGHTS CAN BE AS LOW AS 130' OR AS HIGH AS 195'.

DISCLAIMER: FINAL FRAMING DIMENSIONS SUBJECT TO CHANGE PENDING DETAILED ENGINEERING.

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CHECKED	B. MATTHIES	06/06/24
APPROVED	M. HEIKENS	06/06/24
DWG SCALE: NTS	PLT SCALE: 1:1	

NORTH PLAINS CONNECTOR
SELF SUPPORTING STEEL LATTICE TOWER
TYPICAL 500kV EHV AC DEADEND

DWG. NAME: NPC-A-T009-425 | REVISION NO : C