

Attachment Q

Revised National Grid Engineering Drawings



NATIONAL GRID MERRIMACK VALLEY RELIABILITY PROJECT

DRAWING INDEX

DRAWING NO.	REVISION NO.	DESCRIPTION	DRAWING NO.	REVISION NO.	DESCRIPTION
400298-C-R-001	1	COVER SHEET	400298-C-S-12	1	115_ST_DASU_RS FRAMING DETAIL
400298-C-R-002	2	DRAWING INDEX	400298-C-S-13	1	115_ST_HFDE_SW FRAMING DETAIL
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400298-C-R-308	2	PLAN AND PROFILE-Y151	400298-C-S-19	2	115_WD_HFDE FRAMING DETAIL
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400298-C-R-310	2	PLAN AND PROFILE-Y151	400298-C-S-51	1	345_ST_HFSU_NB FRAMING DETAIL
400298-C-R-311	2	PLAN AND PROFILE-Y151	400298-C-S-52 SH. 1	1	345_ST_HFDE FRAMING DETAIL
400298-C-R-312	2	PLAN AND PROFILE-Y151	400298-C-S-52 SH. 2	1	345_ST_HFDE FRAMING DETAIL
400298-C-R-706	2	PLAN AND PROFILE-3124	400298-C-S-53	1	345_ST_3PDE FRAMING DETAIL
400298-C-R-707	2	PLAN AND PROFILE-3124	400298-C-S-54	1	345_ST_SPDE FRAMING DETAIL
400298-C-R-708	1	PLAN AND PROFILE-3124	400298-C-F-EX-01	1	REINFORCED CONCRETE CAISSON FOUNDATION (SOIL)
400298-C-R-709	2	PLAN AND PROFILE-3124	400298-C-F-EX-02	1	REINFORCED CONCRETE CAISSON FOUNDATION (GROUTED REBAR)
400298-C-R-710	1	PLAN AND PROFILE-3124	400298-C-F-EX-03	1	REINFORCED CONCRETE CAISSON FOUNDATION (ROCK SOCKET)
400298-C-R-711	2	PLAN AND PROFILE-3124	SP.06.01.301.401	6	DIRECT EMBEDMENT FOUNDATION
400298-C-R-712	2	PLAN AND PROFILE-3124	SP.06.01.301.101 SH. 1	9	GROUNDING DETAILS FOR TRANSMISSION LINE STRUCTURES
400298-C-R-713	1	PLAN AND PROFILE-3124	SP.06.01.301.101 SH. 2	9	GROUNDING DETAILS FOR TRANSMISSION LINE STRUCTURES
400298-C-R-714	2	PLAN AND PROFILE-3124	SP.06.01.301.101 SH. 3	9	GROUNDING DETAILS FOR TRANSMISSION LINE STRUCTURES
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			SP.06.01.301.101 SH. 6	9	ALT. GROUNDING DETAILS INSTALL. W/O STEEL CULVERT
			400298-C-P-01 SH. 1	3	PHASING DIAGRAM-Y151
			400298-C-P-01 SH. 2	4	PHASING DIAGRAM-Y151
			400298-C-P-05	2	PHASING DIAGRAM-3124
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			400298-C-X-08 (P)	4	PROPOSED CROSS SECTION
			400298-C-X-09 (E)	4	EXISTING CROSS SECTION
			400298-C-X-09 (P)	3	PROPOSED CROSS SECTION

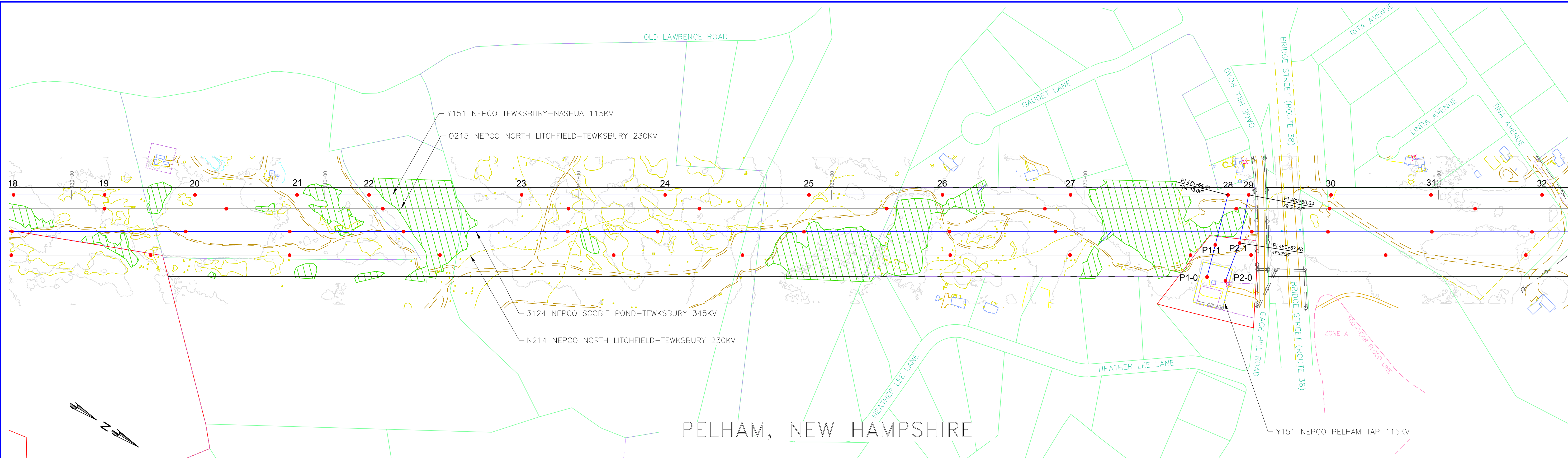
NOTES
REFER TO PSNH NHSEC PERMIT DRAWING SET FOR
LINE 3124, Y151 KEY SHEET DRAWING

nationalgrid		MERRIMACK VALLEY RELIABILITY PROJECT	DRAWING INDEX
PREPARED BY MKB	02/05/16	REVIEWED BY FTX	02/05/16
APPROVED BY NPA	02/05/16	SCALE	N.T.S.
SHEET	1	OF	1
INDEX	400298		
VERSION	1	DESCRIPTION	JLM FTX INPA
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3	4	5	6
4	5	6	7

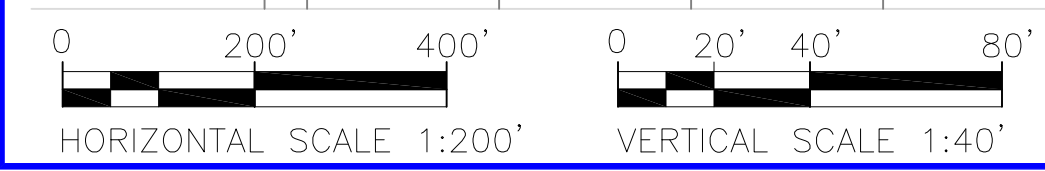
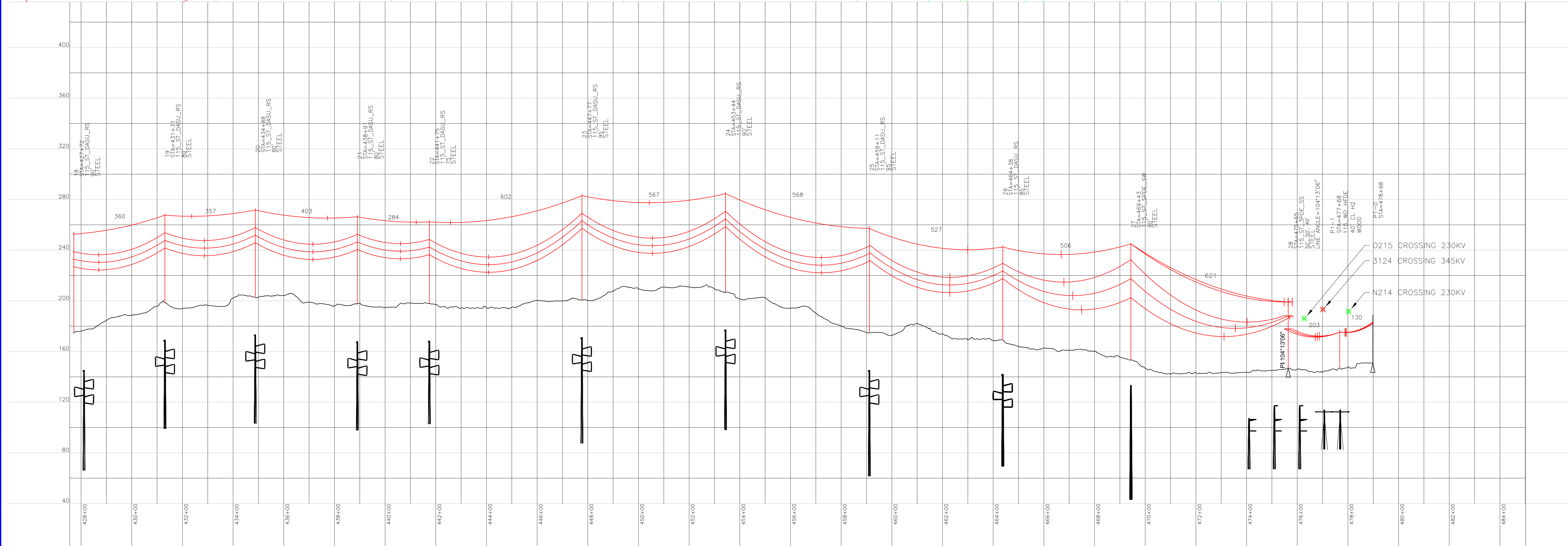
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PELHAM, NEW HAMPSHIRE



PROPOSED OPGW (TO BE DETERMINED) SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

nationalgrid

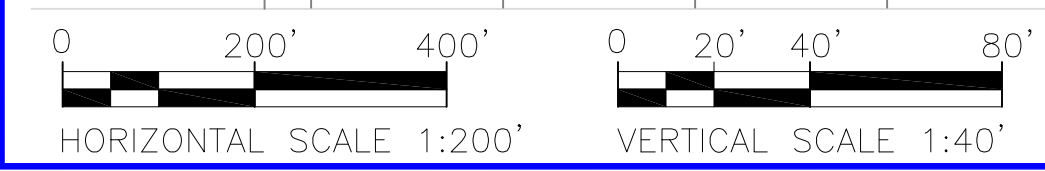
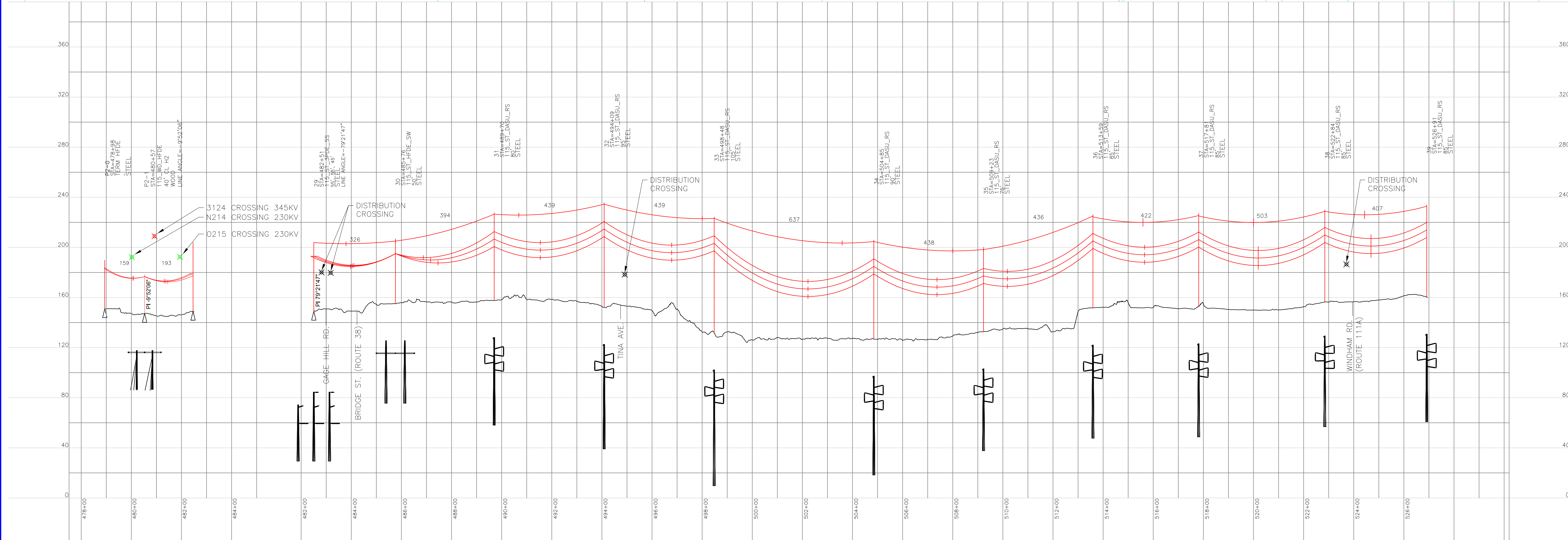
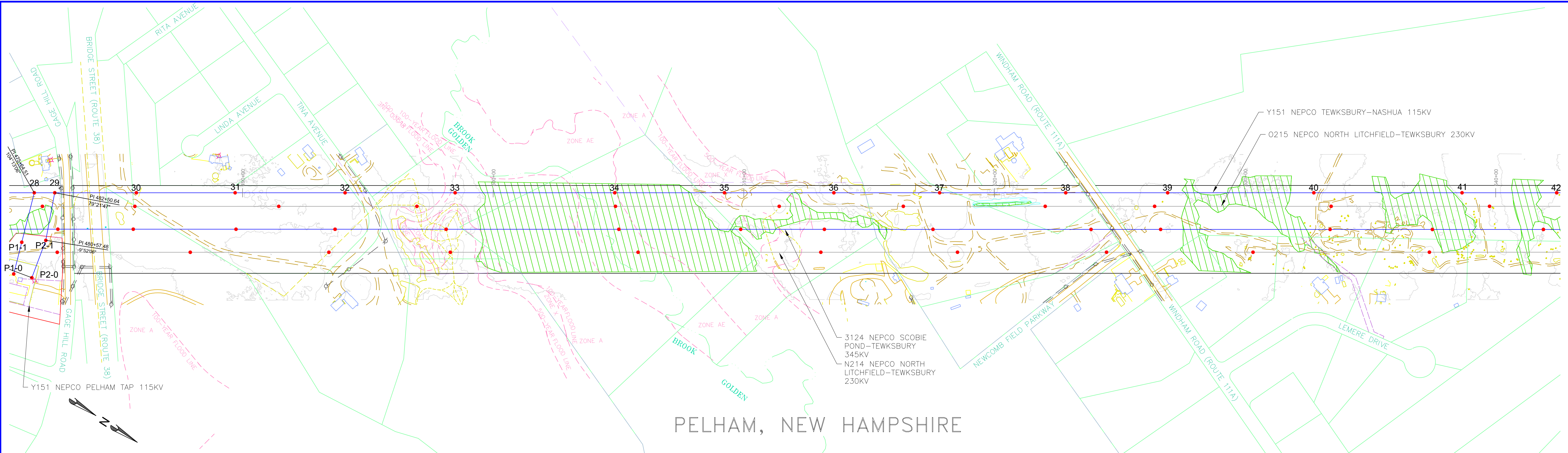
MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE Y151 115KV

VER	DATE	DESCRIPTION
1	05/22/15	NHSEC PERMIT FILING
2	10/29/15	115KV ST-HFDE TAP STRUCTURE REVISED TO 115 WD-HFDE
3	02/05/16	REVISED NHSEC FILING
4		
5		
6		
7		

PREPARED BY MKB 02/05/16
 REVIEWED BY FTX 02/05/16
 APPROVED BY NPA 02/05/16
 SCALE 1" = 400'
 SHEET 1 OF 1
 INDEX 400298

APPROVED (PRINT)	VERSION
JLM/FTX/NPA	3
MKB/FTX/NPA	
MKB/FTX/NPA	

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 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

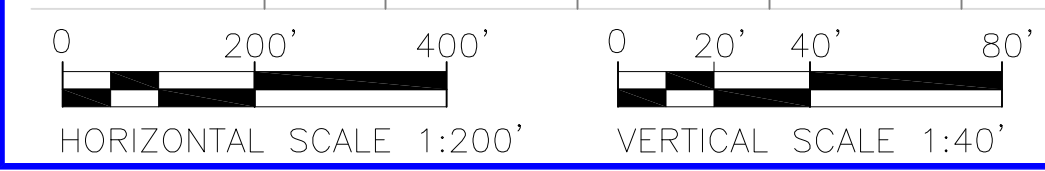
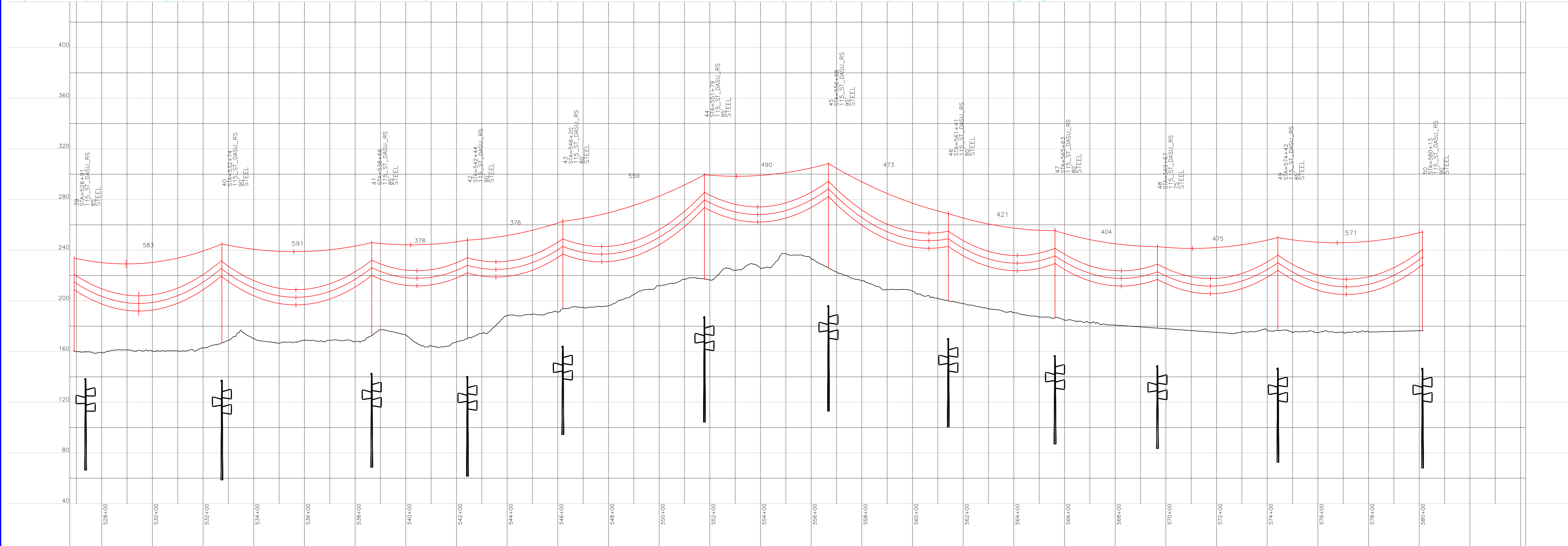
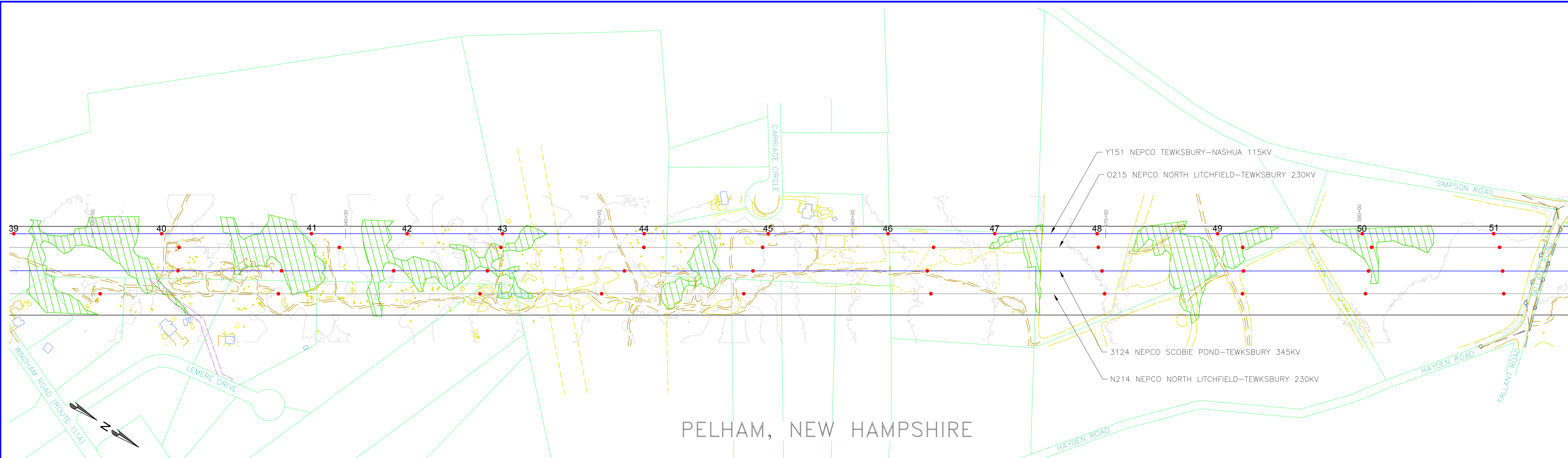
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MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE Y151 115KV

VER	DATE	DESCRIPTION
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3	02/05/16	REVISED INHSEC FILING
4		
5		
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7		

PREPARED BY MKB 02/05/16
 REVIEWED BY FTX 02/05/16
 APPROVED BY NPA 02/05/16
 SCALE 1 OF 1
 SHEET INDEX 400298

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PROPOSED OPGW (TO BE DETERMINED)
 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285
 SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE Y151 115KV

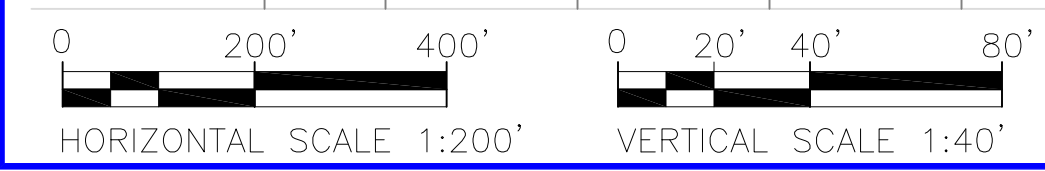
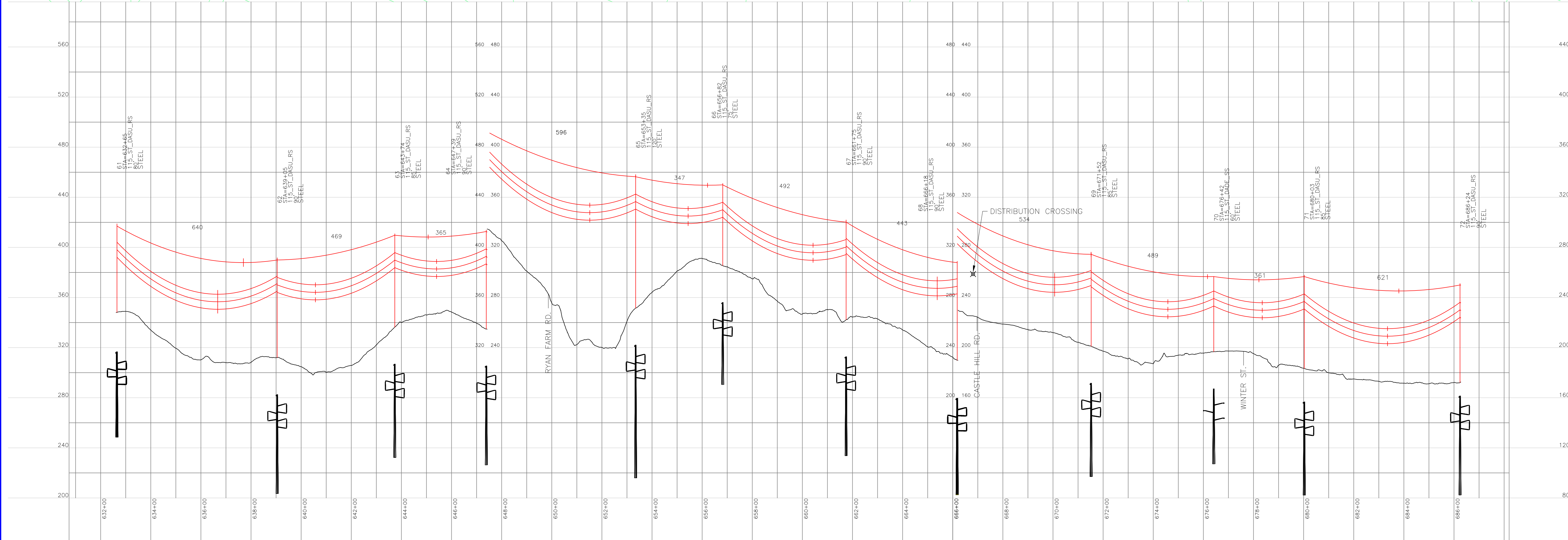
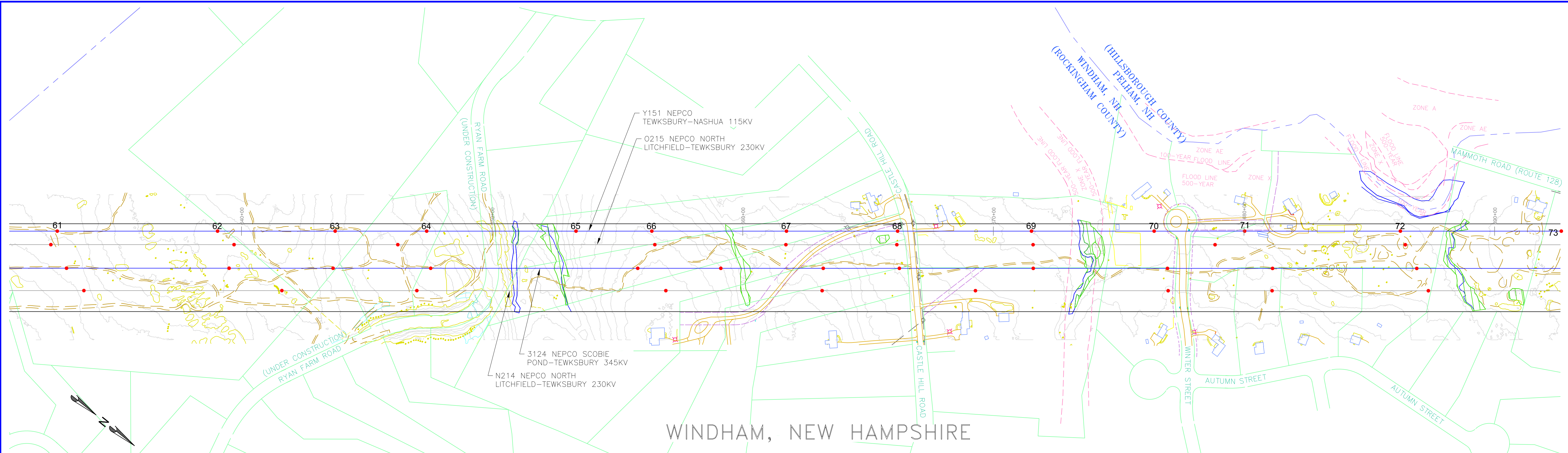
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 REVIEWED BY: FTX 02/05/16
 APPROVED BY: NPA 02/05/16
 SCALE: 1" = 200'
 SHEET: 1 OF 1
 INDEX: 400298

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VER	DATE	DESCRIPTION
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2	02/05/16	REVISED INPSEC FILING
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VERSION: 2

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 SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

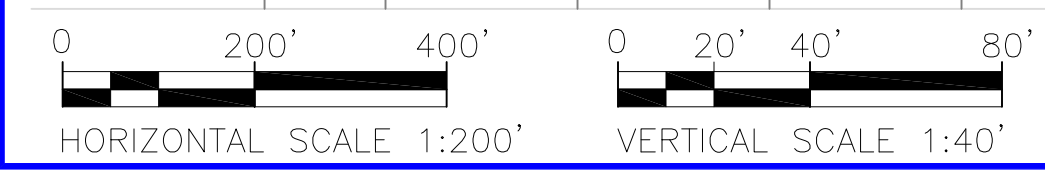
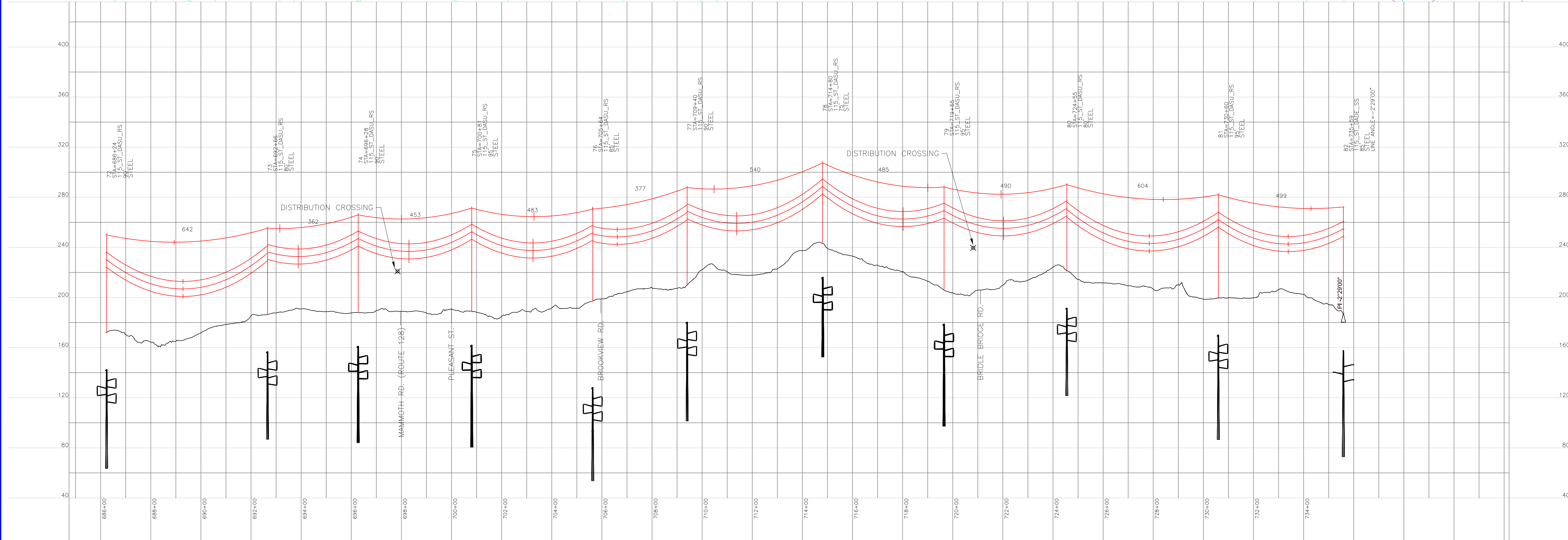
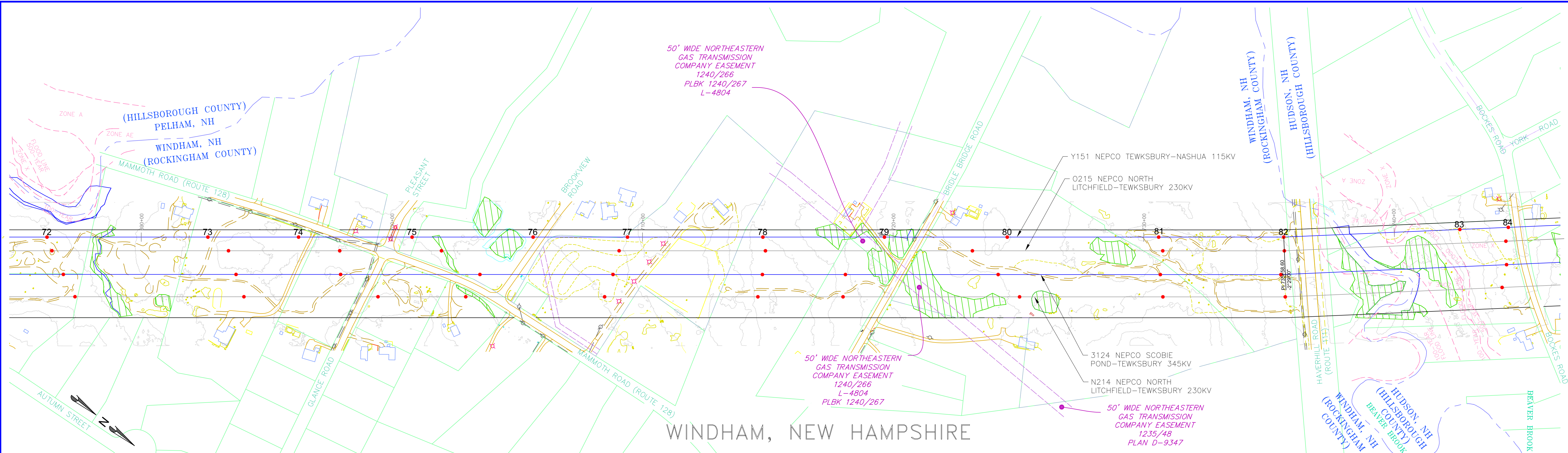
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MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE Y151 115KV

VER	DATE	DESCRIPTION
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PREPARED BY: MKB 02/05/16
 REVIEWED BY: FTX 02/05/16
 APPROVED BY: NPA 02/05/16
 SCALE: 1" = 400'
 SHEET: 1 OF 1
 INDEX: 400298

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SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

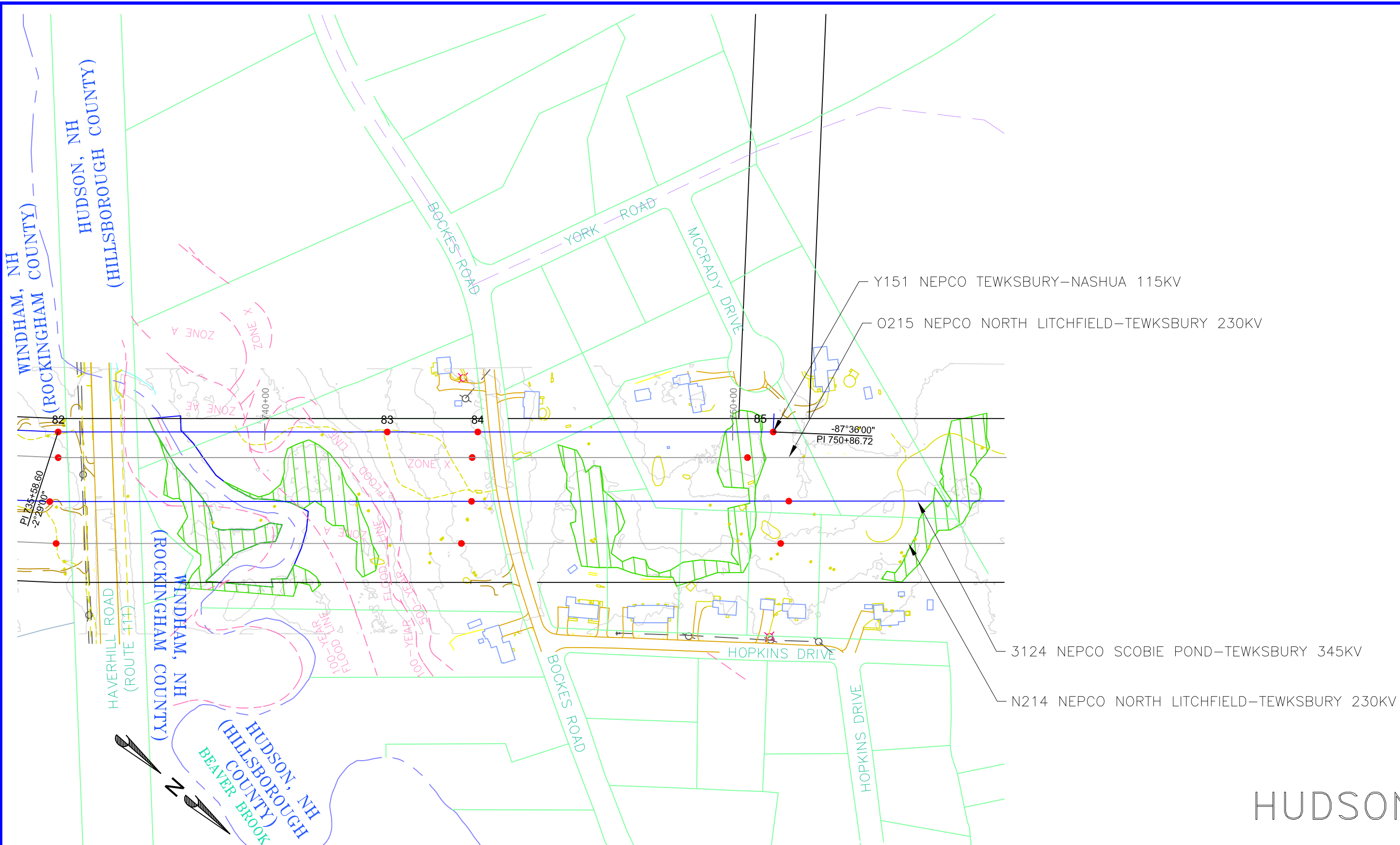
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PLAN AND PROFILE DRAWINGS		REVIEWED BY	FTX	DATE	02/05/16
SCOBIE POND TO TEWKSBURY		APPROVED BY	NPA	DATE	02/05/16
LINE Y151 115KV		SCALE	1" = 400'	SHEET	1 OF 1
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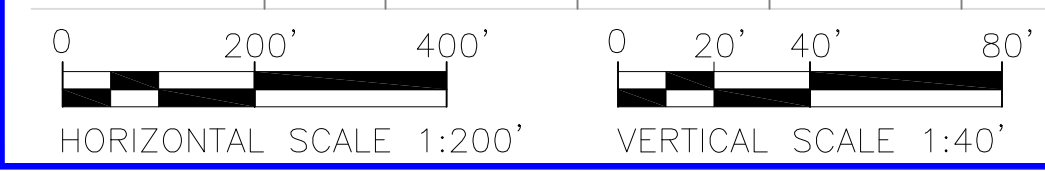
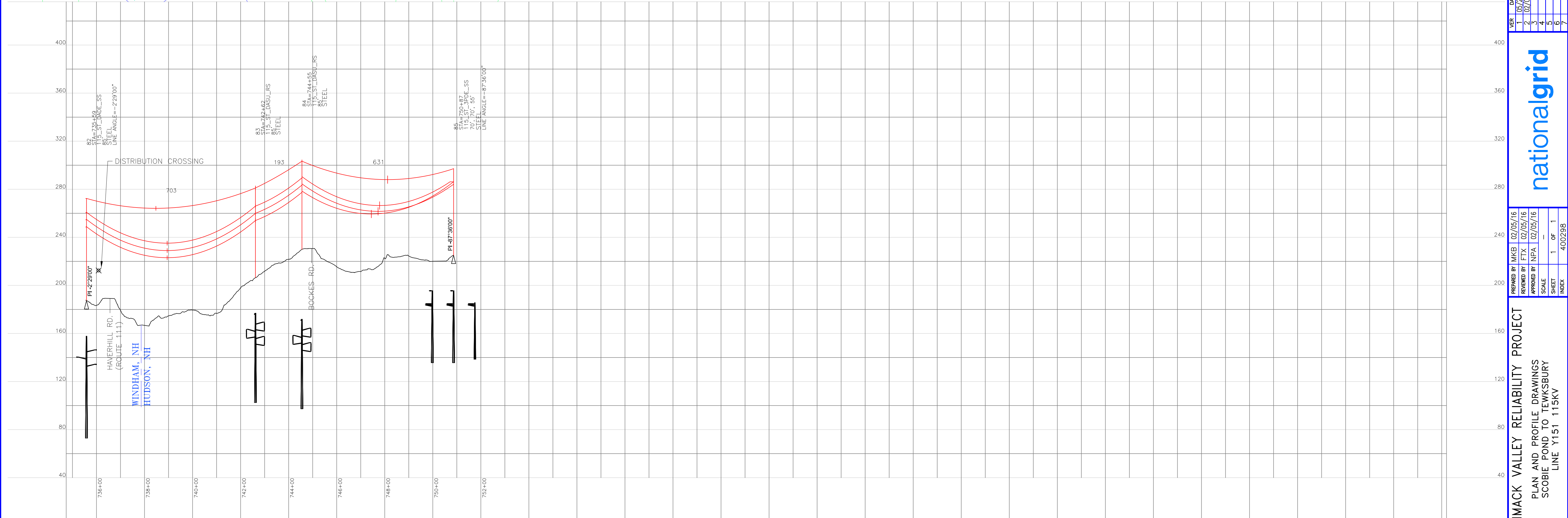
PREPARED BY	MKEB
REVIEWED BY	FTX
APPROVED BY	NPA
SCALE	1" = 400'
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VERSION	2
APPROVED BY	JLM/FTX/NPA
APPROVED BY	MKEB/FTX/NPA

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HUDSON, NEW HAMPSHIRE



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 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

INCHES ON ORIGINAL

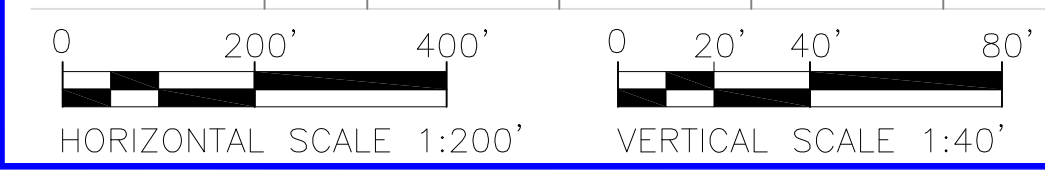
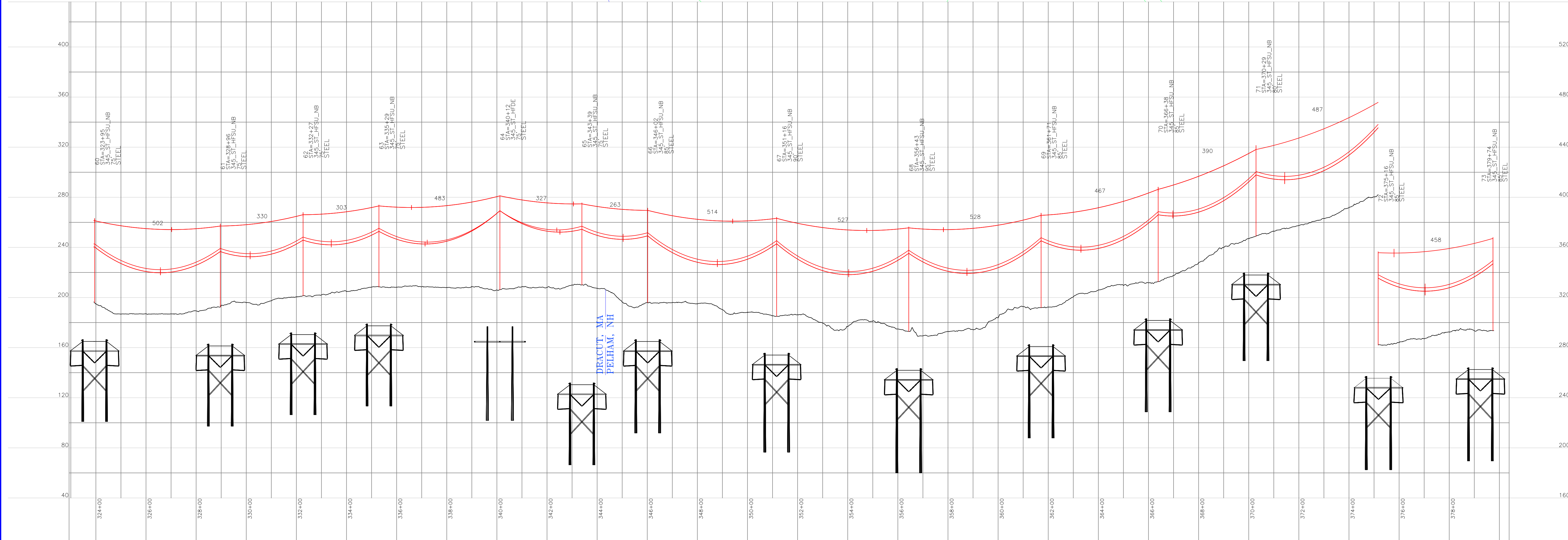
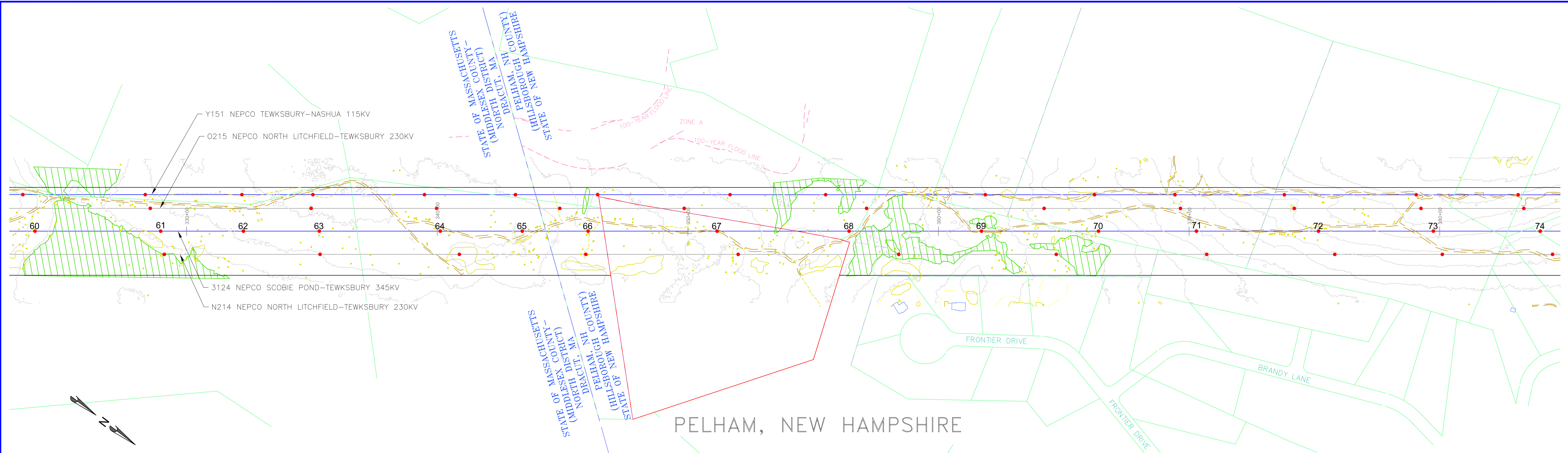
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PLAN AND PROFILE DRAWINGS		REVIEWED BY	FTX	DATE	02/05/16
SCOBIE POND TO TEWKSBURY		APPROVED BY	NPA	DATE	02/05/16
LINE Y151 115KV		SCALE	1"	SHEET	1 OF 1
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VER	DATE	DESCRIPTION
1	05/22/15	INPSEC PERMIT FILING
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JLM	FTX	NPA
MKB	FTX	NPA

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PROPOSED 3/8"-7 STRAND EHS AND OPGW (TO BE DETERMINED)
 PROPOSED BUNDLED FALCON 1590 KCMIL 54/19 ACSR
 SHIELD WIRE SHOWN AT NESC HEAVY, 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY, 10000 LBS 284°F MAX SAG

INCHES ON ORIGINAL

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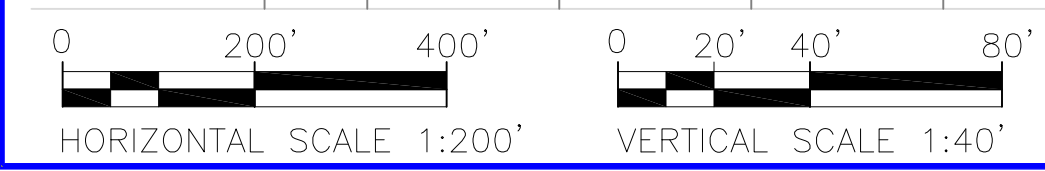
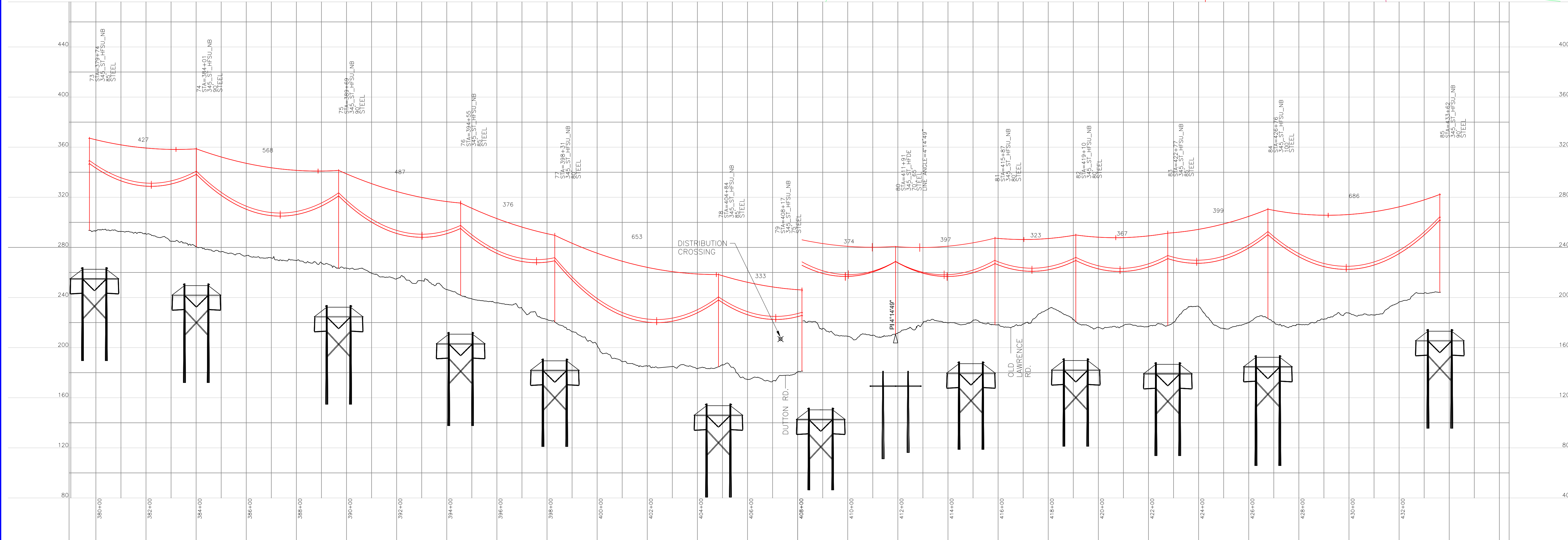
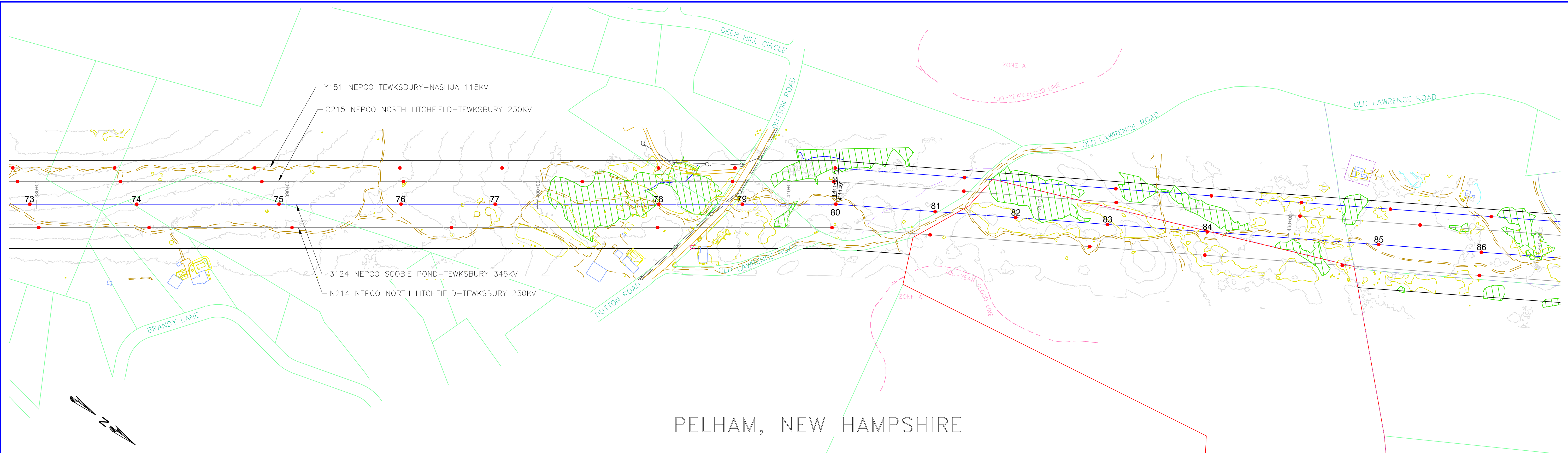
MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE 3124 345KV

PREPARED BY	DATE	DESCRIPTION
MKB	02/05/16	INDEX
FTX	02/05/16	SCALE
NPA	02/05/16	SHEET 1 OF 1

VER	DATE	DESCRIPTION
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PROPOSED 3/8"-7 STRAND EHS AND OPGW (TO BE DETERMINED)
PROPOSED BUNDLED FALCON 1590 KCMIL 54/19 ACSR

SHIELD WIRE SHOWN AT NESC HEAVY, 4000 LBS, 60°F MAX SAG
CONDUCTOR SHOWN AT NESC HEAVY, 10000 LBS 284°F MAX SAG

INCHES ON ORIGINAL

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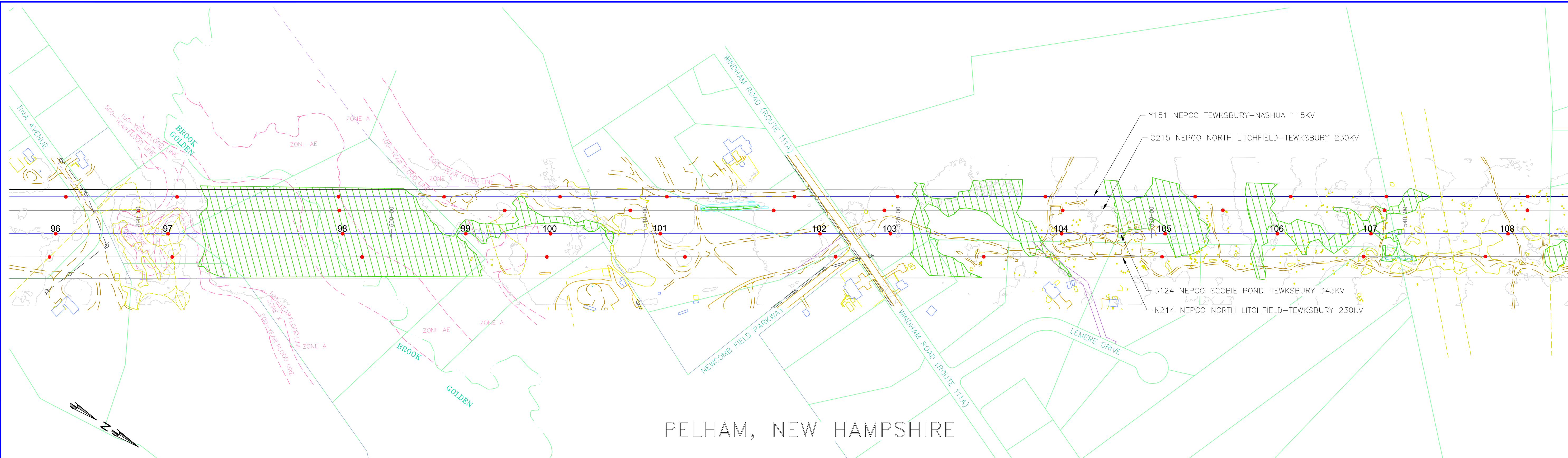
MERRIMACK VALLEY RELIABILITY PROJECT
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SCOBIE POND TO TEWKSBURY
LINE 3124 345KV

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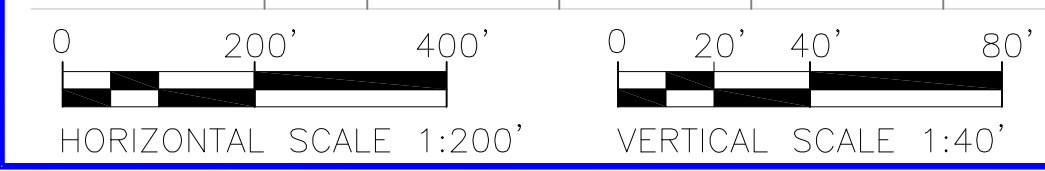
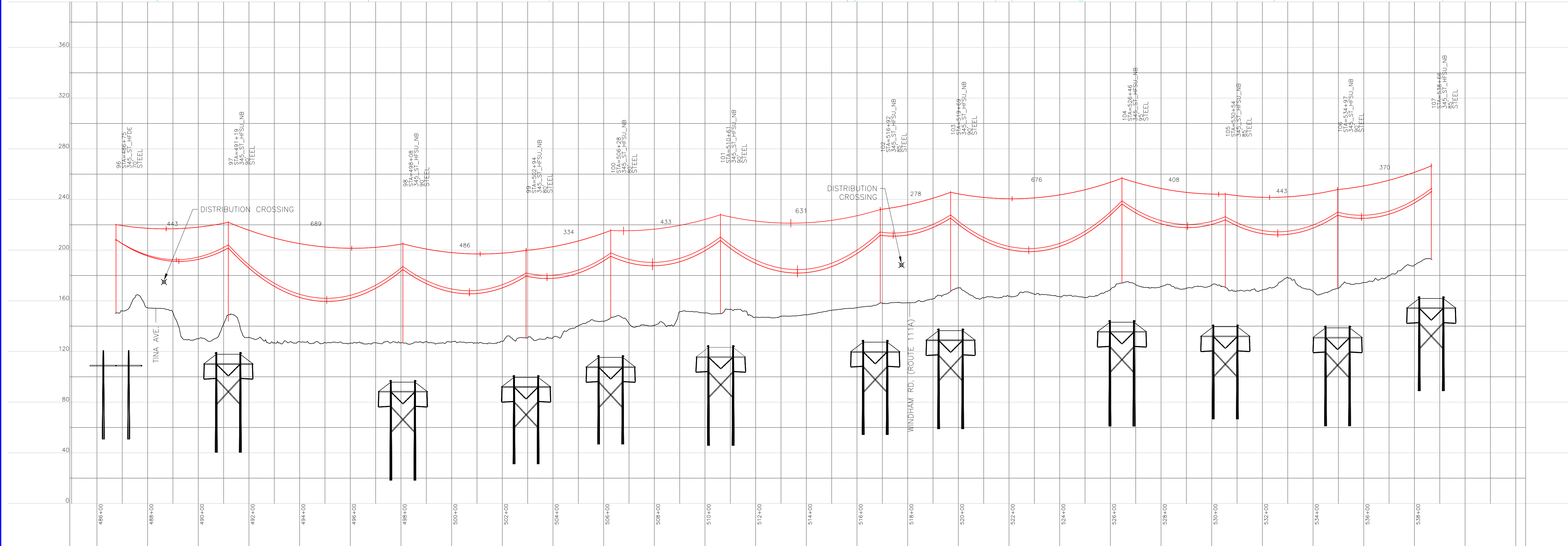
PREPARED BY MKB 02/05/16
REVIEWED BY FTX 02/05/16
APPROVED BY NPA 02/05/16
SCALE 1" = 400' INDEX 1 OF 1

400298

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PELHAM, NEW HAMPSHIRE



PROPOSED 3/8"-7 STRAND EHS AND OPGW (TO BE DETERMINED)
PROPOSED BUNDLED FALCON 1590 KCMIL 54/19 ACSR
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INCHES ON ORIGINAL

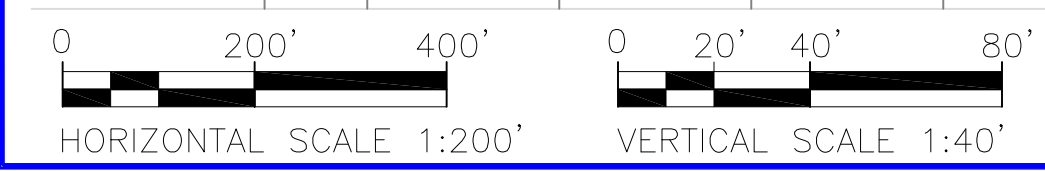
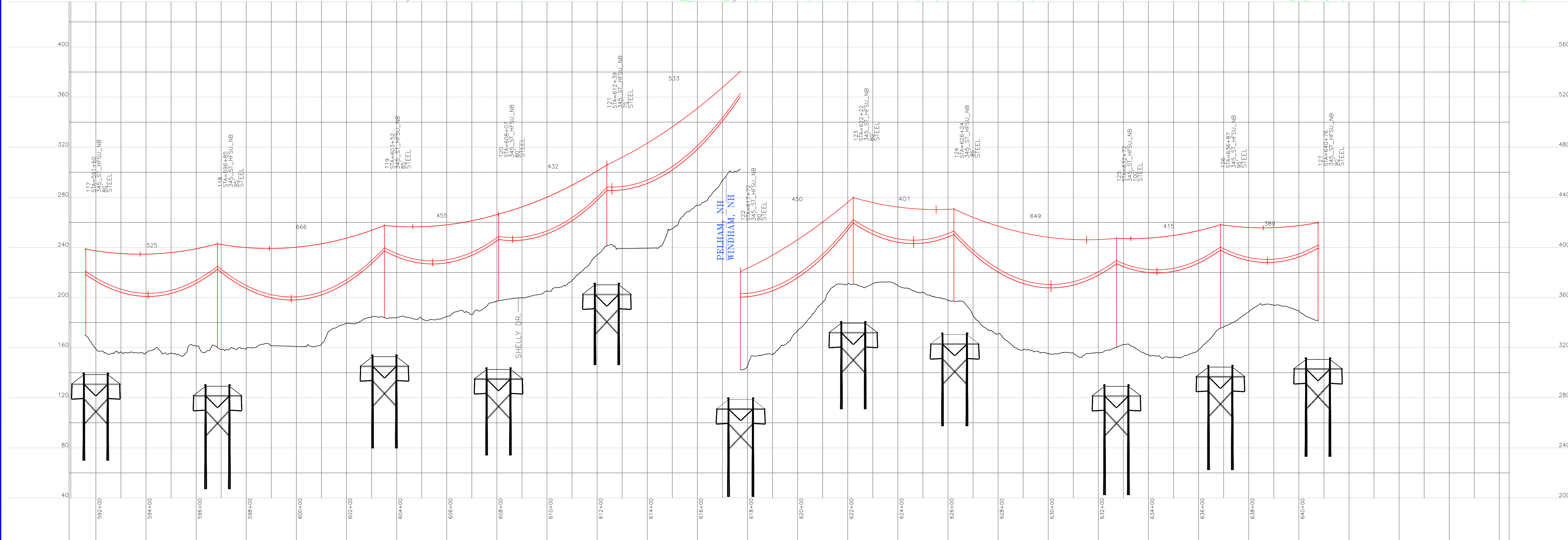
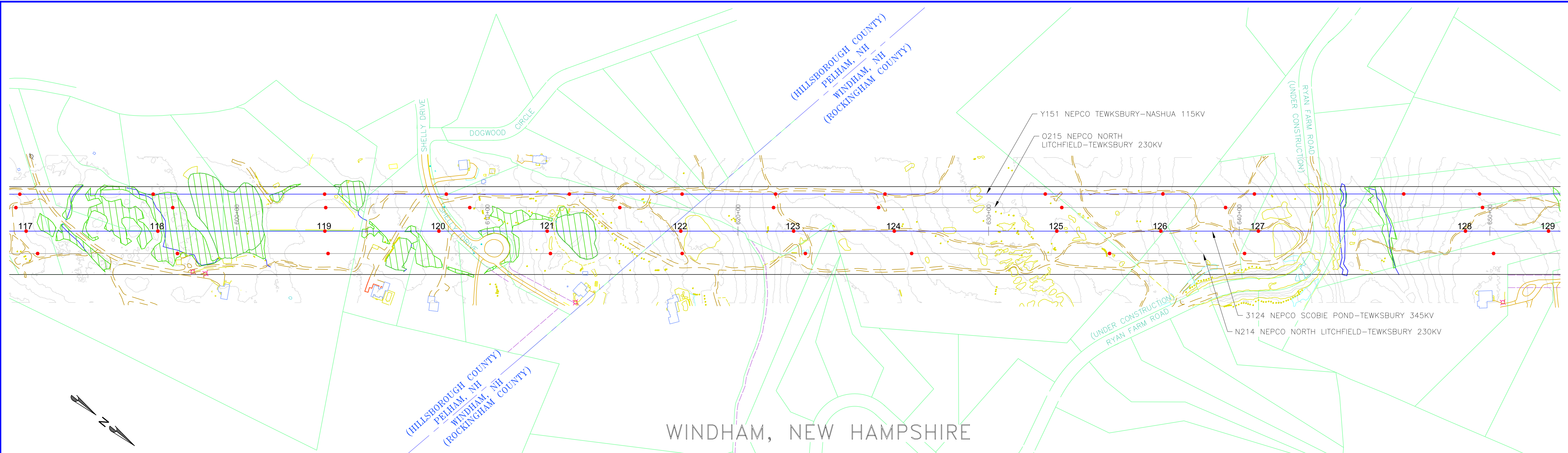
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MERRIMACK VALLEY RELIABILITY PROJECT
PLAN AND PROFILE DRAWINGS
SCOBIE POND TO TEWKSBURY
LINE 3124 345KV

VER	DATE	DESCRIPTION
1	05/22/15	INRSEC PERMIT FILING
2	02/05/16	REVISED INRSEC FILING
3		
4		
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PREPARED BY: MKB 02/05/16
REVIEWED BY: FTX 02/05/16
APPROVED BY: NPA 02/05/16
SCALE: 1" = 200'
SHEET: 1 OF 1
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INCHES ON ORIGINAL

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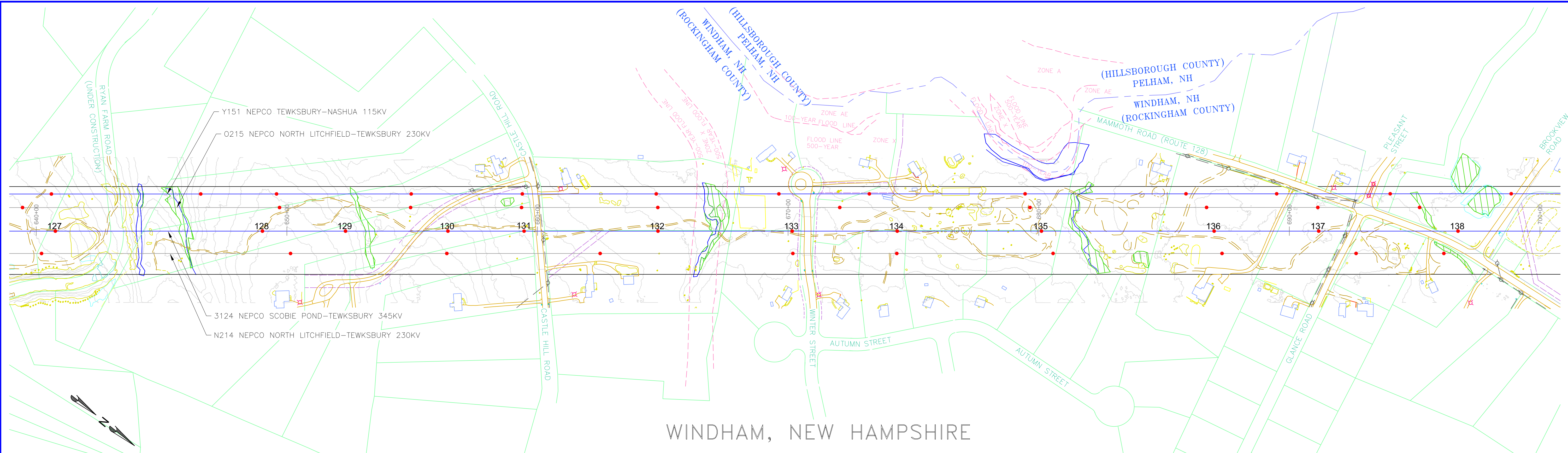
MERRIMACK VALLEY RELIABILITY PROJECT
PLAN AND PROFILE DRAWINGS
SCOBIE POND TO TEWKSBURY
LINE 3124 345KV

VER	DATE	DESCRIPTION
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2	02/05/16	REVISED INPSEC FILING
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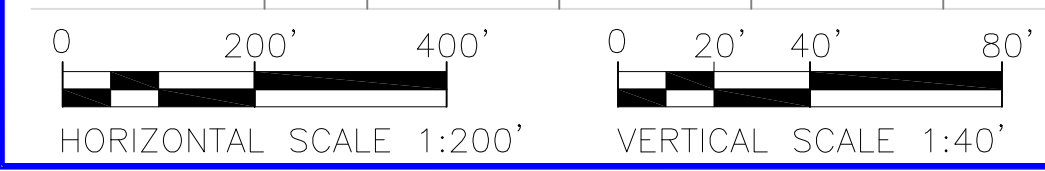
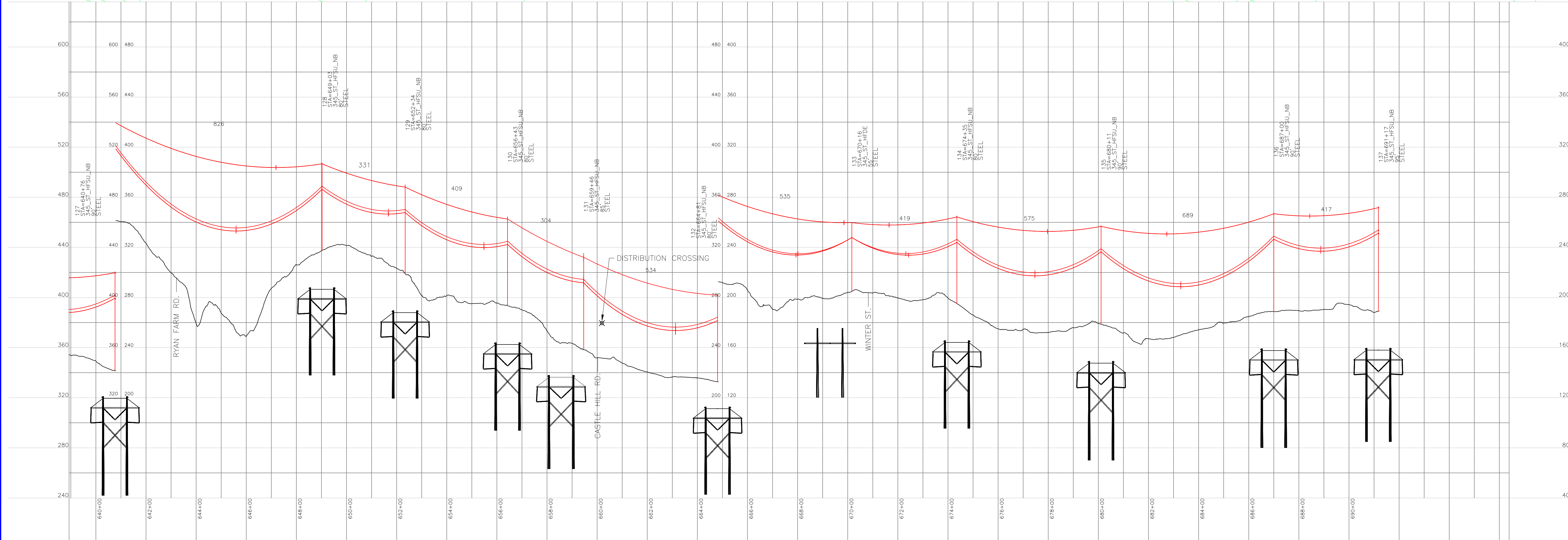
PREPARED BY	MKB	02/05/16
REVIEWED BY	FTX	02/05/16
APPROVED BY	NPA	02/05/16
SCALE		
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WINDHAM, NEW HAMPSHIRE



PROPOSED 3/8"-7 STRAND EHS AND OPGW (TO BE DETERMINED)
 PROPOSED BUNDLED FALCON 1590 KCMIL 54/19 ACSR

SHIELD WIRE SHOWN AT NESC HEAVY, 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY, 10000 LBS 284°F MAX SAG

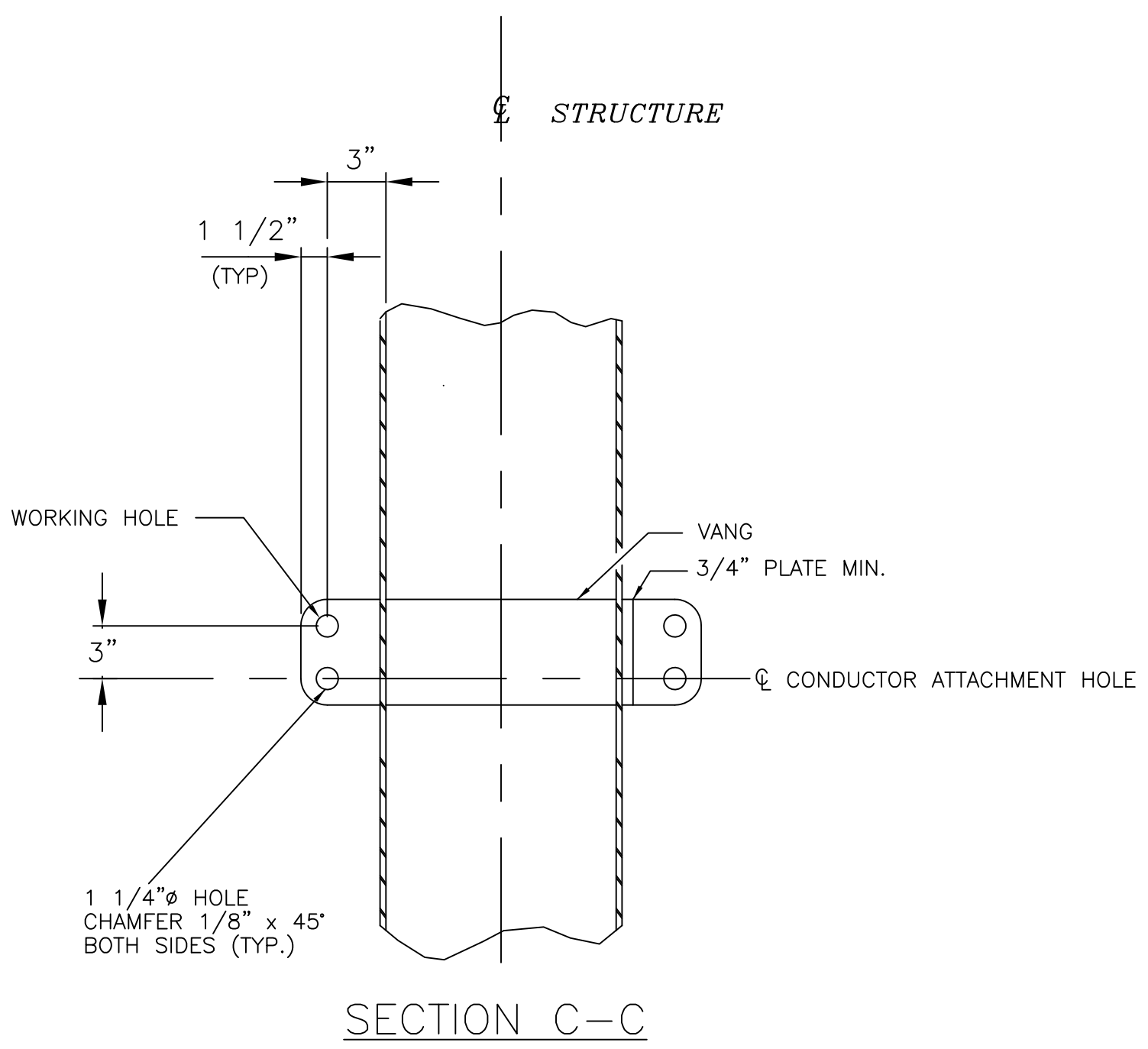
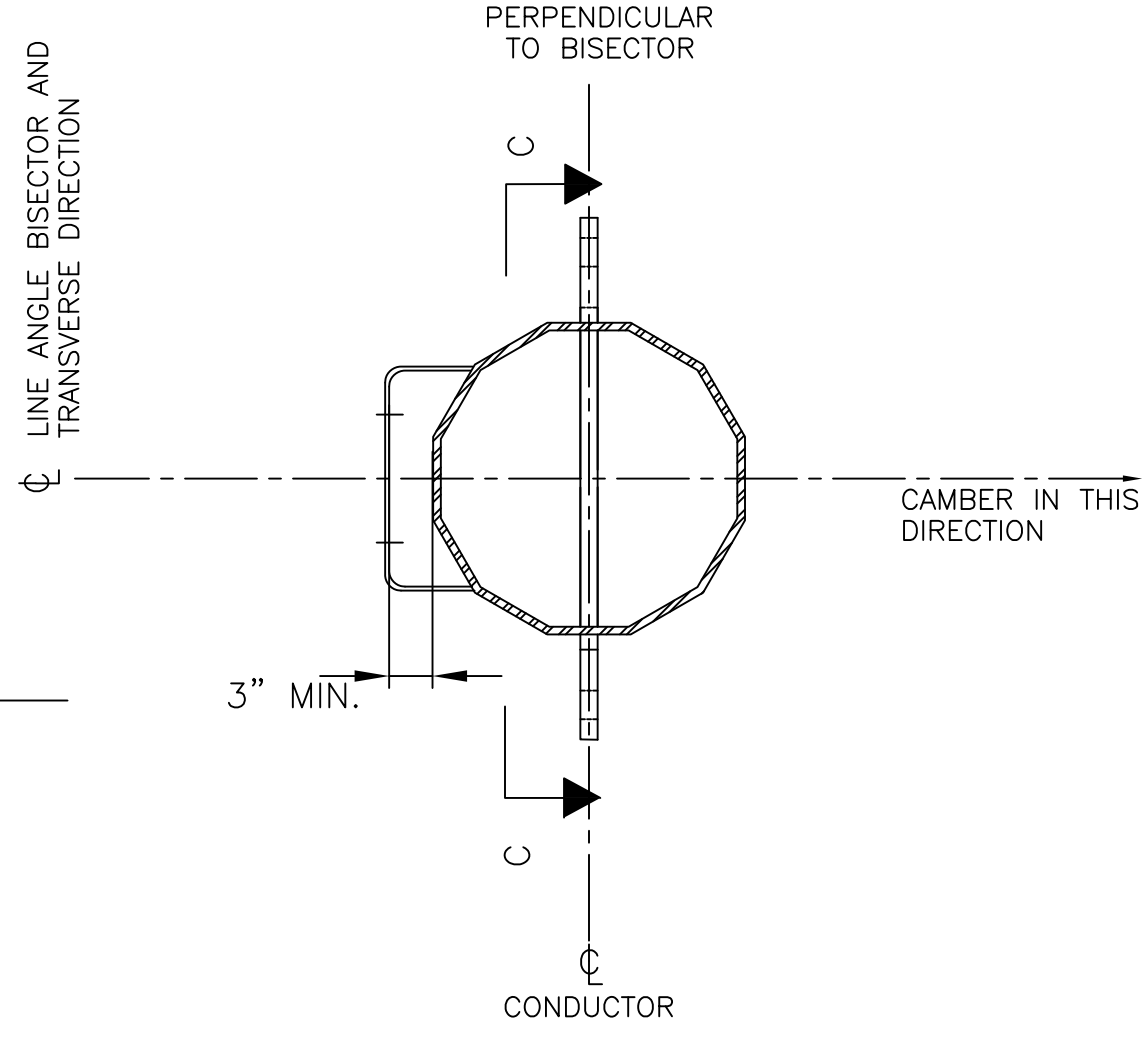
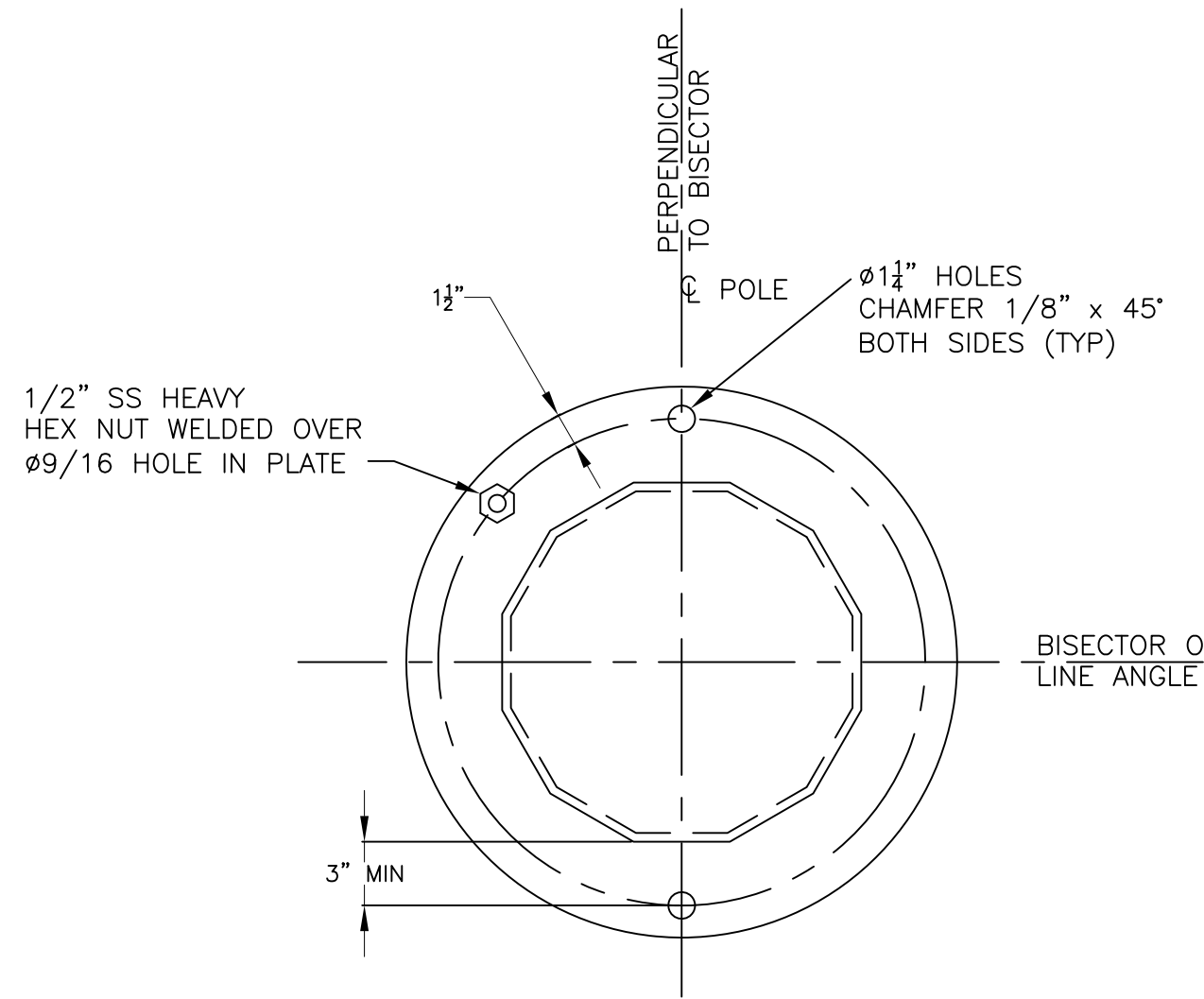
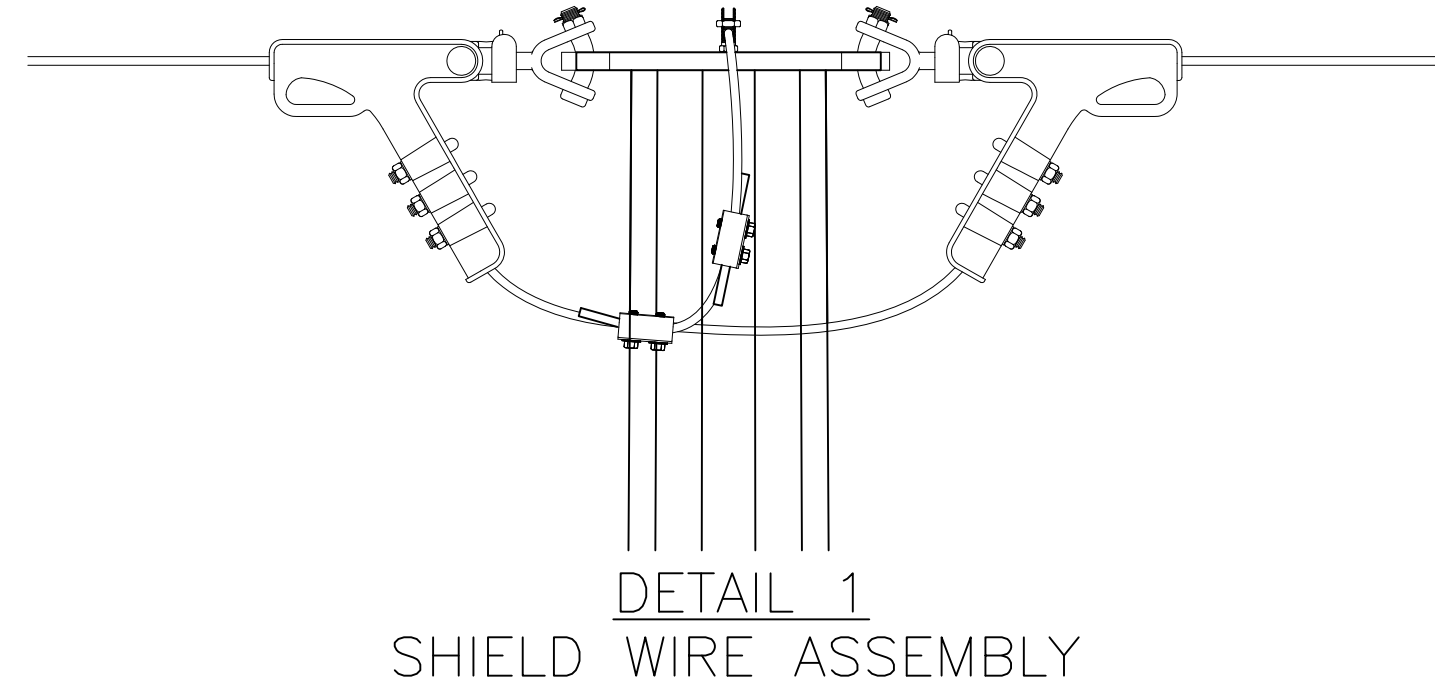
INCHES ON ORIGINAL

MERRIMACK VALLEY RELIABILITY PROJECT		PREPARED BY	MKB	DATE	02/05/16
PLAN AND PROFILE DRAWINGS		REVIEWED BY	FTX	DATE	02/05/16
SCOBIE POND TO TEWKSBURY		APPROVED BY	NPA	DATE	02/05/16
LINE 3124 345KV		SCALE	1" = 40'	SHEET	1 OF 1
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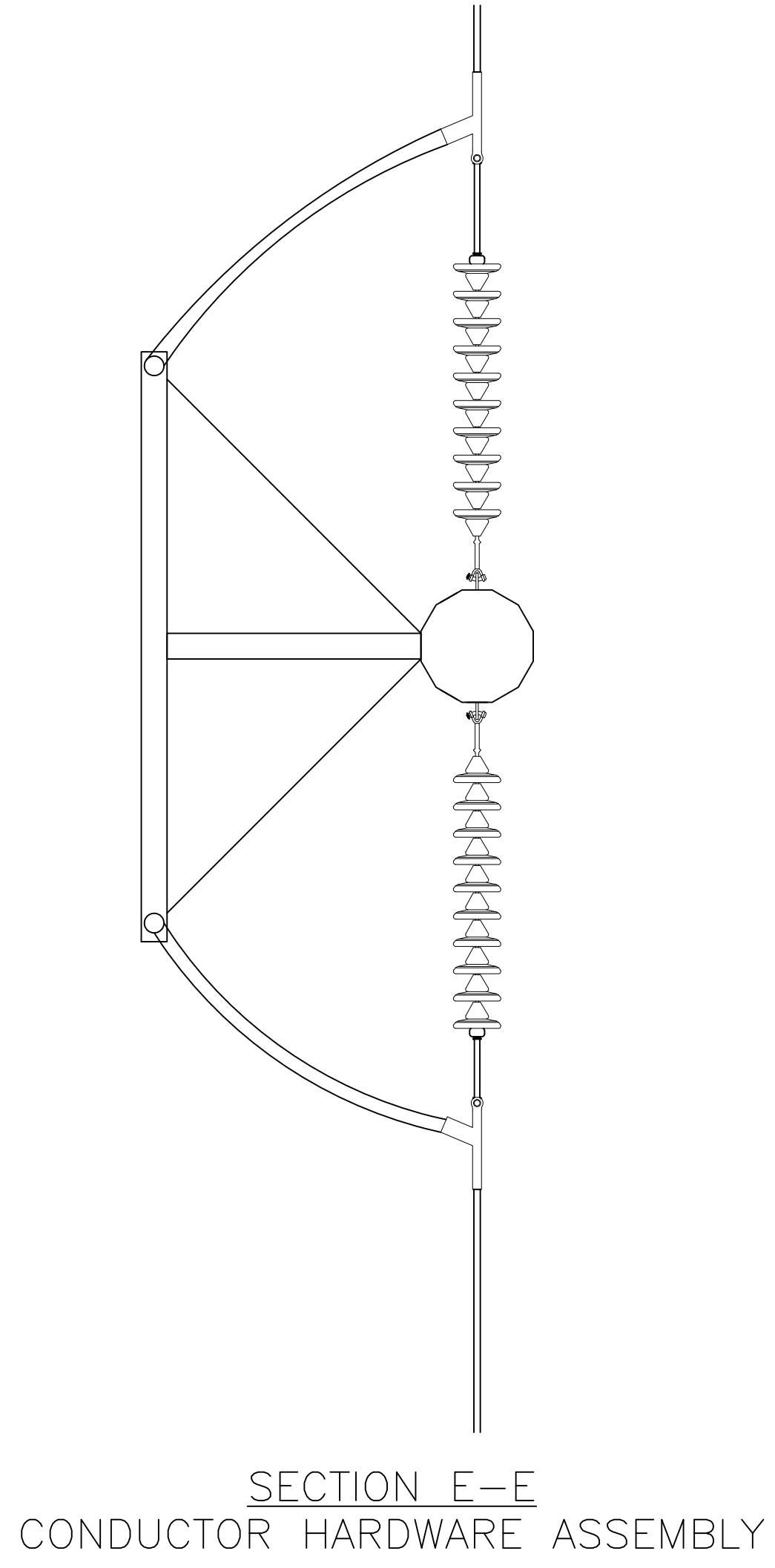
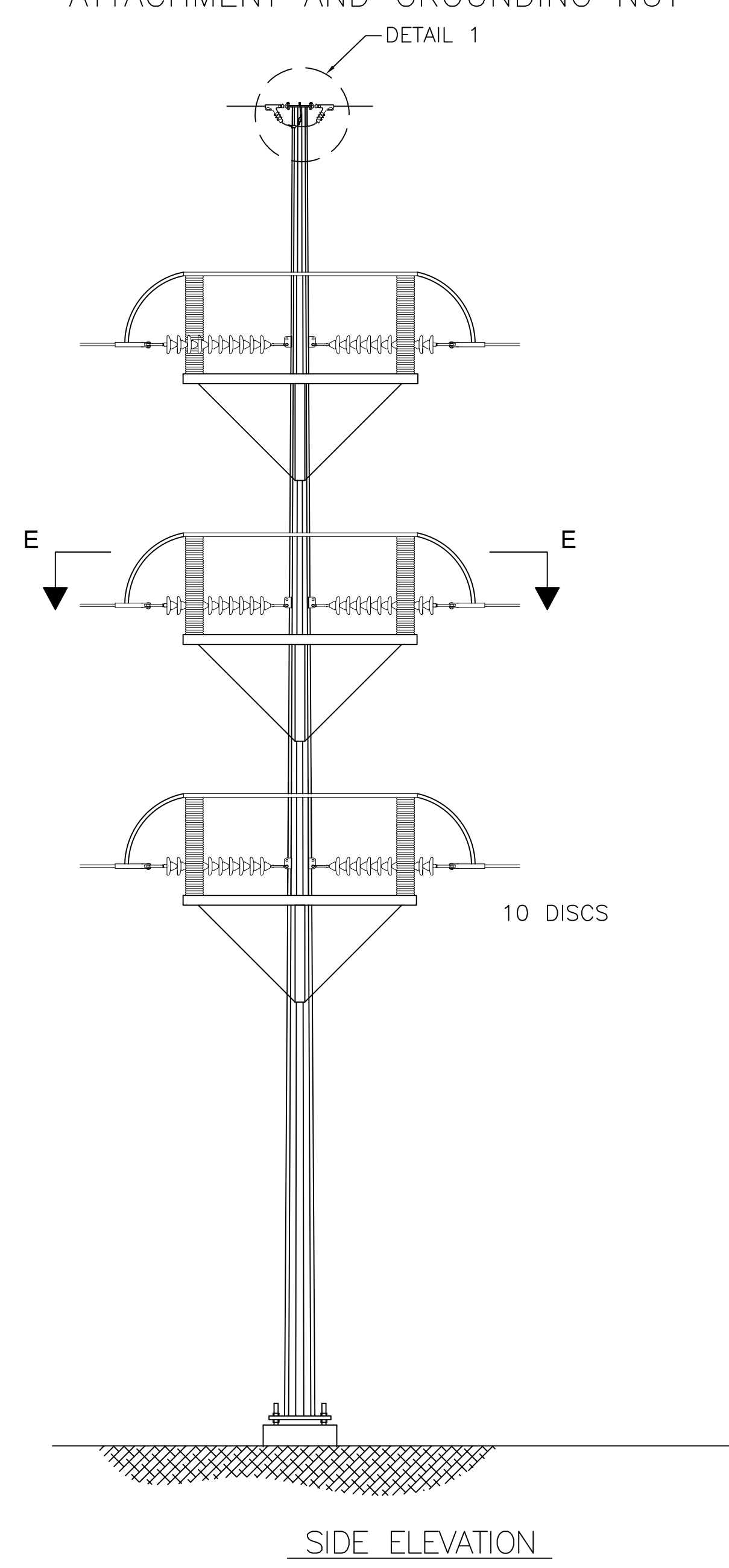
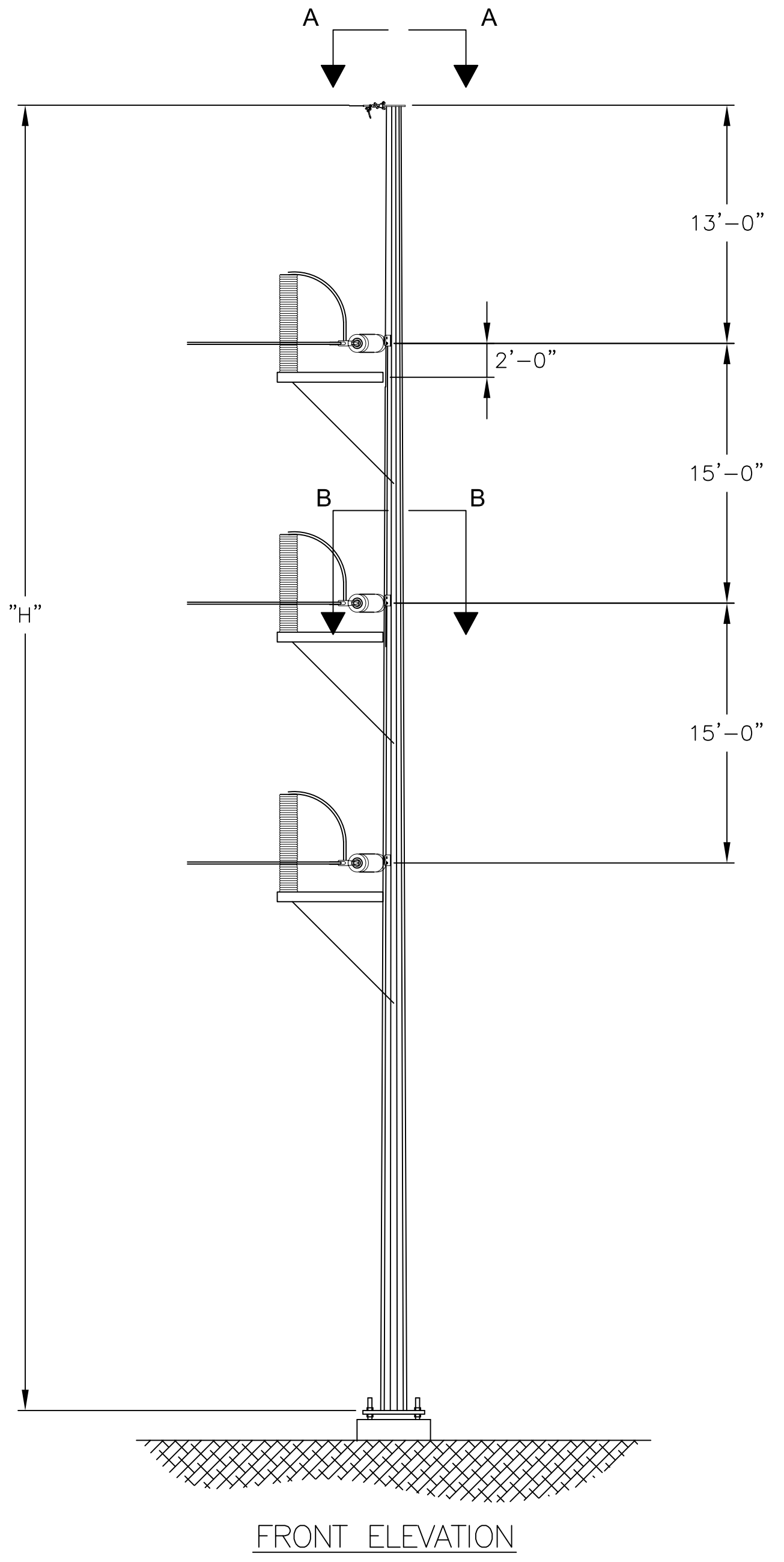
REVISION	DESCRIPTION	DATE
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2	REVISED INPSEC FILING	02/05/16
3		
4		
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APPROVED (PROJECT)	VERSION
JLM/FTX/NPA	2
MKB/FTX/NPA	

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- NOTES:
- REFER TO WORK LIST FOR POLE HEIGHT.
 - SEE SPECIFICATION SP.06.01.301.101 FOR STRUCTURE GROUNDING DETAILS.
 - SEE SPECIFICATION SP.06.01.301.201 FOR STRUCTURE NUMBERING AND WARNING SIGNS REQUIRED FOR ALL STRUCTURES.
 - STEEL POLE MANUFACTURER DRAWINGS TO SUPERCEDE CONCEPT DRAWINGS AND WILL BE ISSUED FOR CONSTRUCTION AS SOON AS THEY ARE AVAILABLE.
 - TURNER SILVERTIP 1TSB SWITCH OR SIMILAR TO BE USED.
 - SINGLE POLE STRUCTURE SHIELDWIRE ON Y151 MAINLINE WILL UTILIZE OPGW AND ON SOUTH BROADWAY TAP WILL UTILIZE 3/8" EHS



VER	DATE	ISSUED FOR SCOPE DOCUMENT	VERSION DESCRIPTION	VERSION
1	09/19/14	ISSUED FOR SCOPE DOCUMENT		3
2	07/27/15	RE-ISSUED FOR SCOPE DOCUMENT		
3	02/05/16	REVISED FOR NH SEC FILING		
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5				
6				
7				

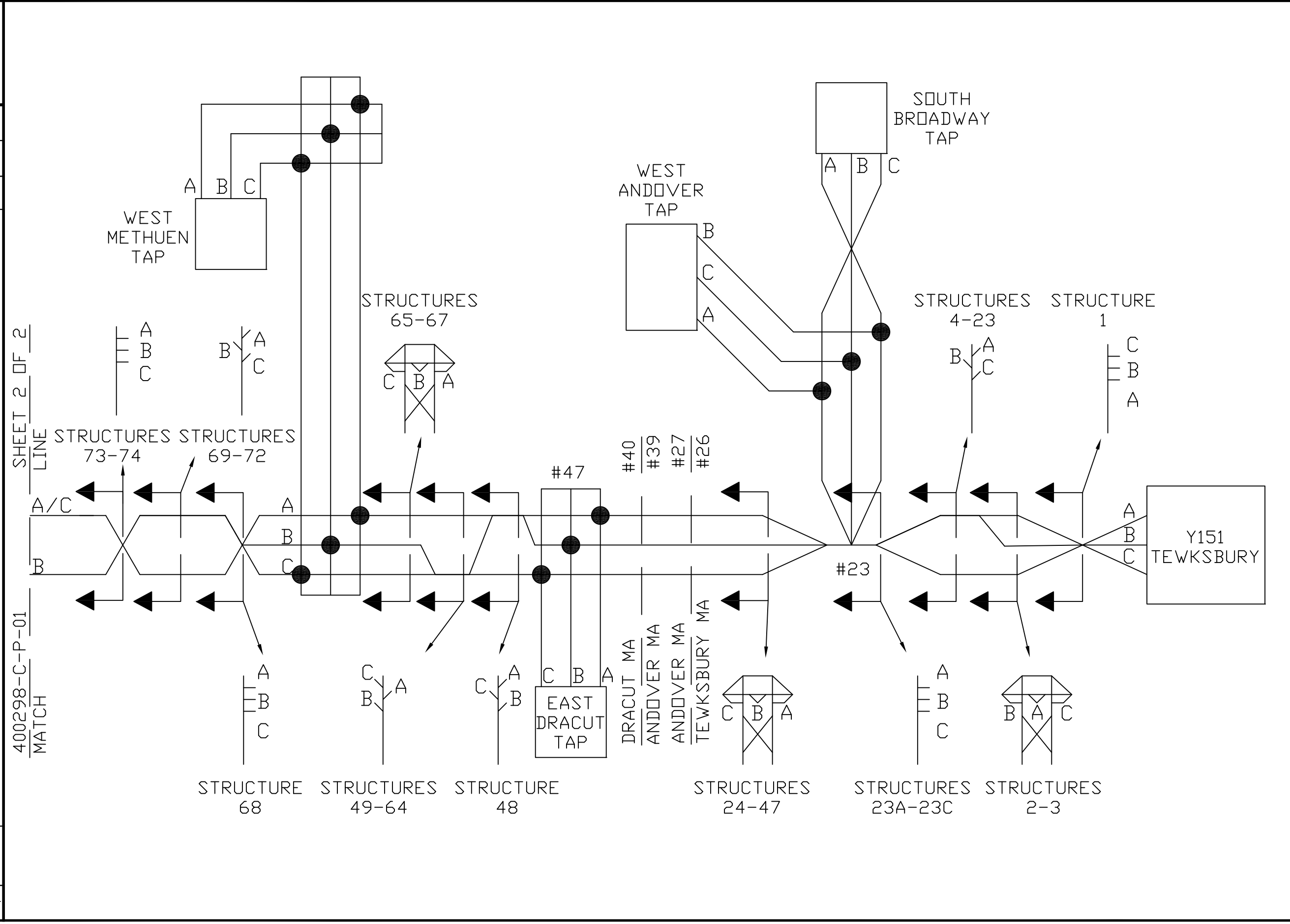
PREPARED BY	MKB	DATE	02/05/16
REVIEWED BY	FTX	DATE	02/05/16
APPROVED BY	NPA	DATE	02/05/16
SCALE	NTS		
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SCOBIE POND - TEWKSBURY
115KV REPLACEMENT STRUCTURE
SINGLE CIRCUIT Y151 LINE
STEEL SINGLE POLE SWITCH - SINGLE INS. STRING

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VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
1	09/19/14	ISSUED FOR SCOPE DOCUMENT	EJJ	FTX	NPA	3
2	05/22/15	ISSUED FOR PERMITTING	EJJ	FTX	NPA	
3	02/05/16	REVISED FOR PERMITTING	MKB	FTX	NPA	
4						



INCHES ON ORIGINAL

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PHASING DIAGRAM
 115KV Y151 LINE
 TEWKSBURY 22 SUBSTATION
 TO EVERSOURCE TRANSFER

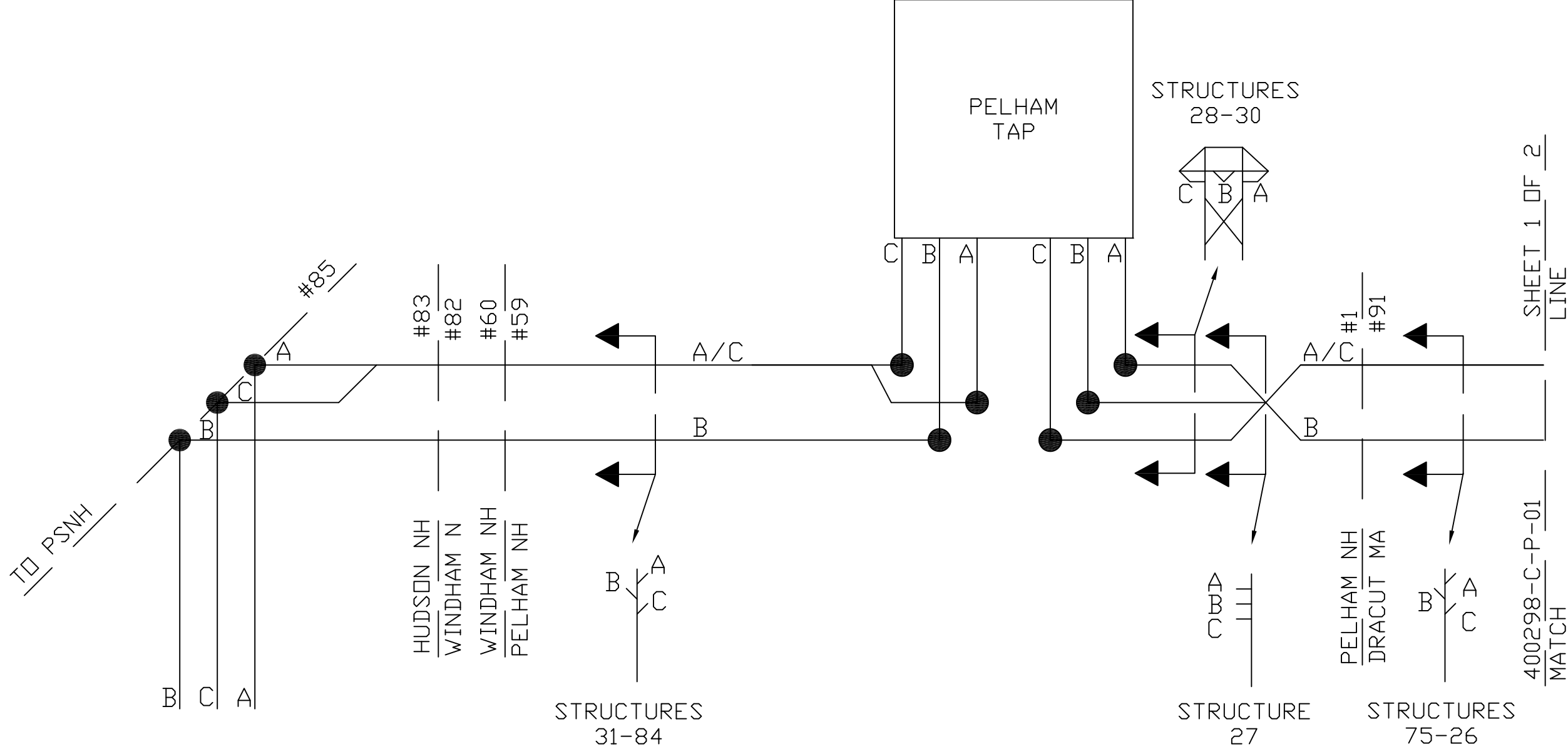
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PREPARED BY	MKB	02/05/16
REVIEWED BY	FTX	02/05/16
APPROVED BY	NPA	02/05/16
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VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
1	09/19/14	ISSUED FOR SCOPE DOCUMENT	EJJ	FTX	NPA	4
2	05/22/15	ISSUED FOR PERMITTING	EJJ	FTX	NPA	
3	06/08/15	ISSUED FOR SCOPE DOCUMENT	DD	FTX	NPA	
4	02/05/16	REVISED FOR PERMITTING	MKB	FTX	NPA	



SHEET 1 OF 2
LINE

400298-C-P-01
MATCH

PHASING DIAGRAM
115KV Y151 LINE
TEWKSBURY 22 SUBSTATION
TO EVERSOURCE TRANSFER

PREPARED BY	MKB	02/05/16
REVIEWED BY	FTX	02/05/16
APPROVED BY	NPA	02/05/16
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SHEET	2	OF 2
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