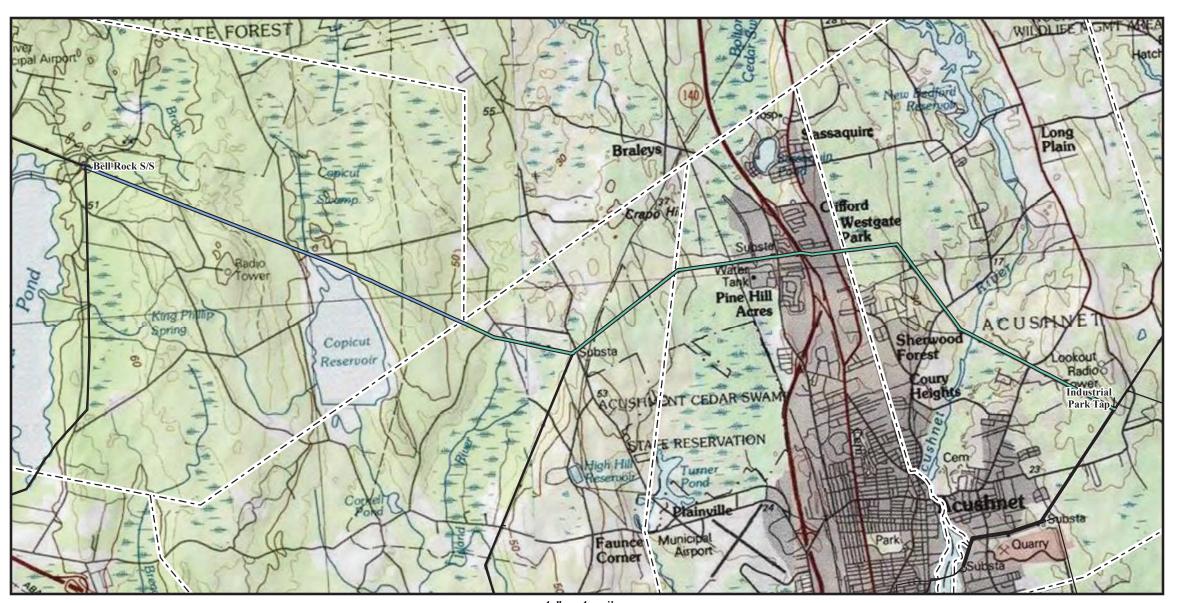
#### APPENDIX B PROJECT FIGURES



## **Acushnet to Fall River Reliability Project**

Acushnet, New Bedford, Dartmouth, and Fall River, Massachusetts

# **Appendix B - Figures**



### Prepared For:

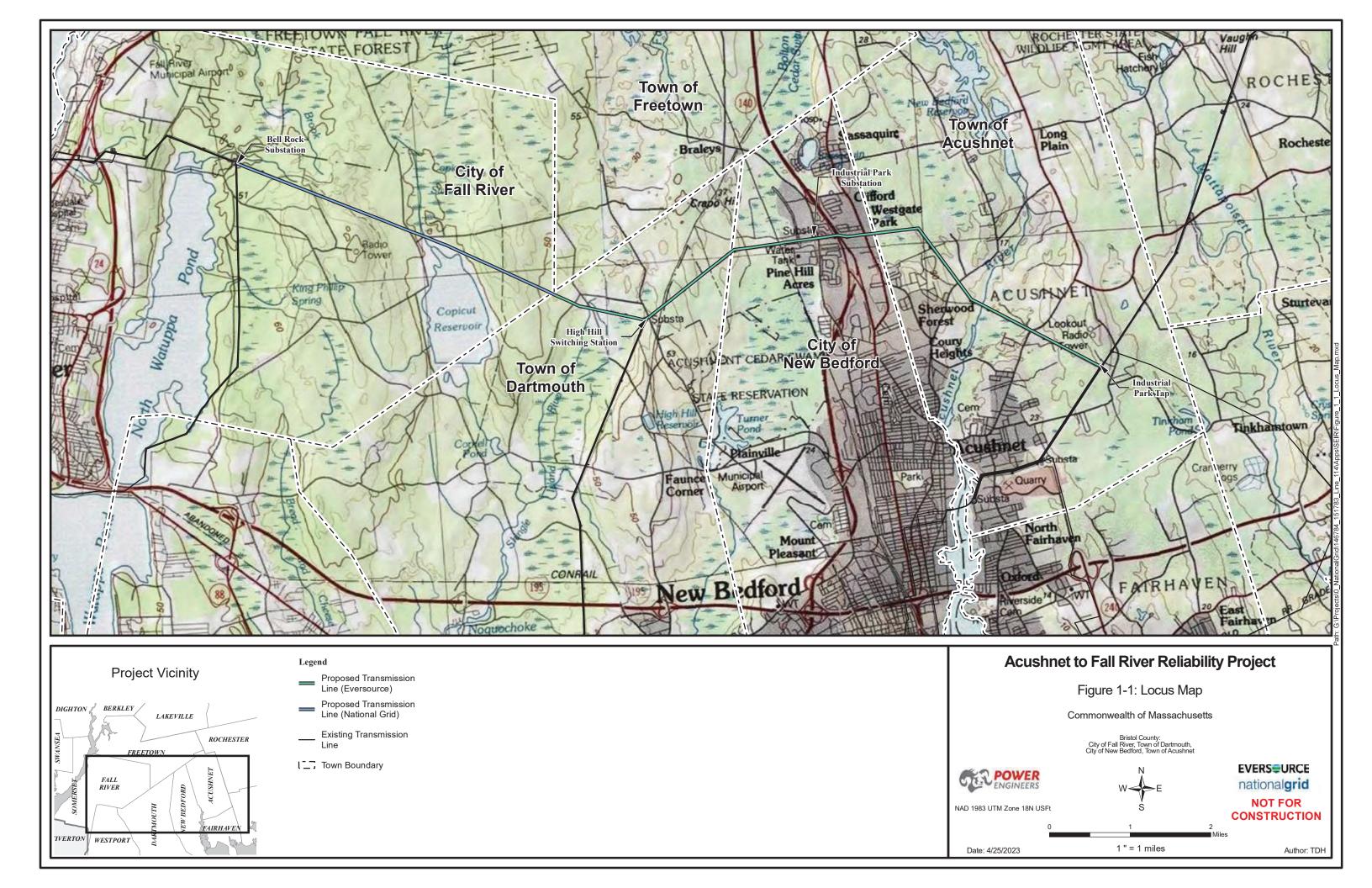
New England Power Company 170 Data Drive Waltham, MA 02451

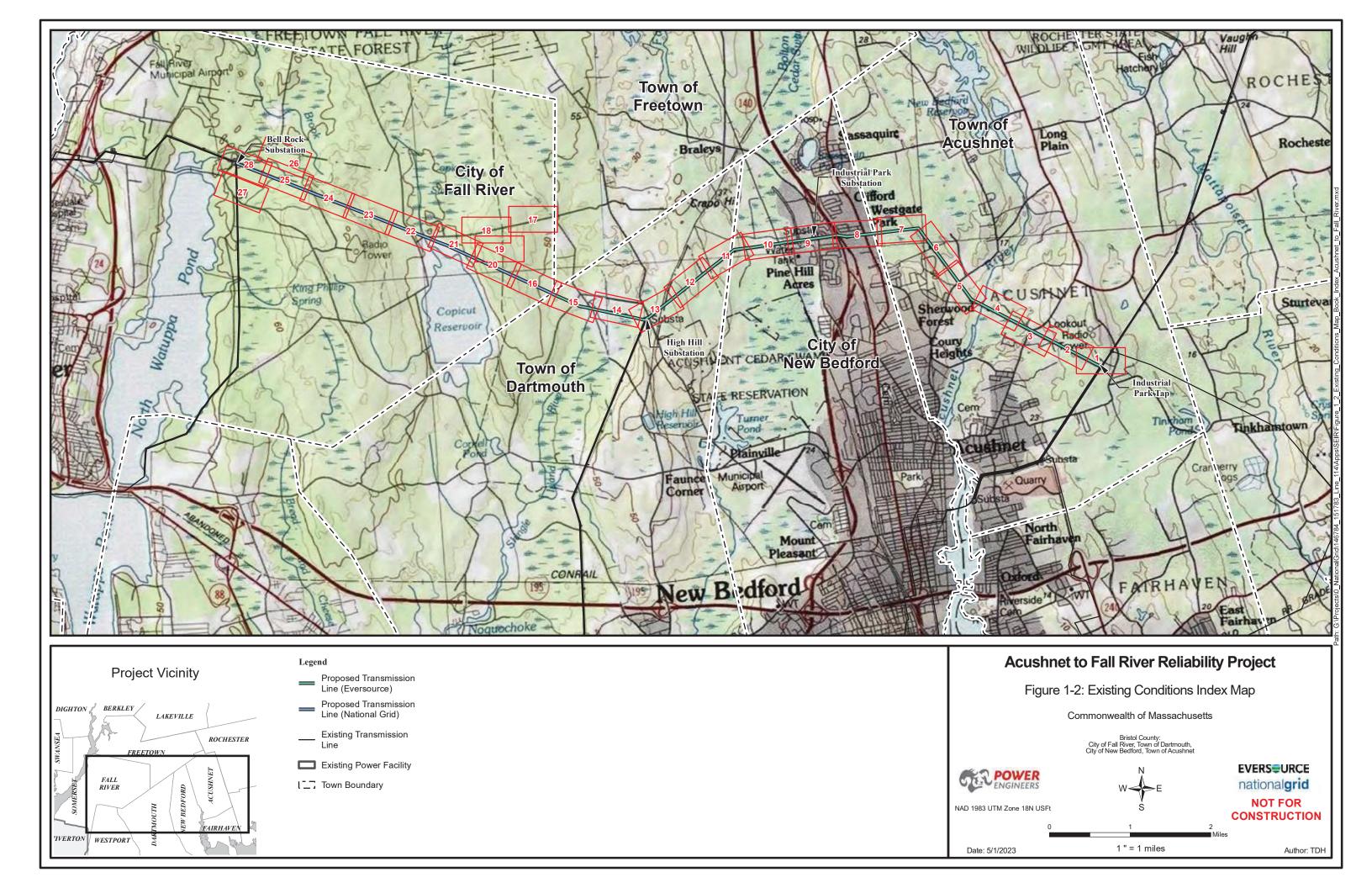
NSTAR Electric Company d/b/a Eversource Energy 247 Station Drive Westwood, MA 02090

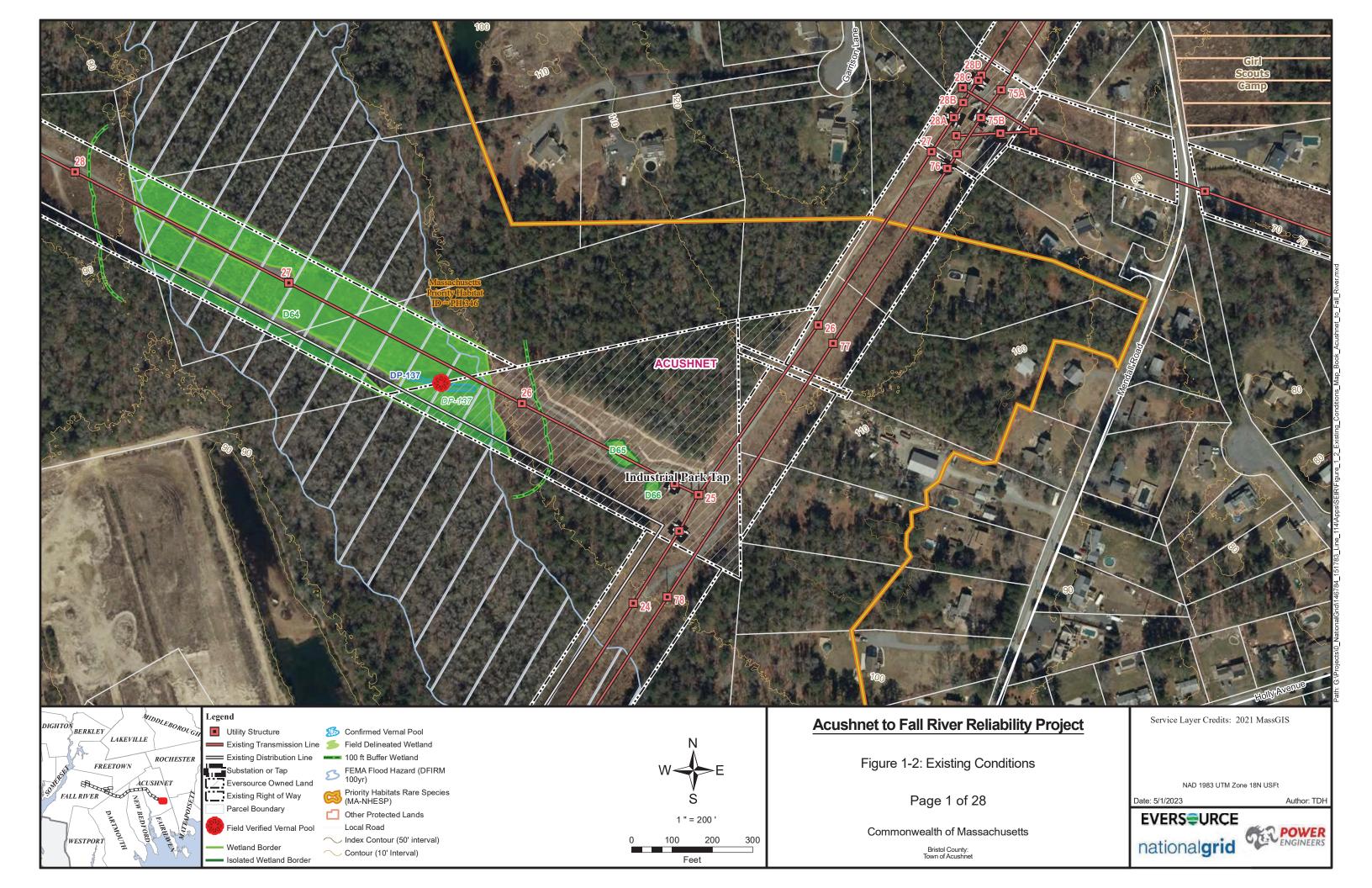
### Compiled By:

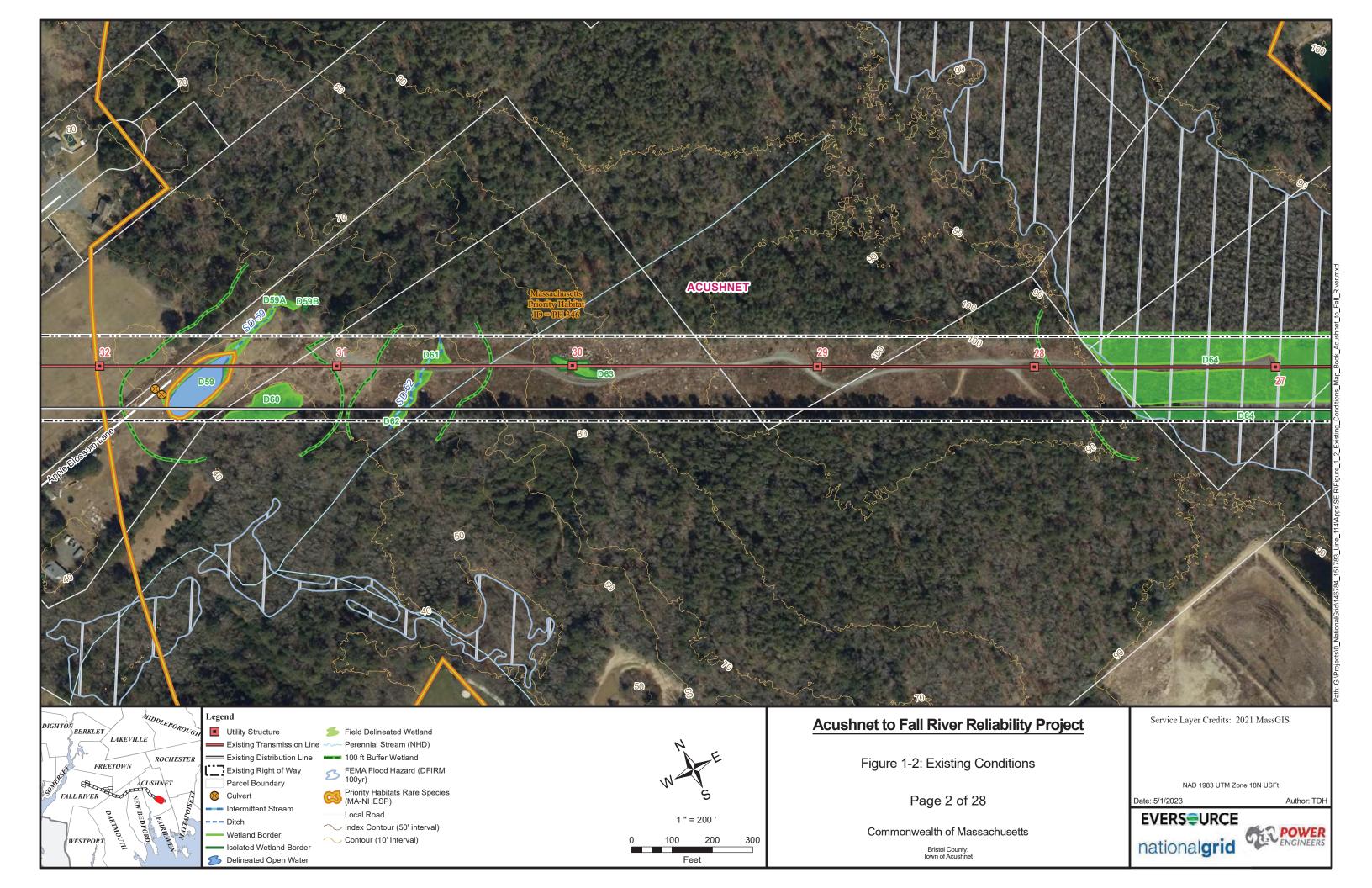
POWER Engineers, Inc 2 Hampshire Street Suite 301 Foxborough, MA 02035

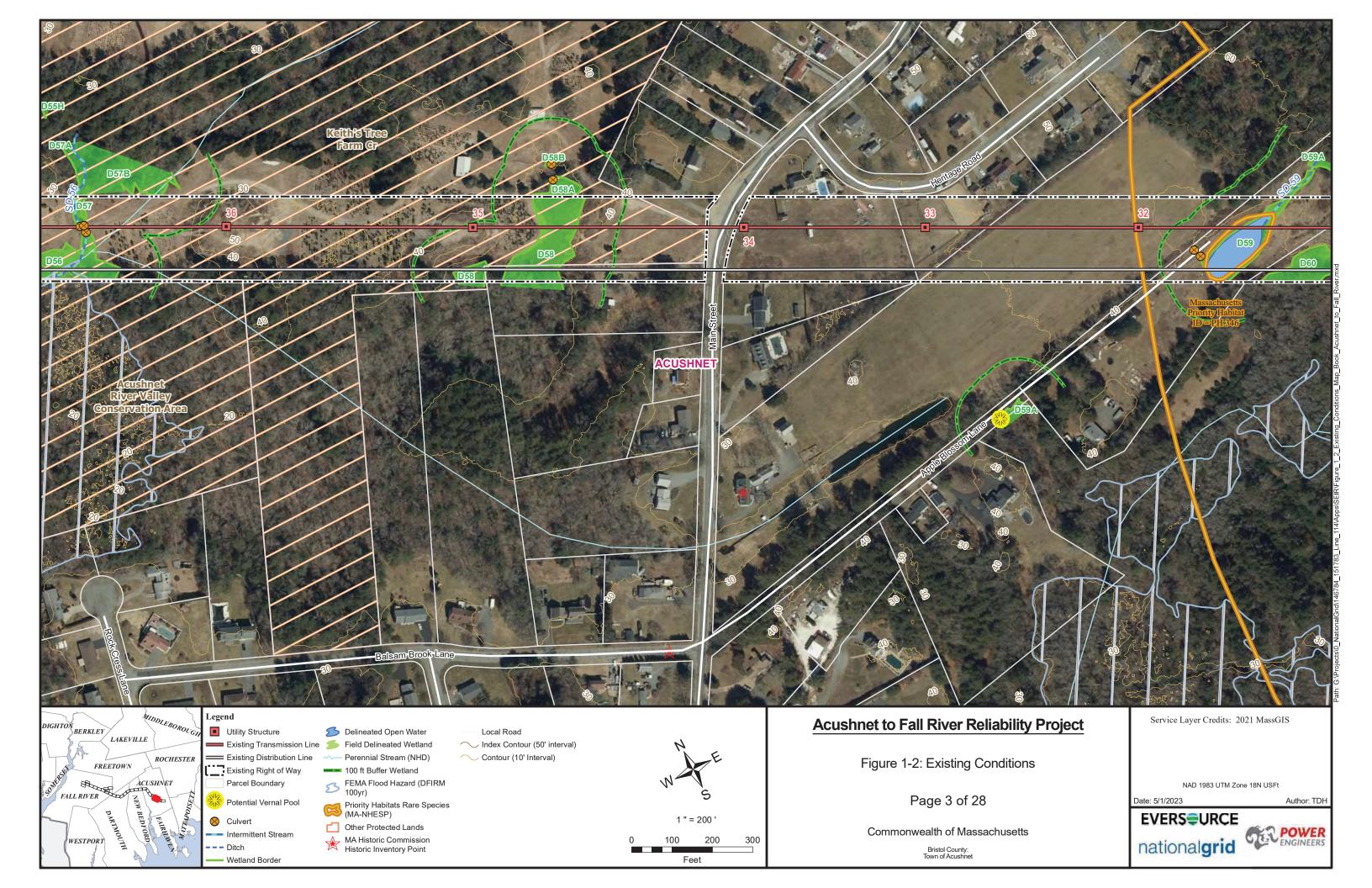
June 2023

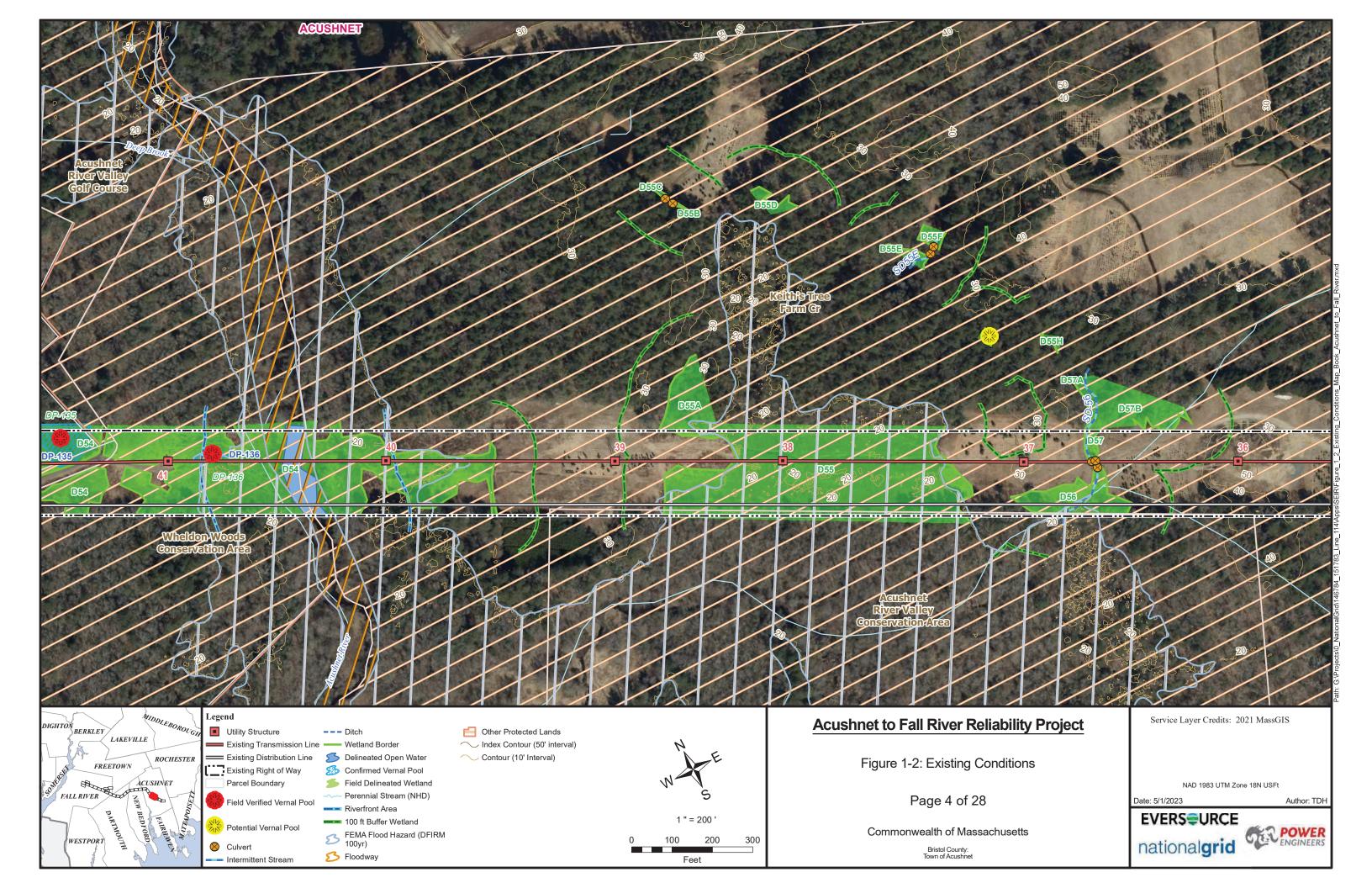


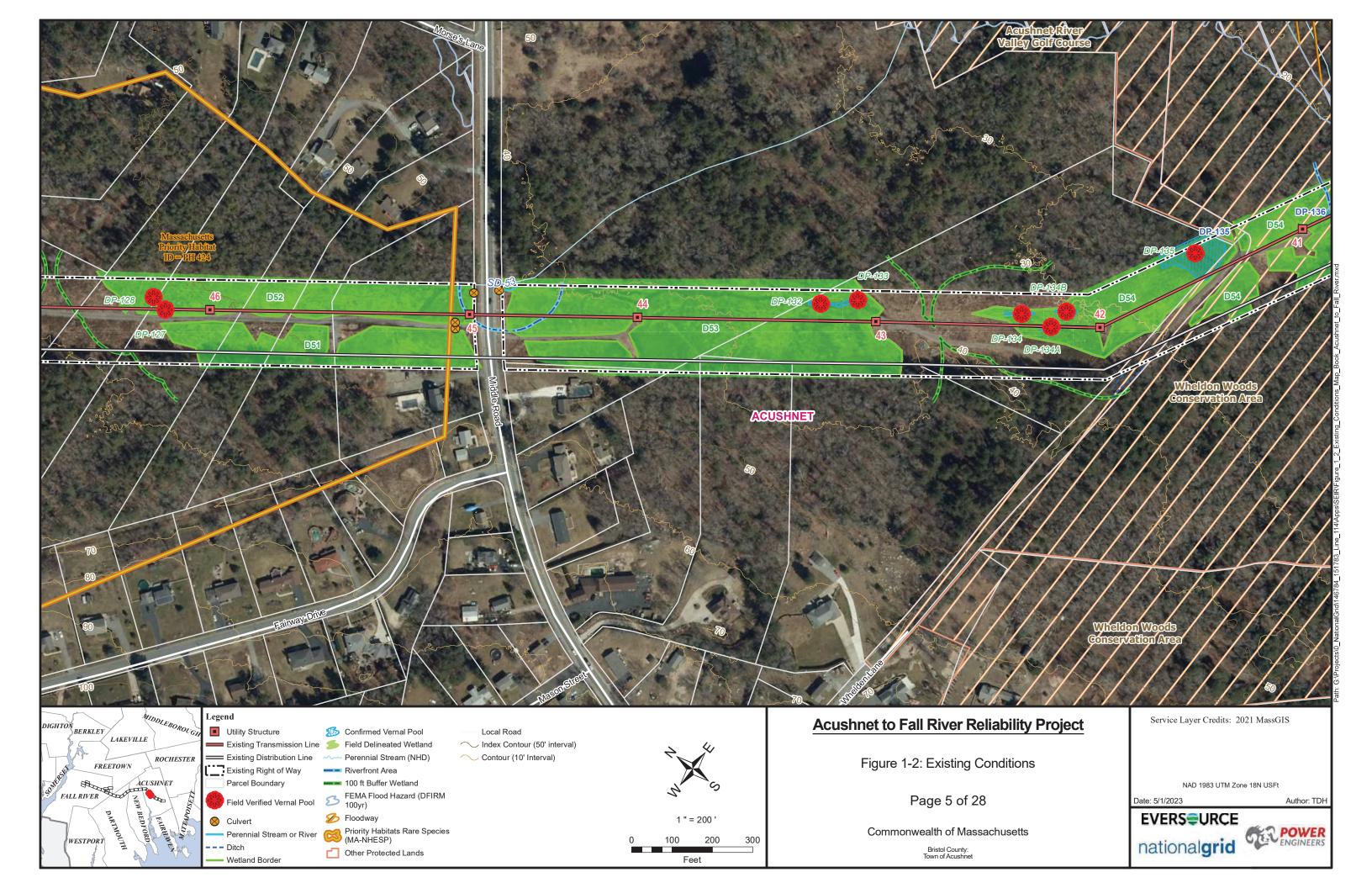


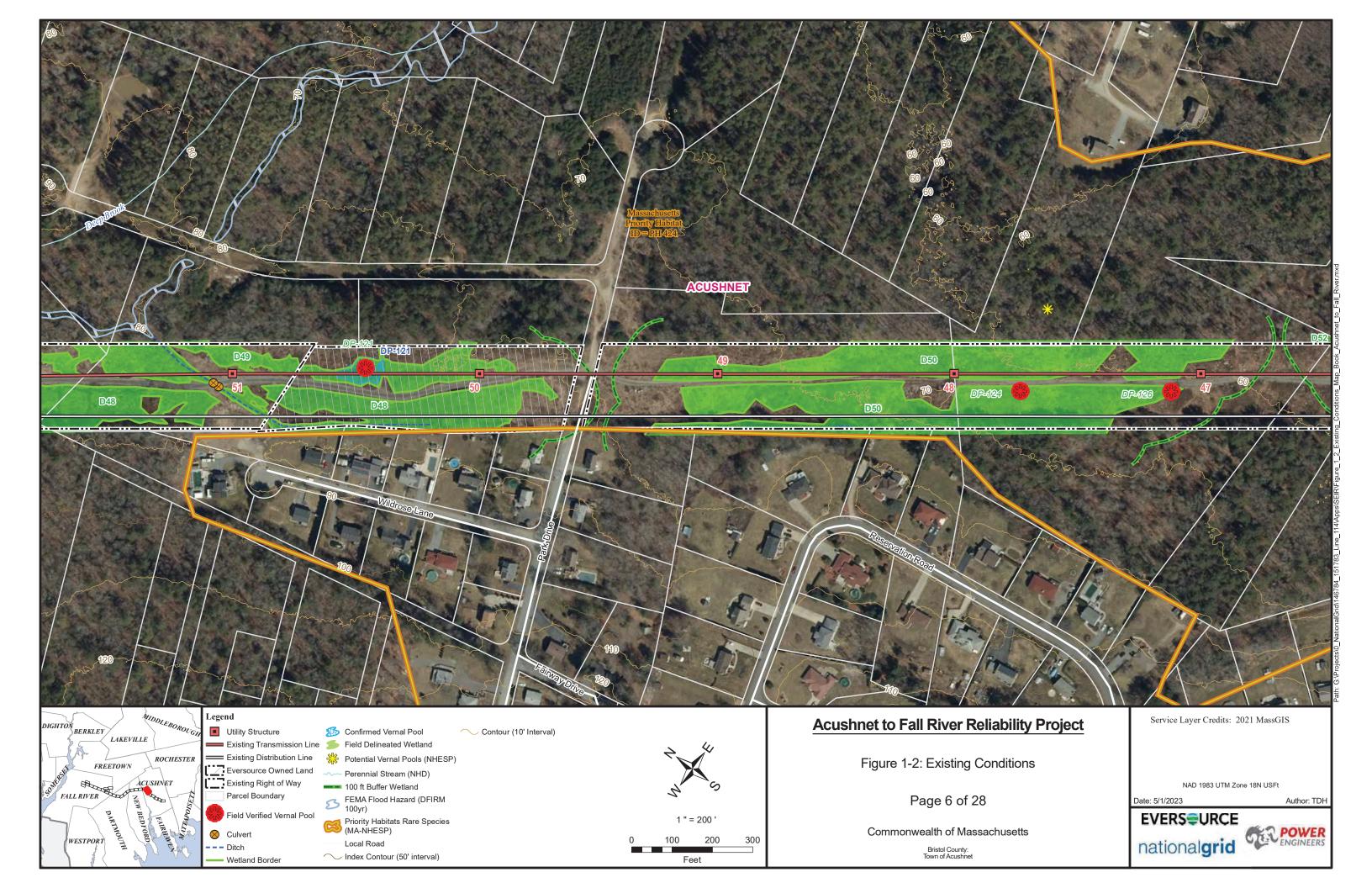


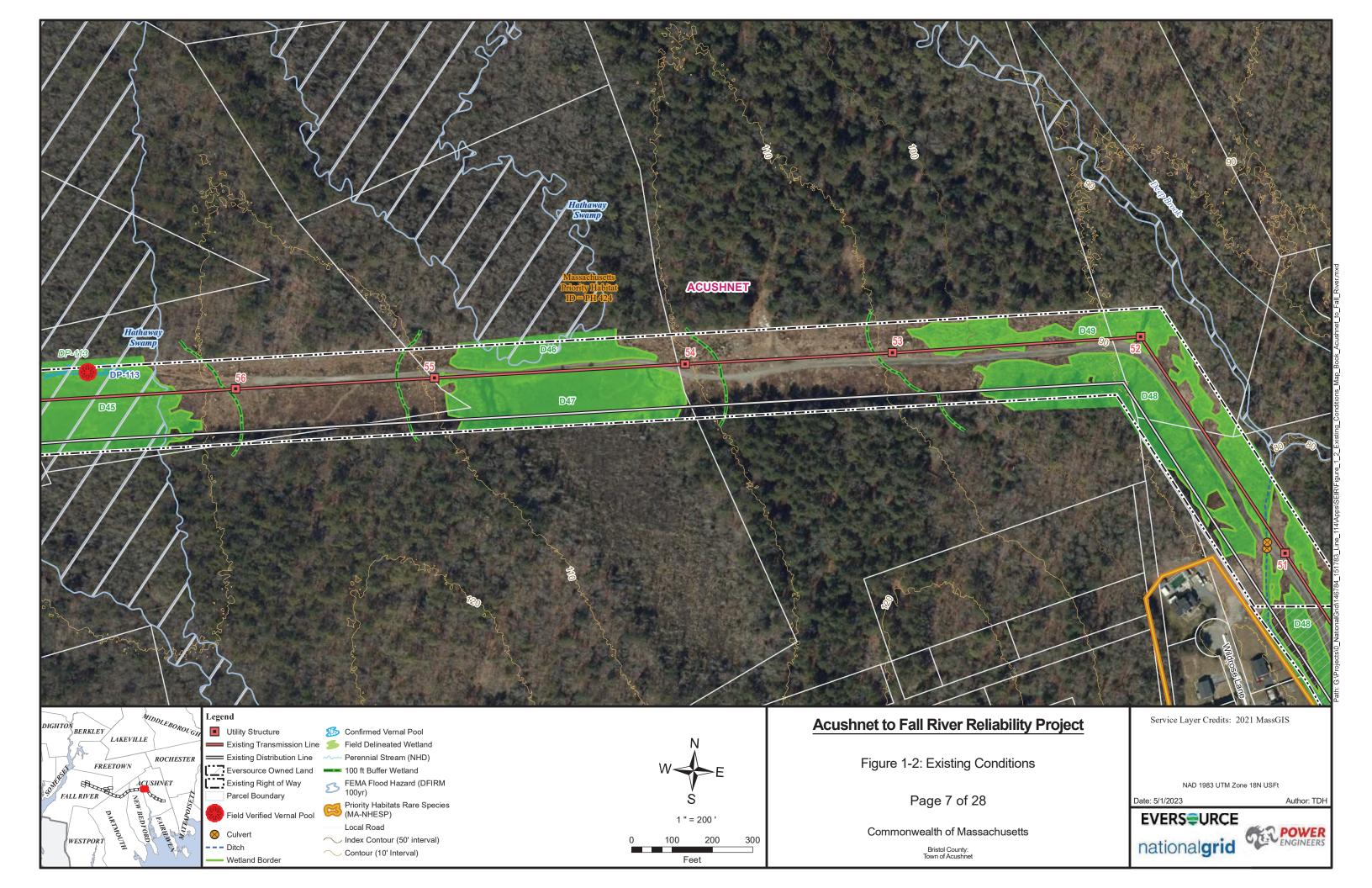


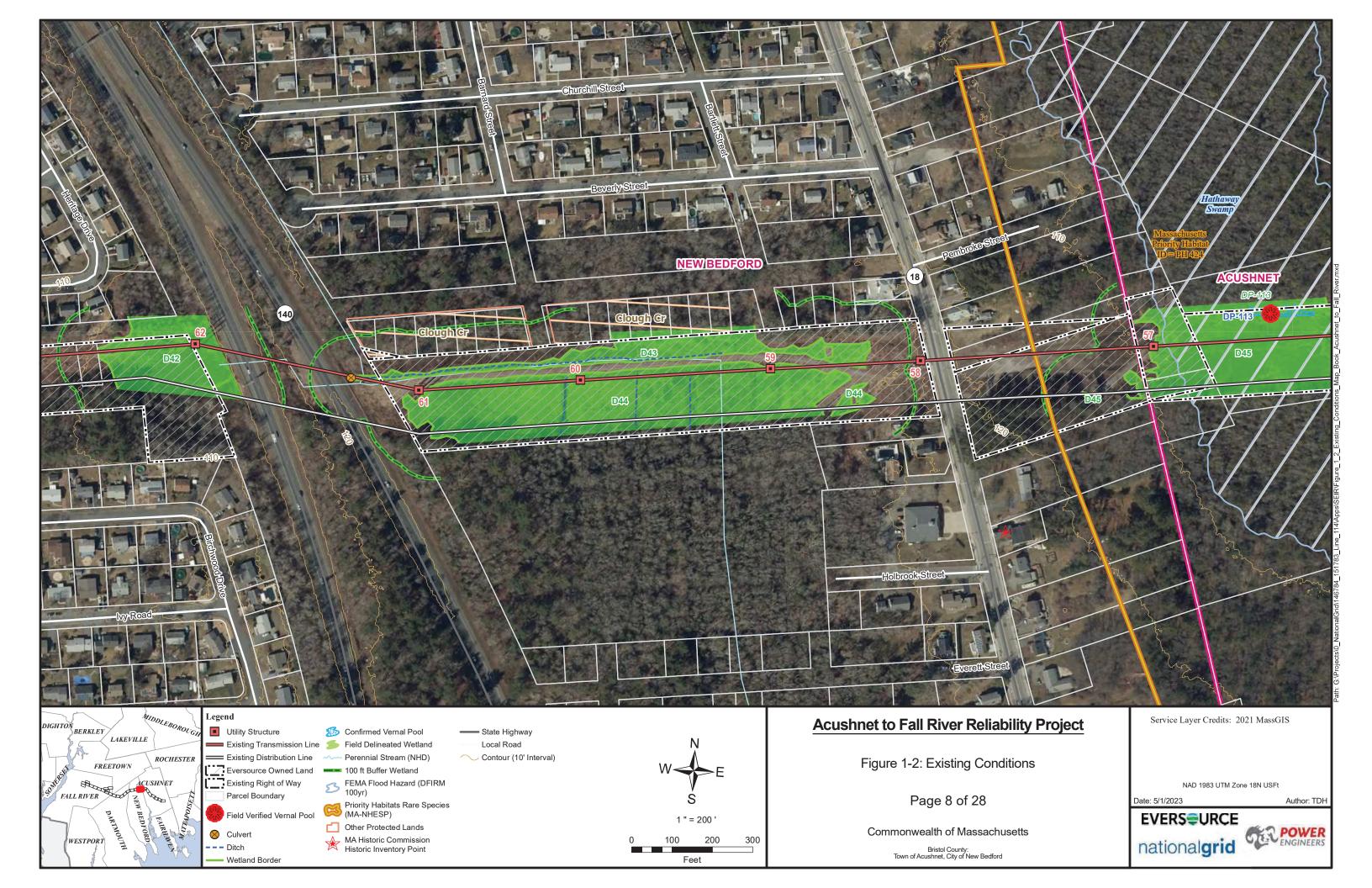


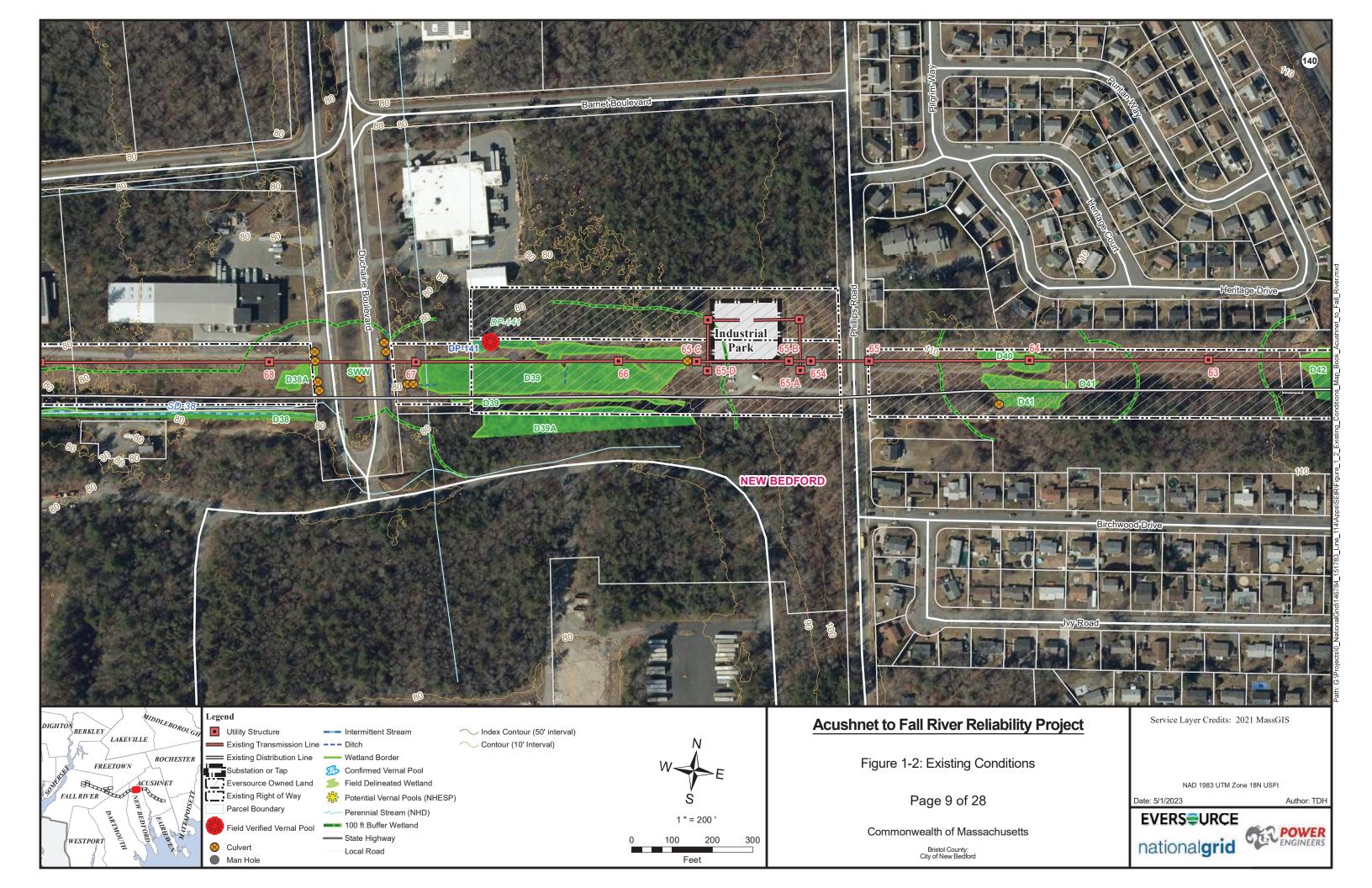


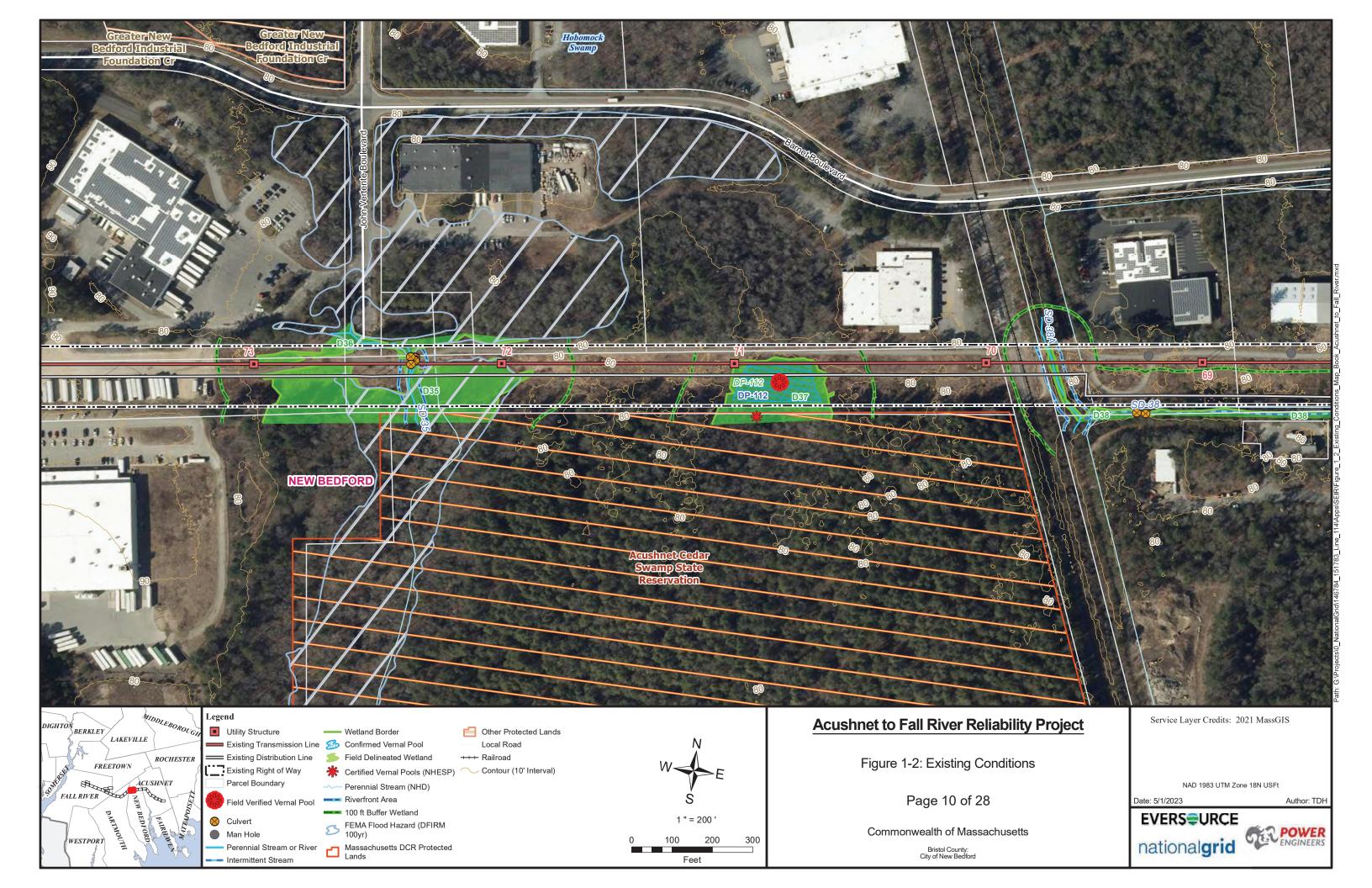


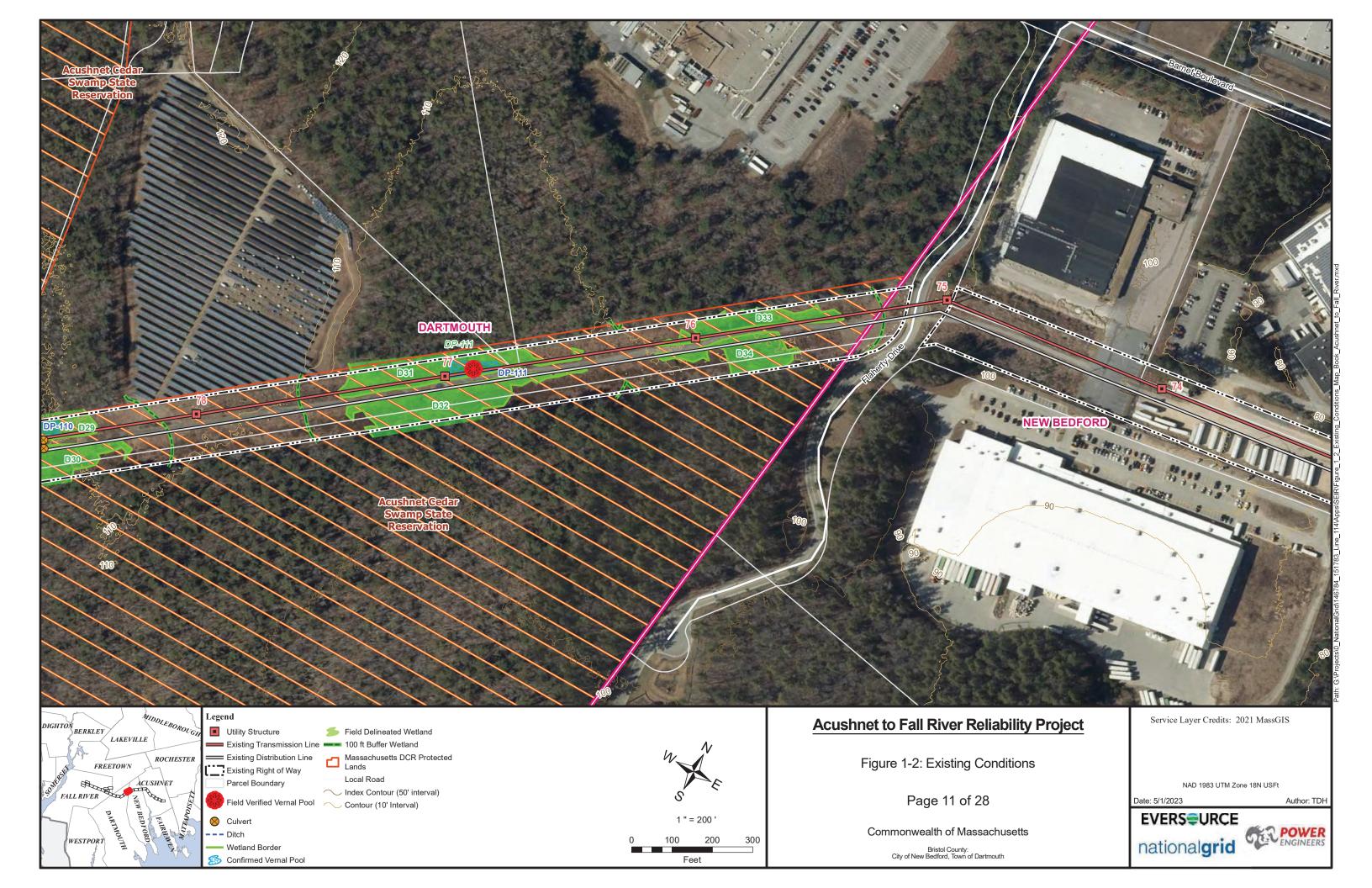


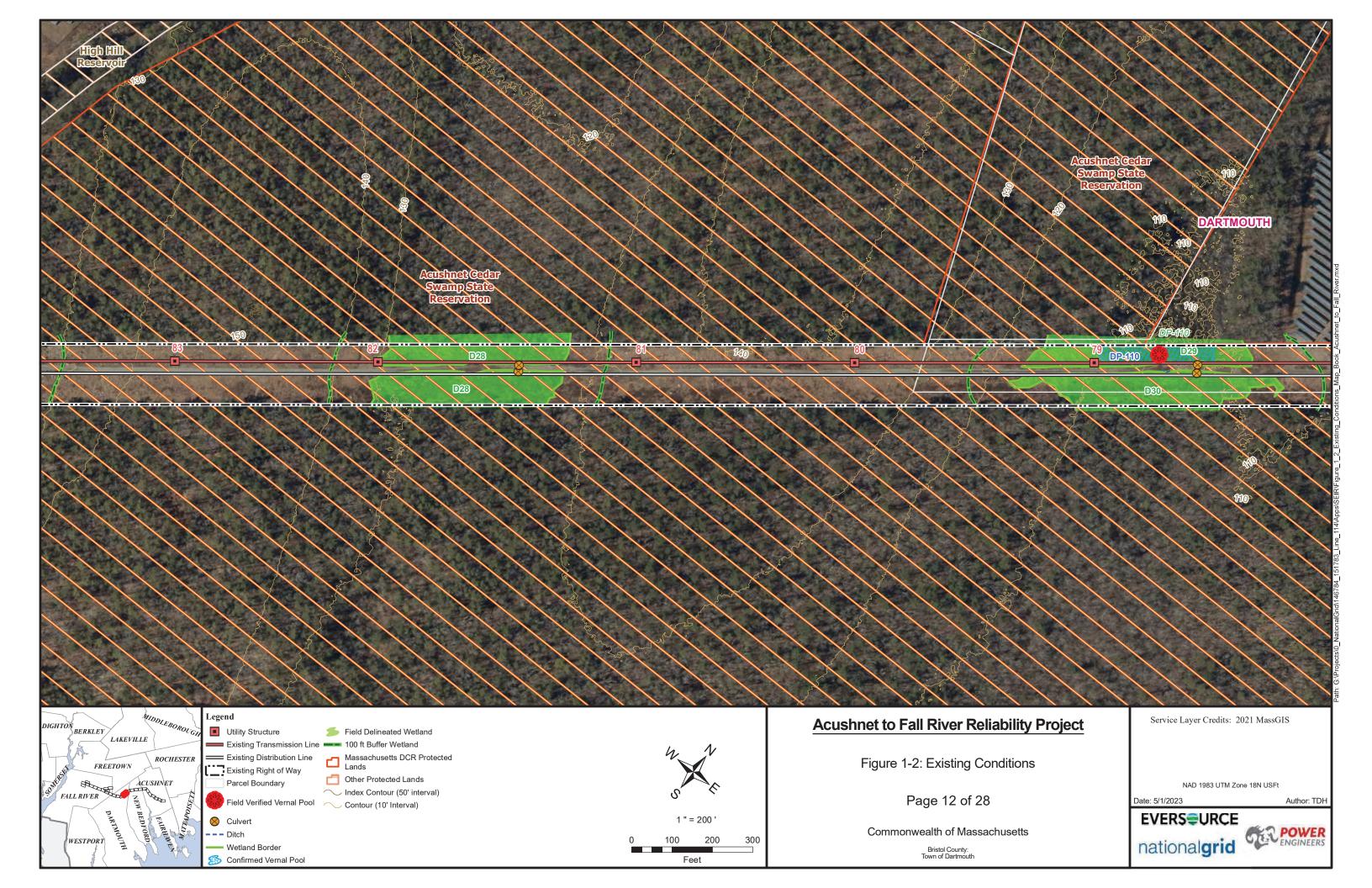


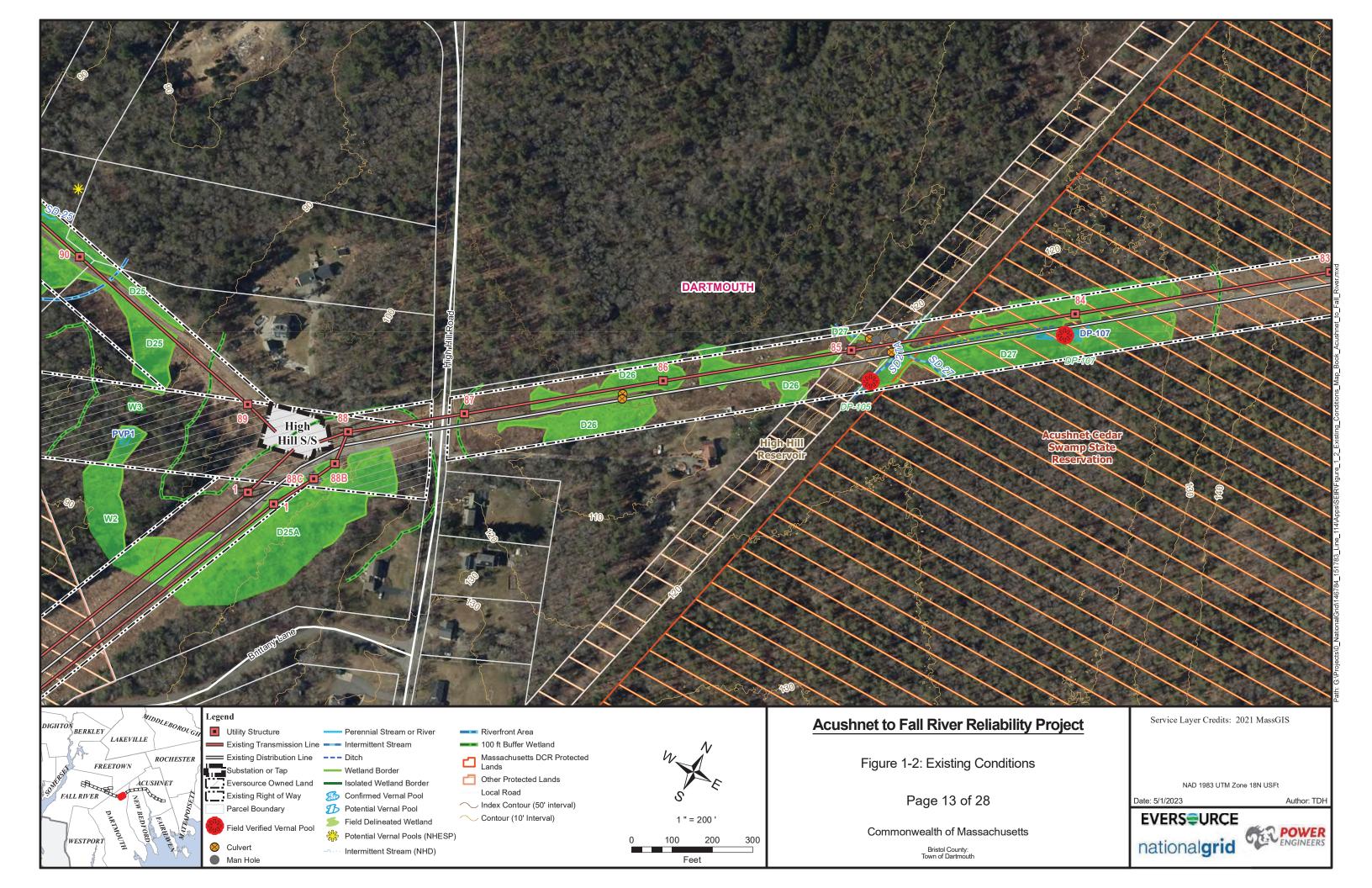


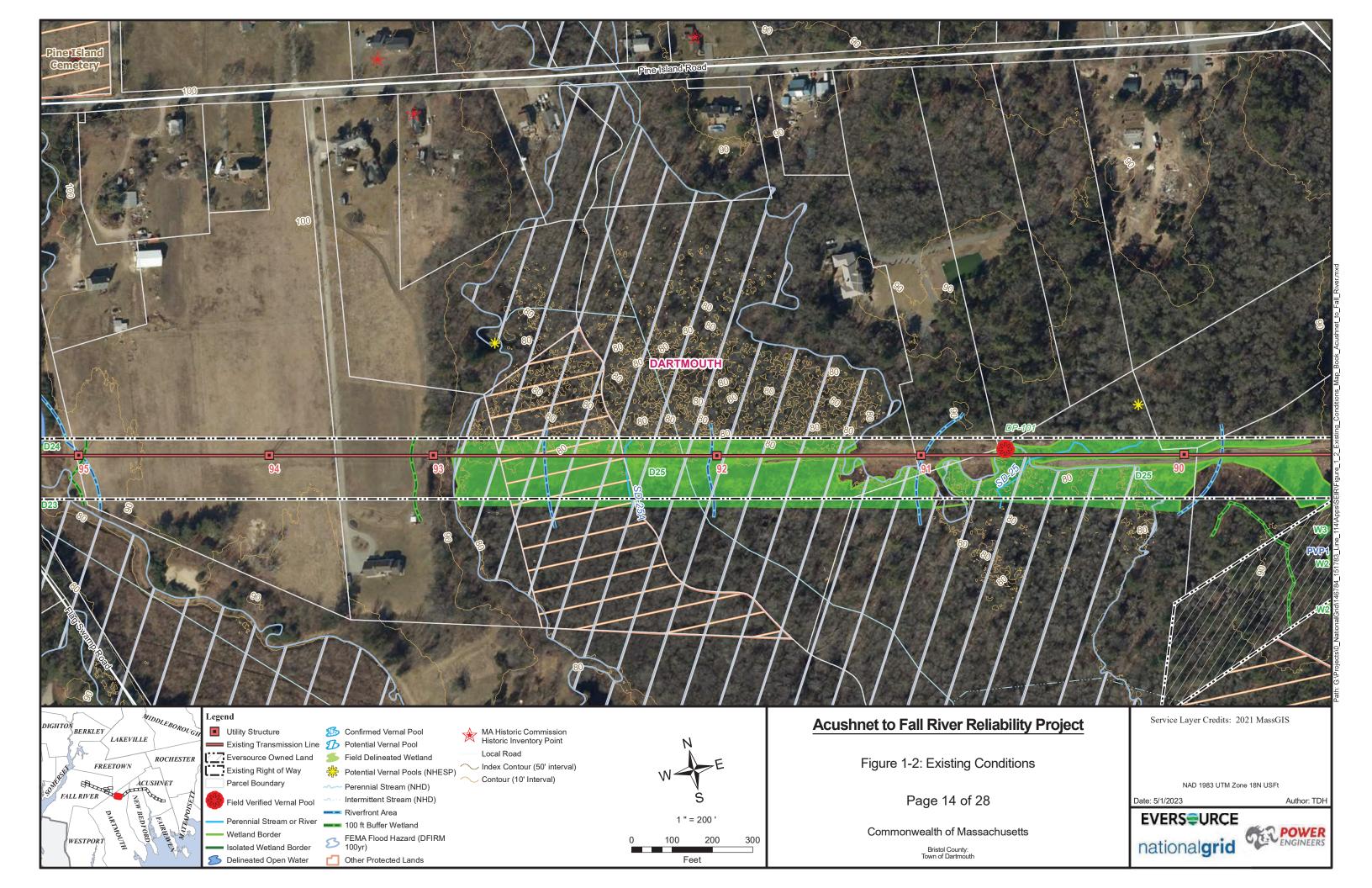


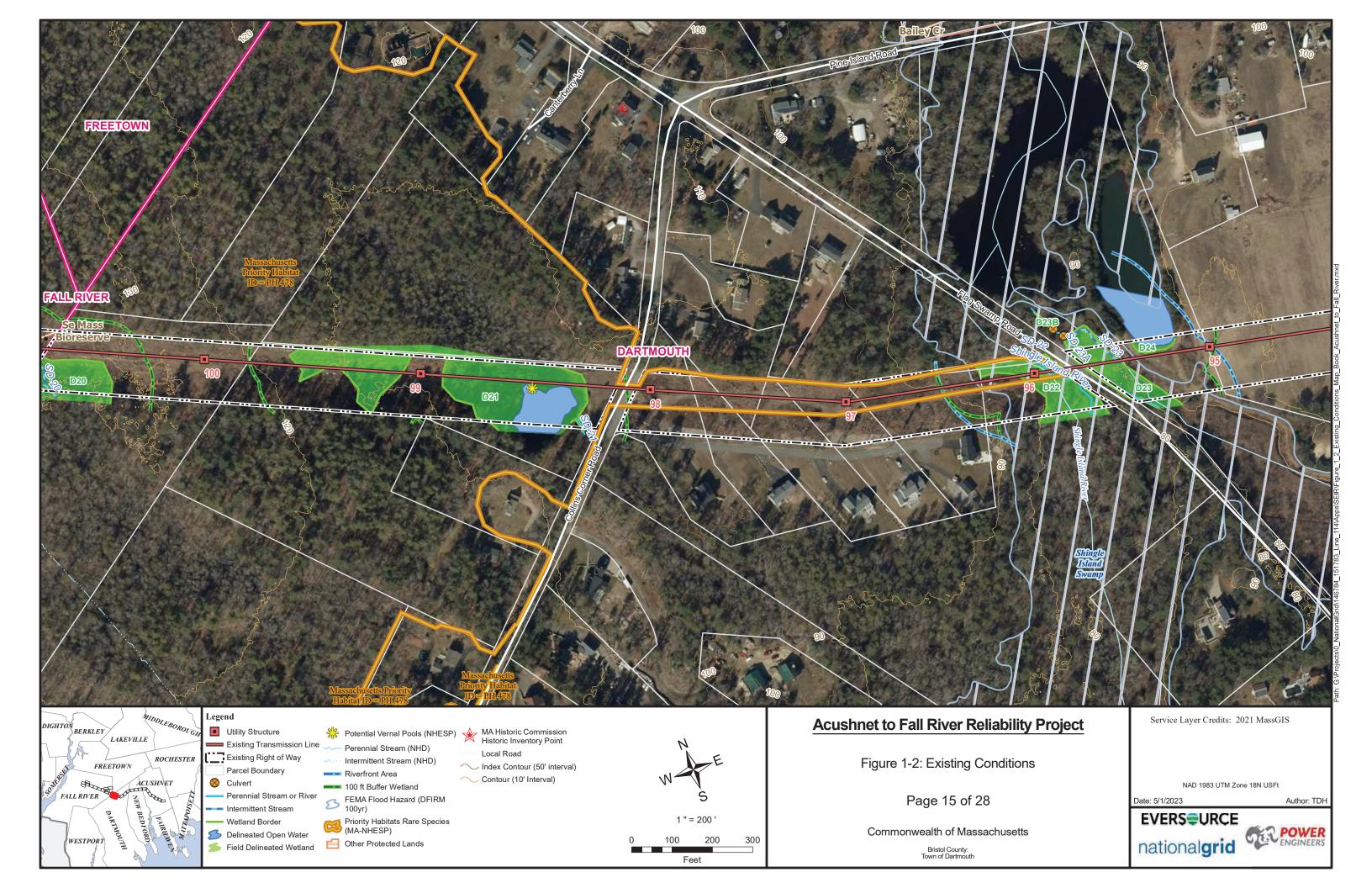


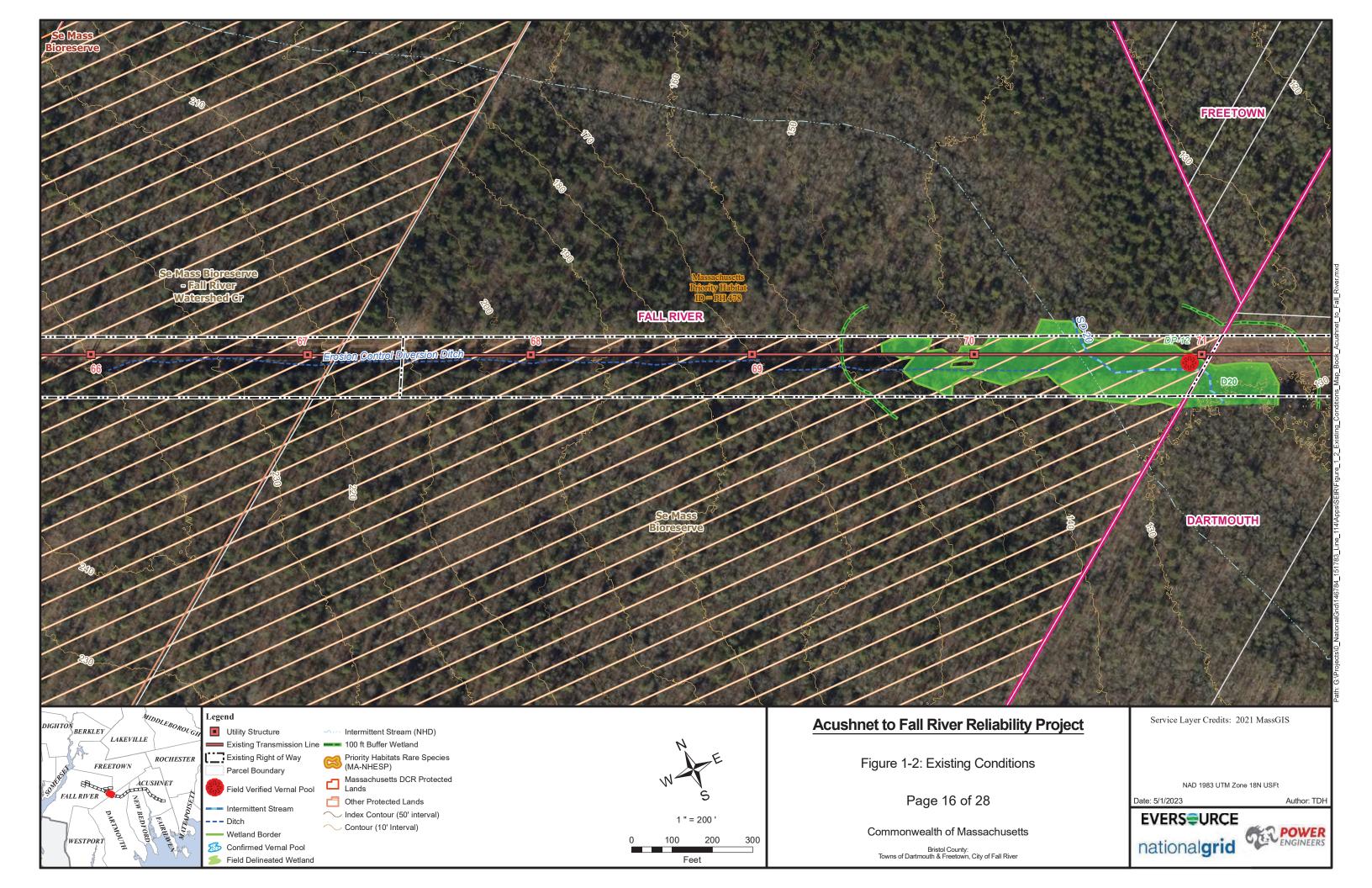


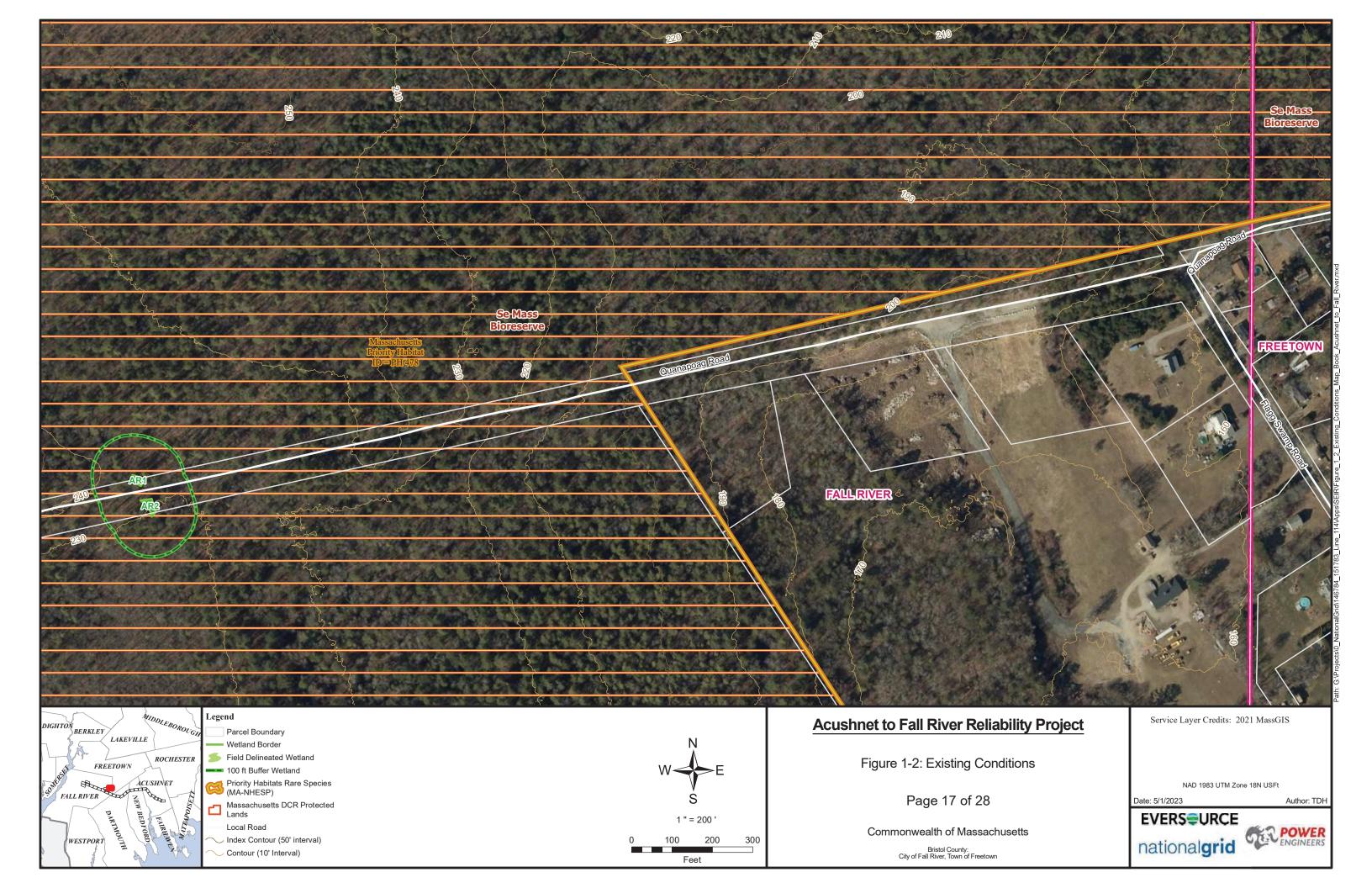


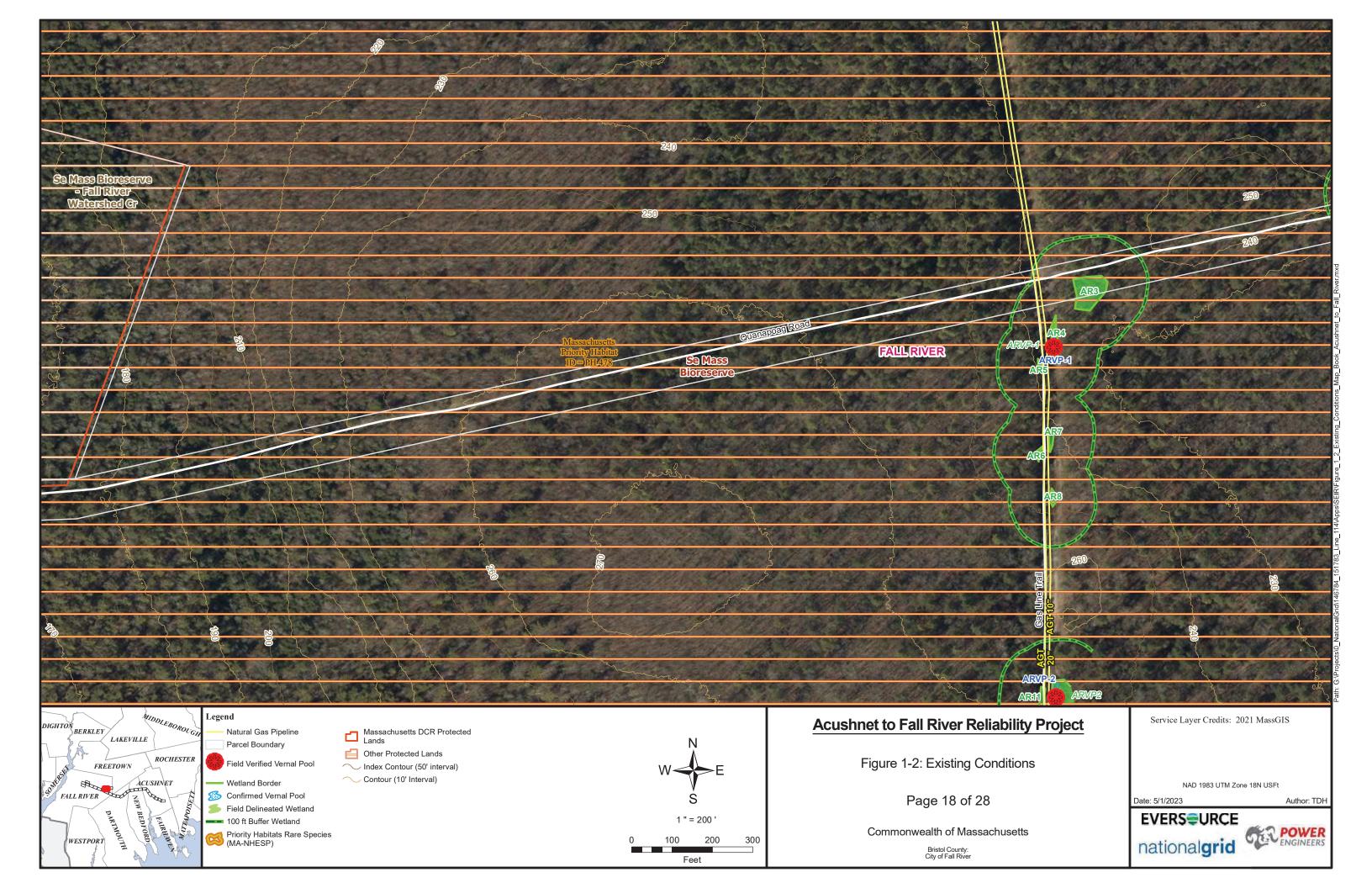


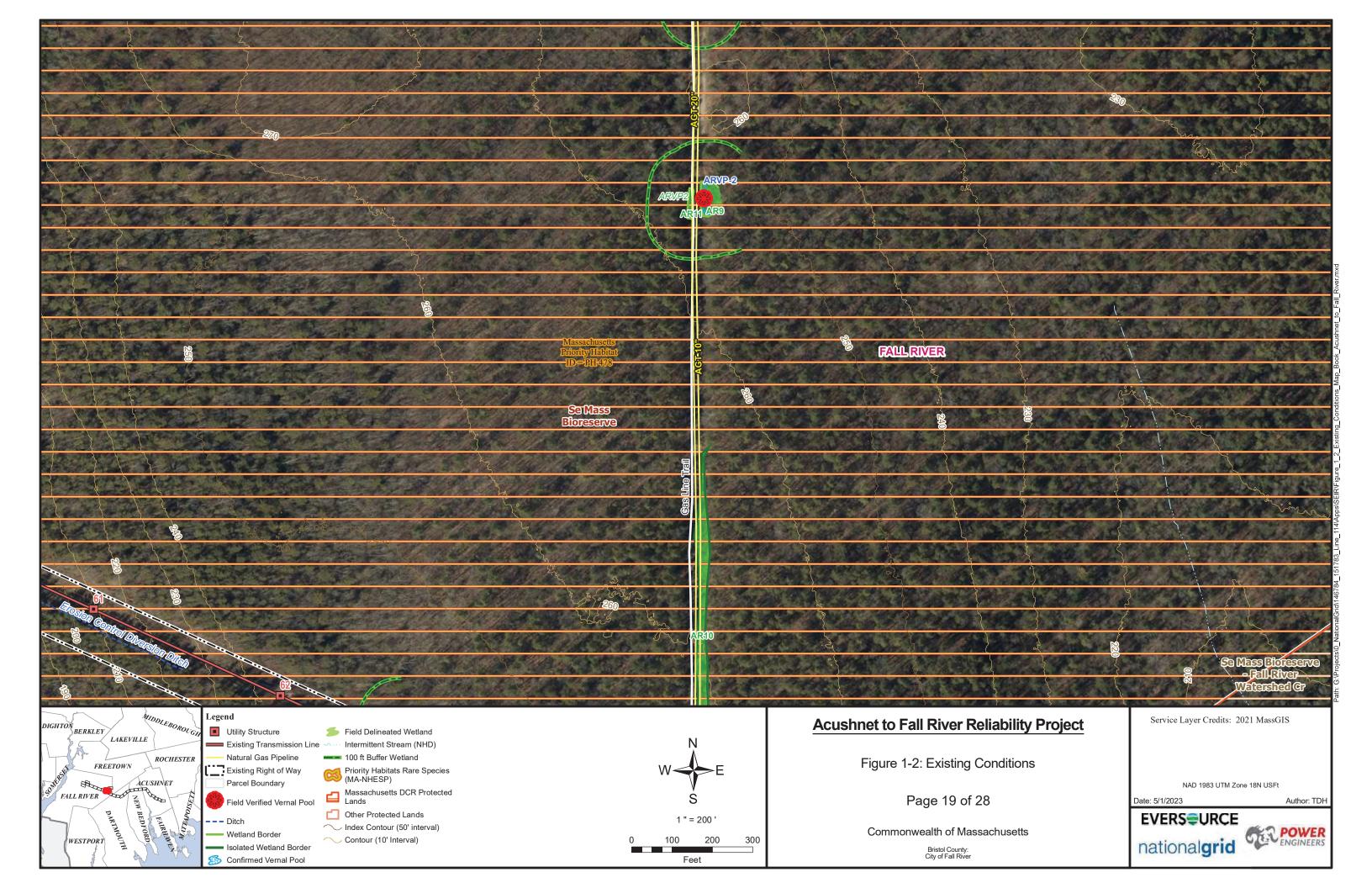


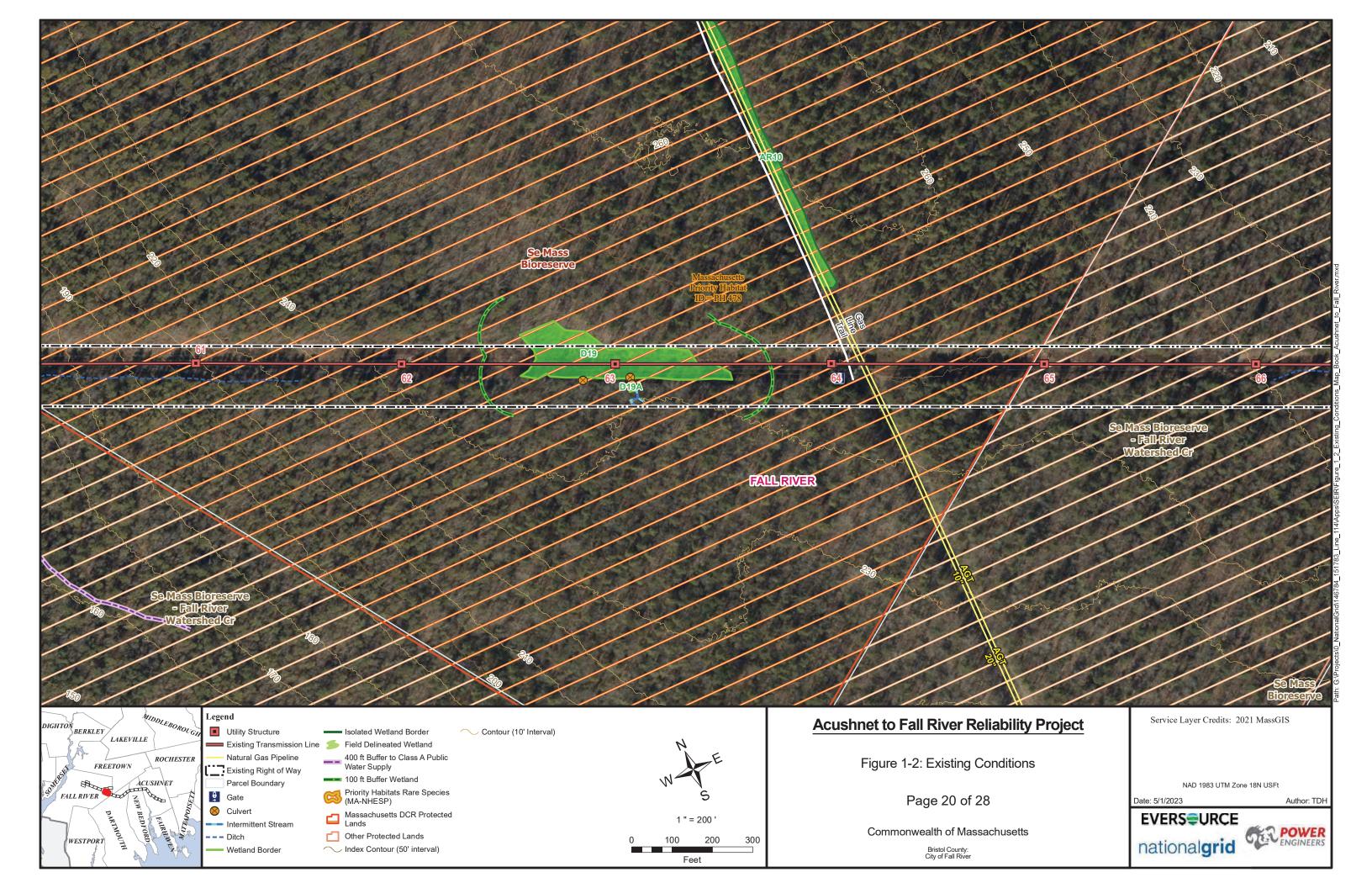


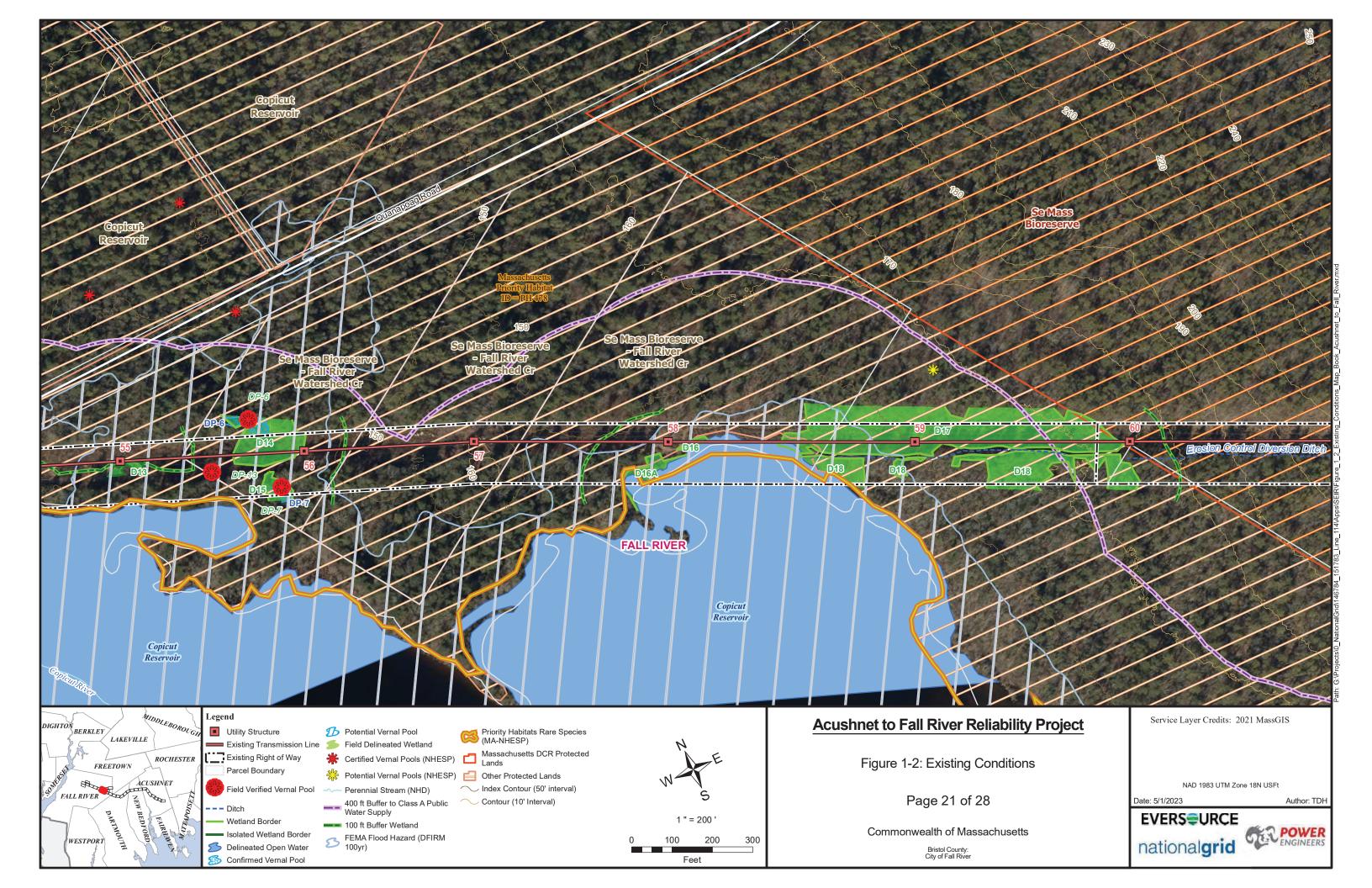


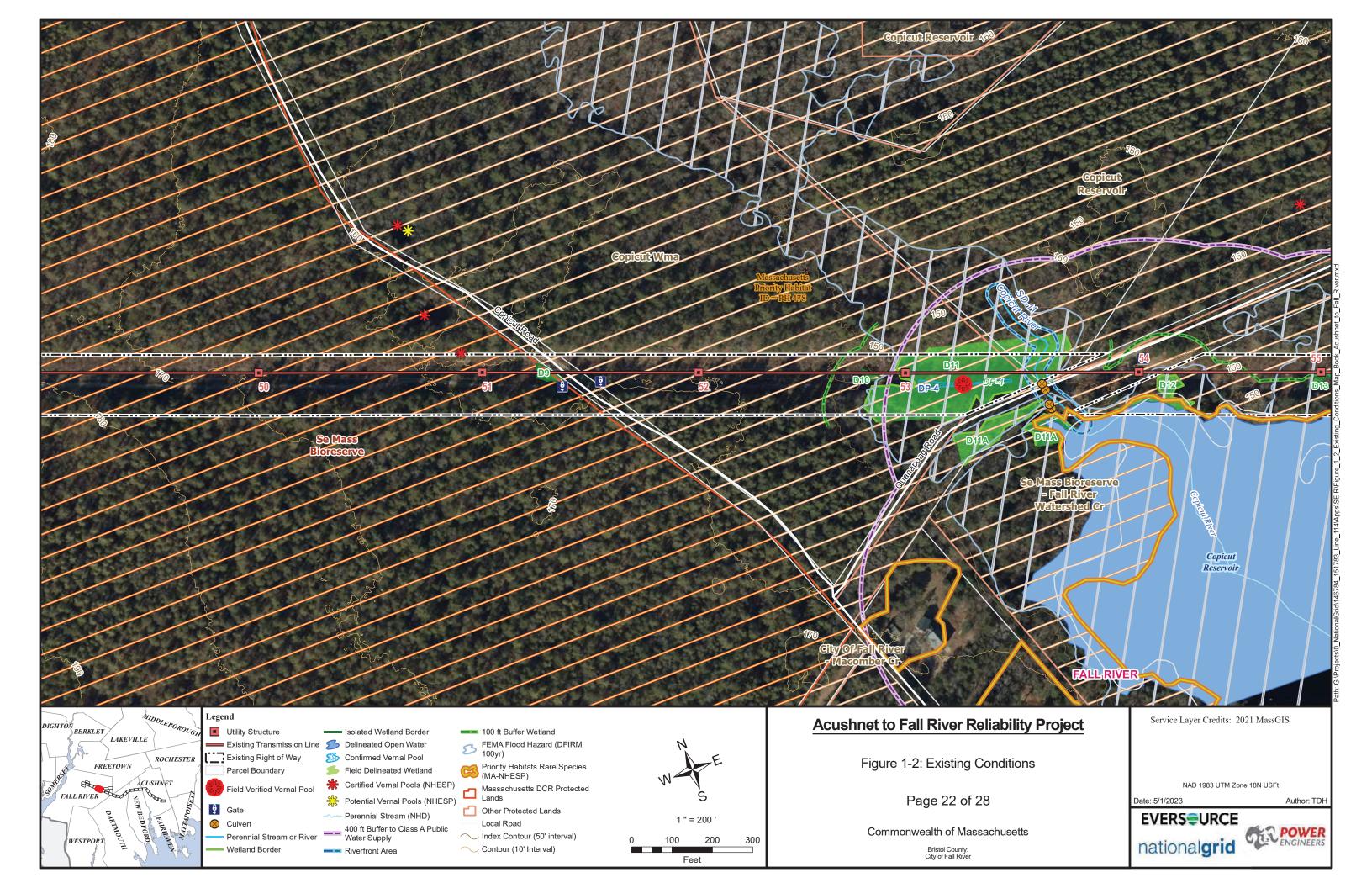


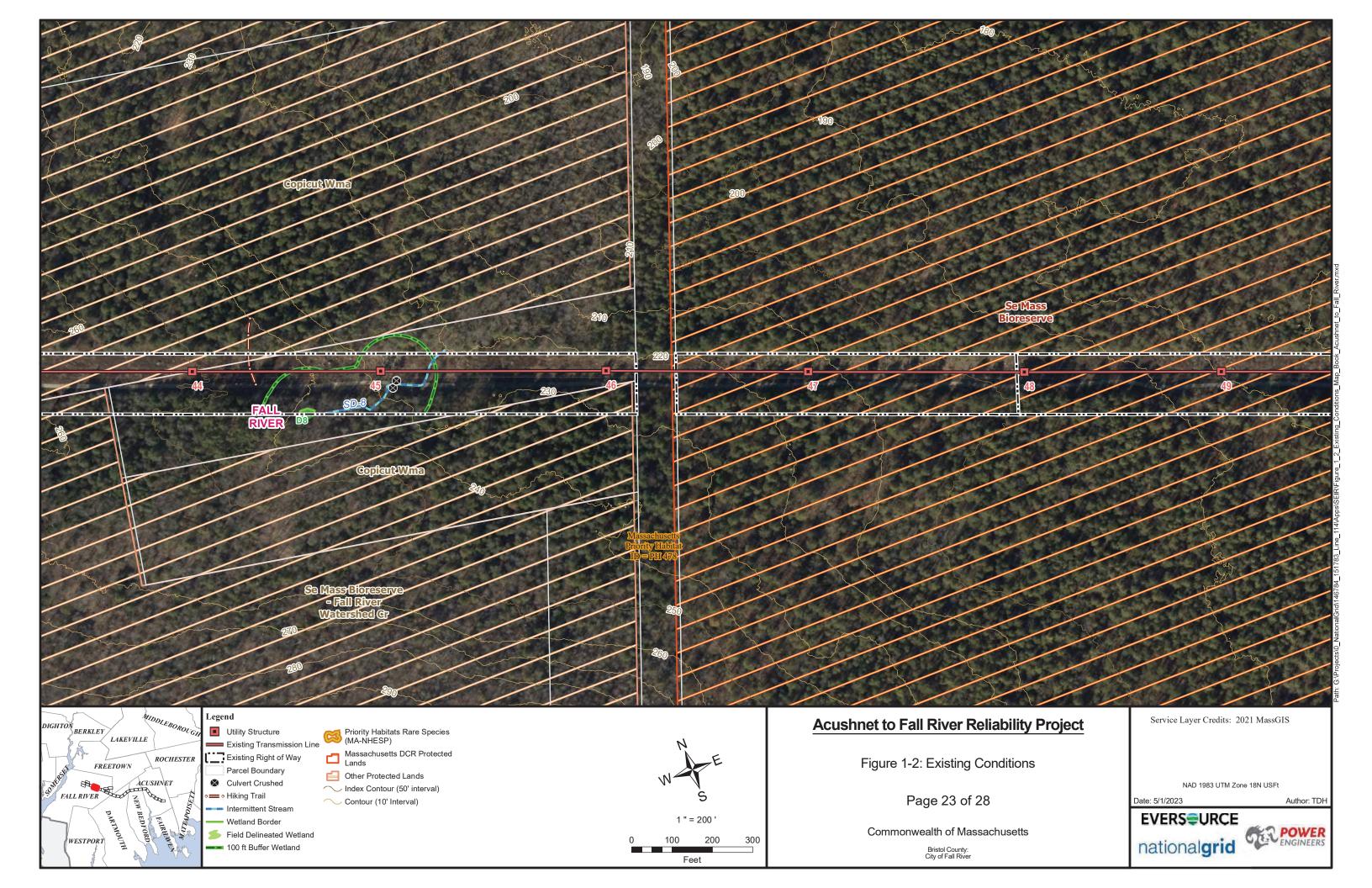


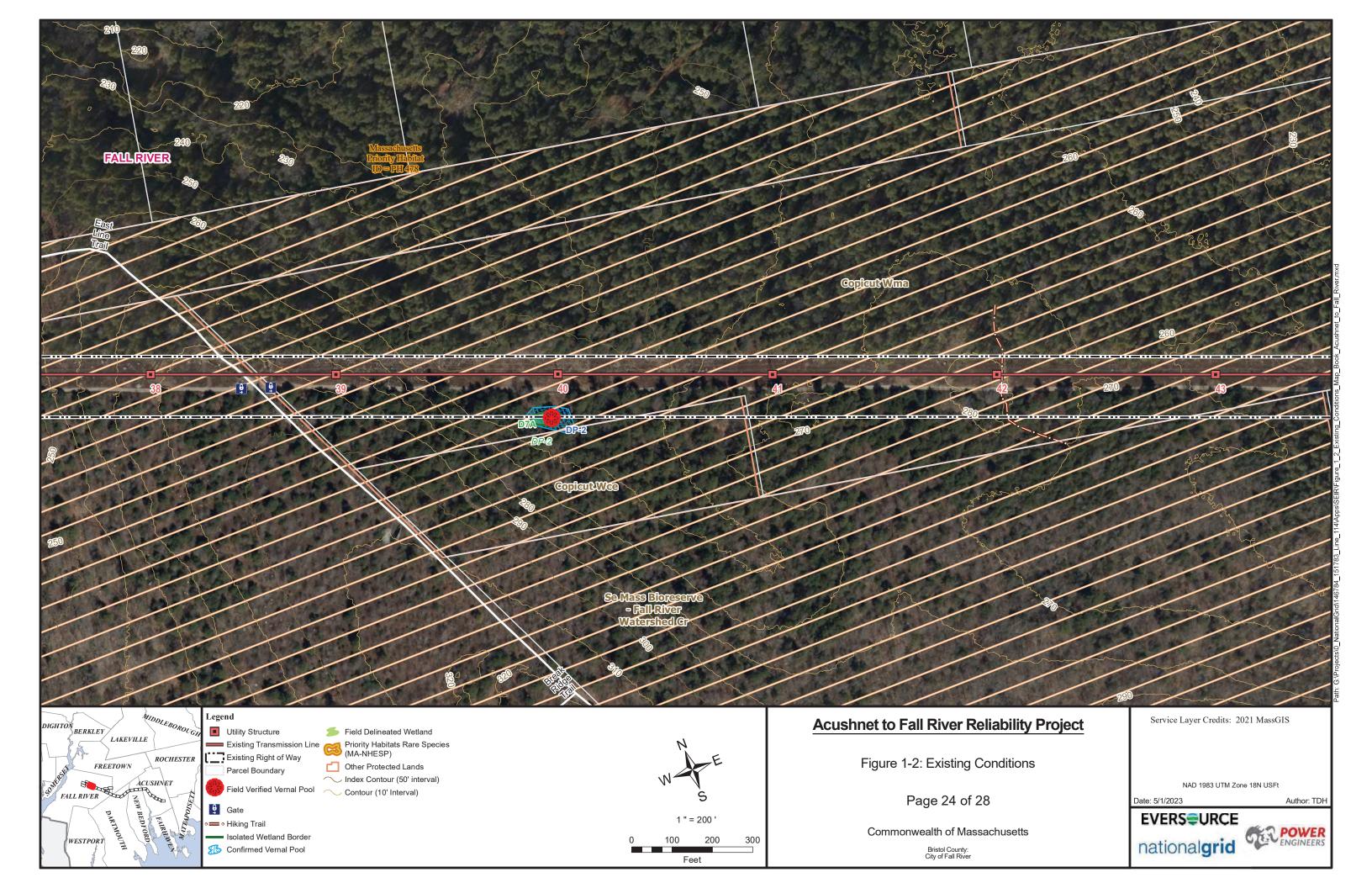


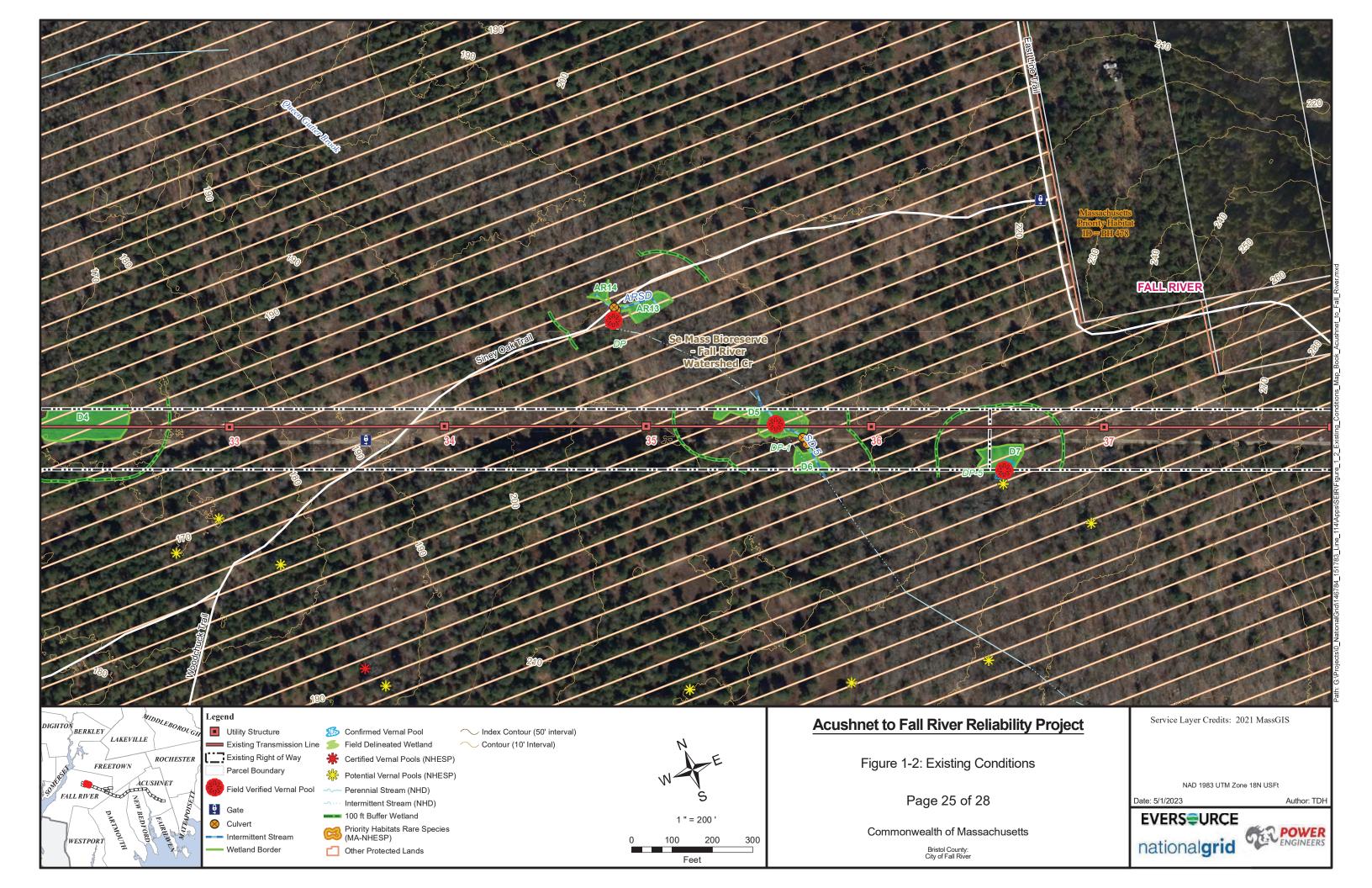


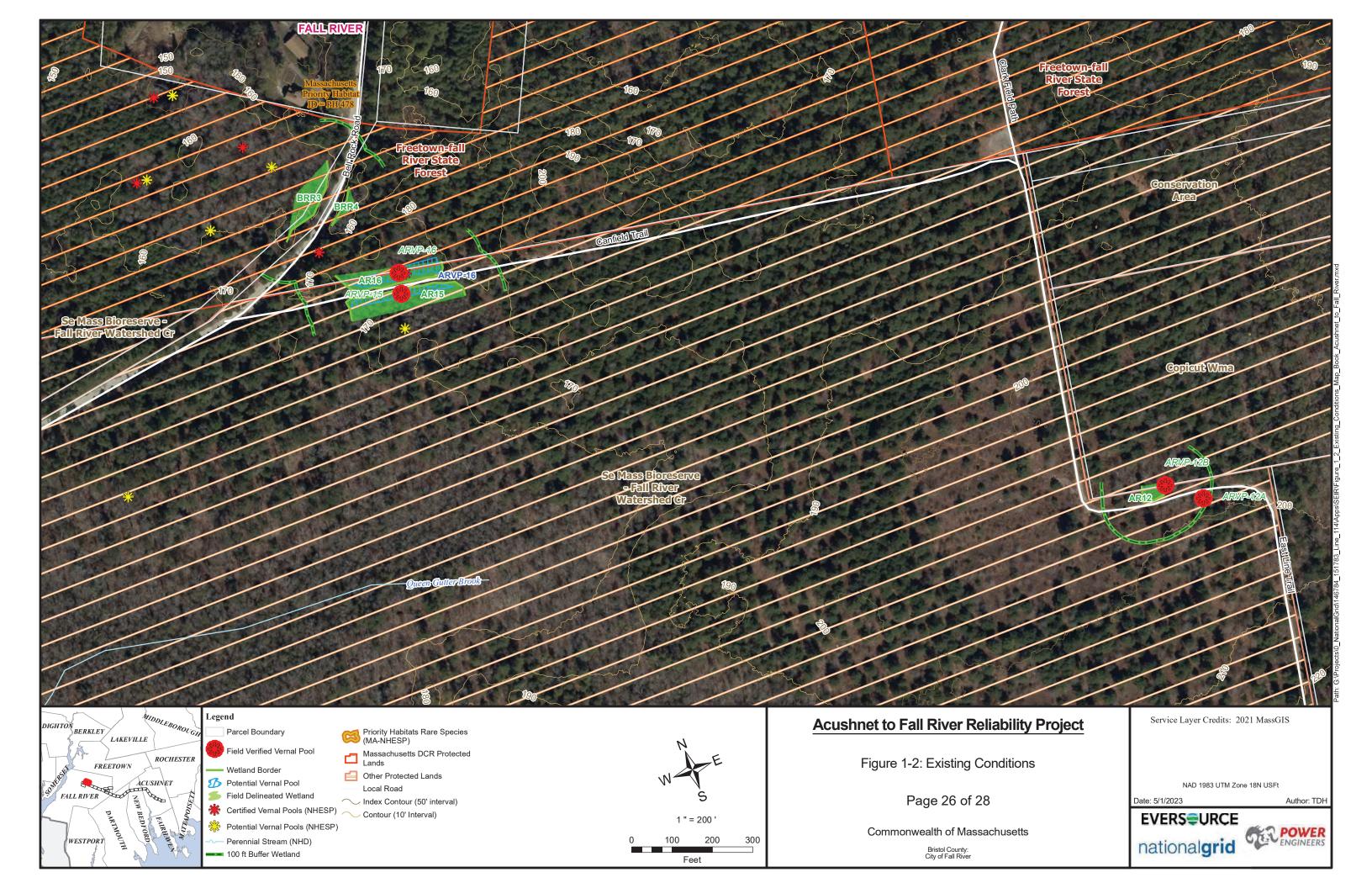


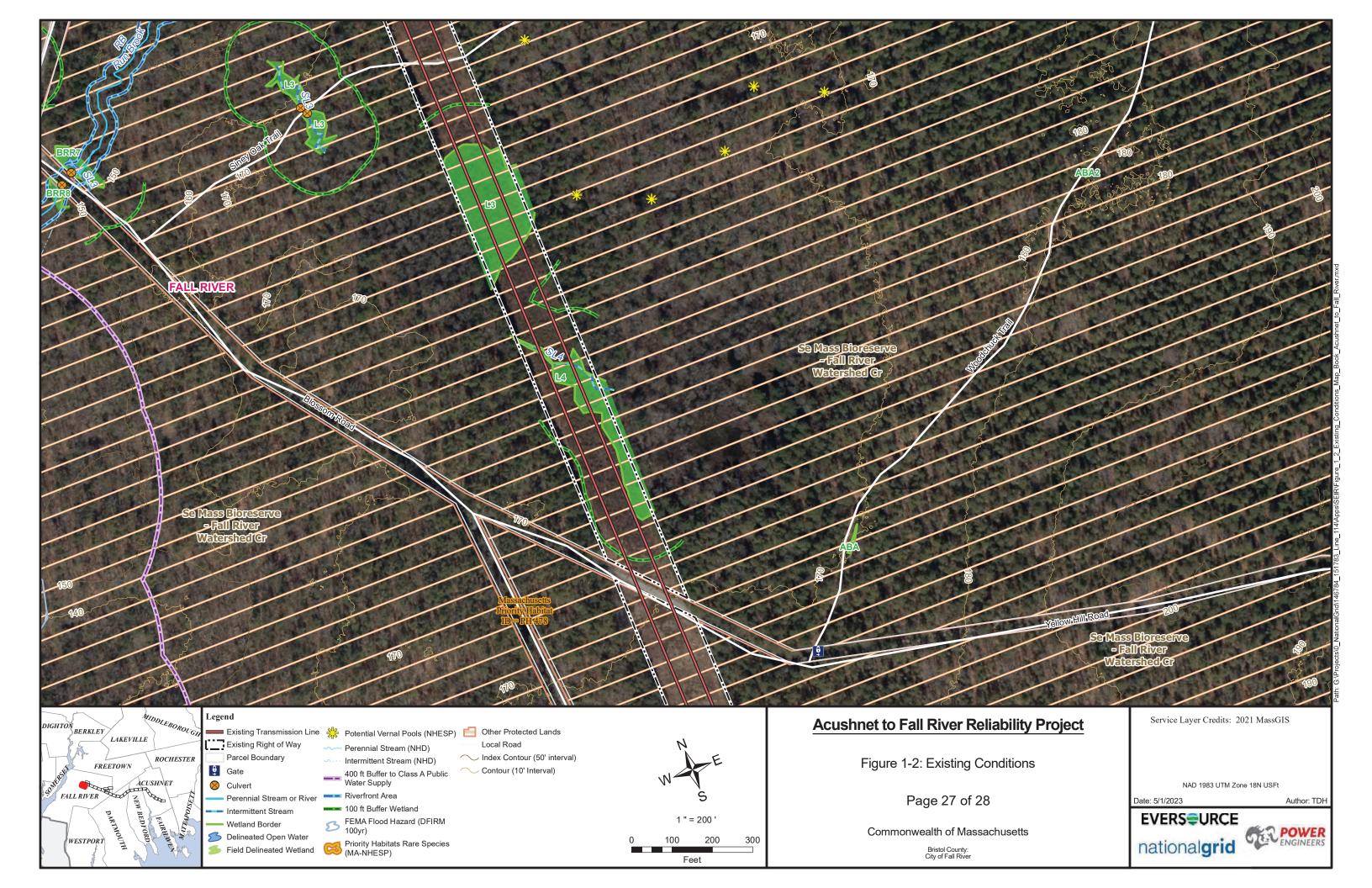


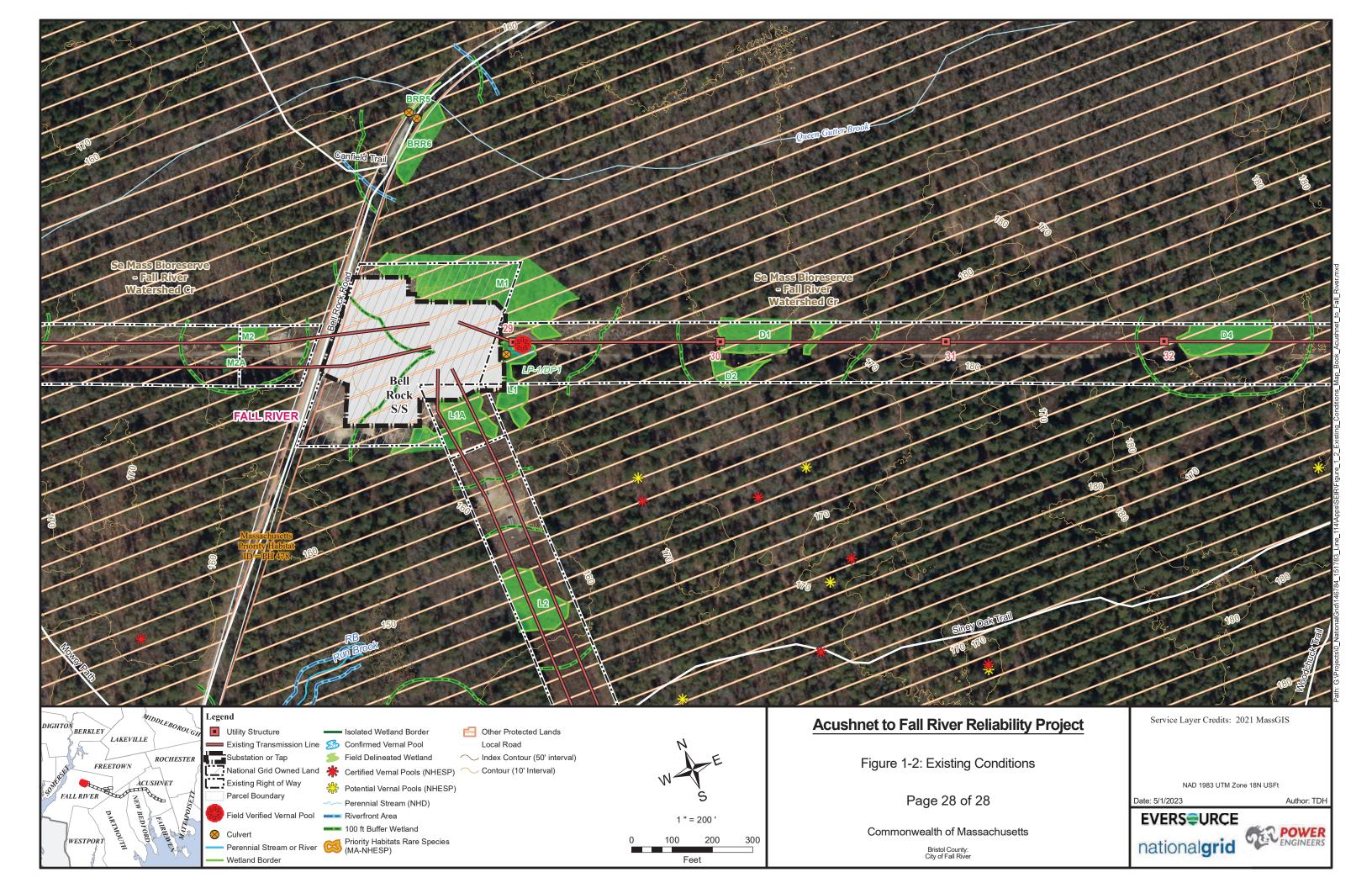


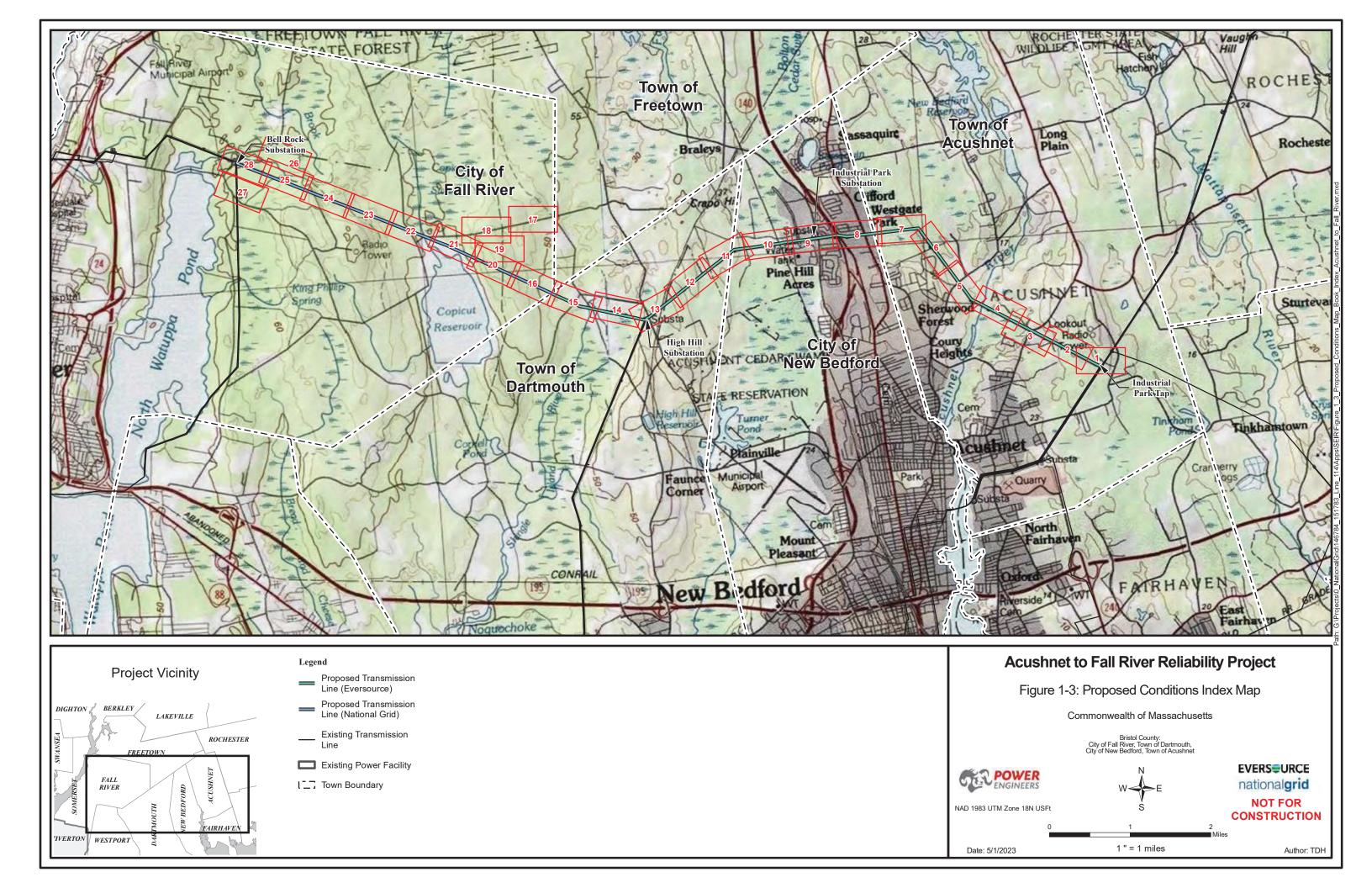


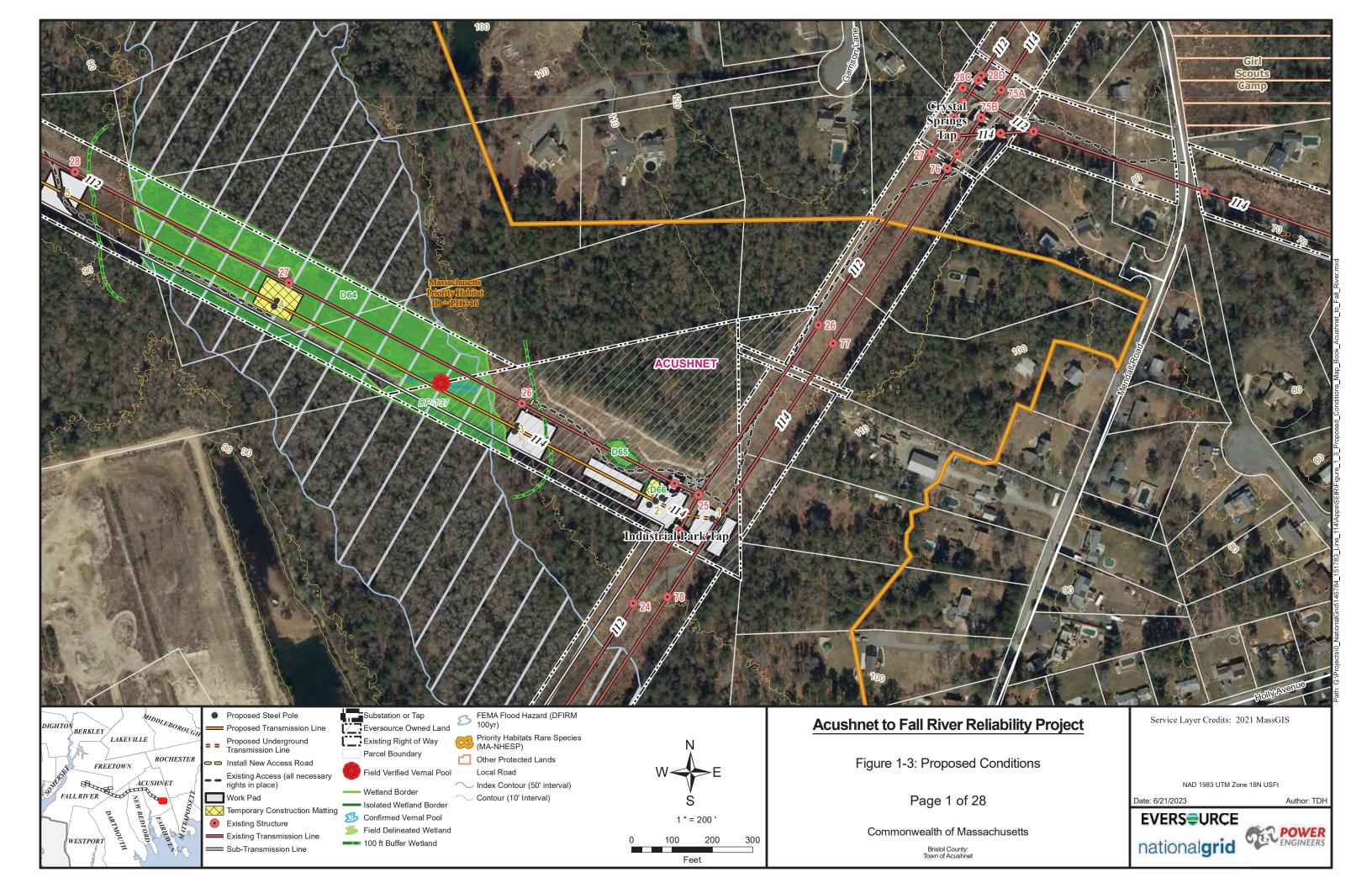


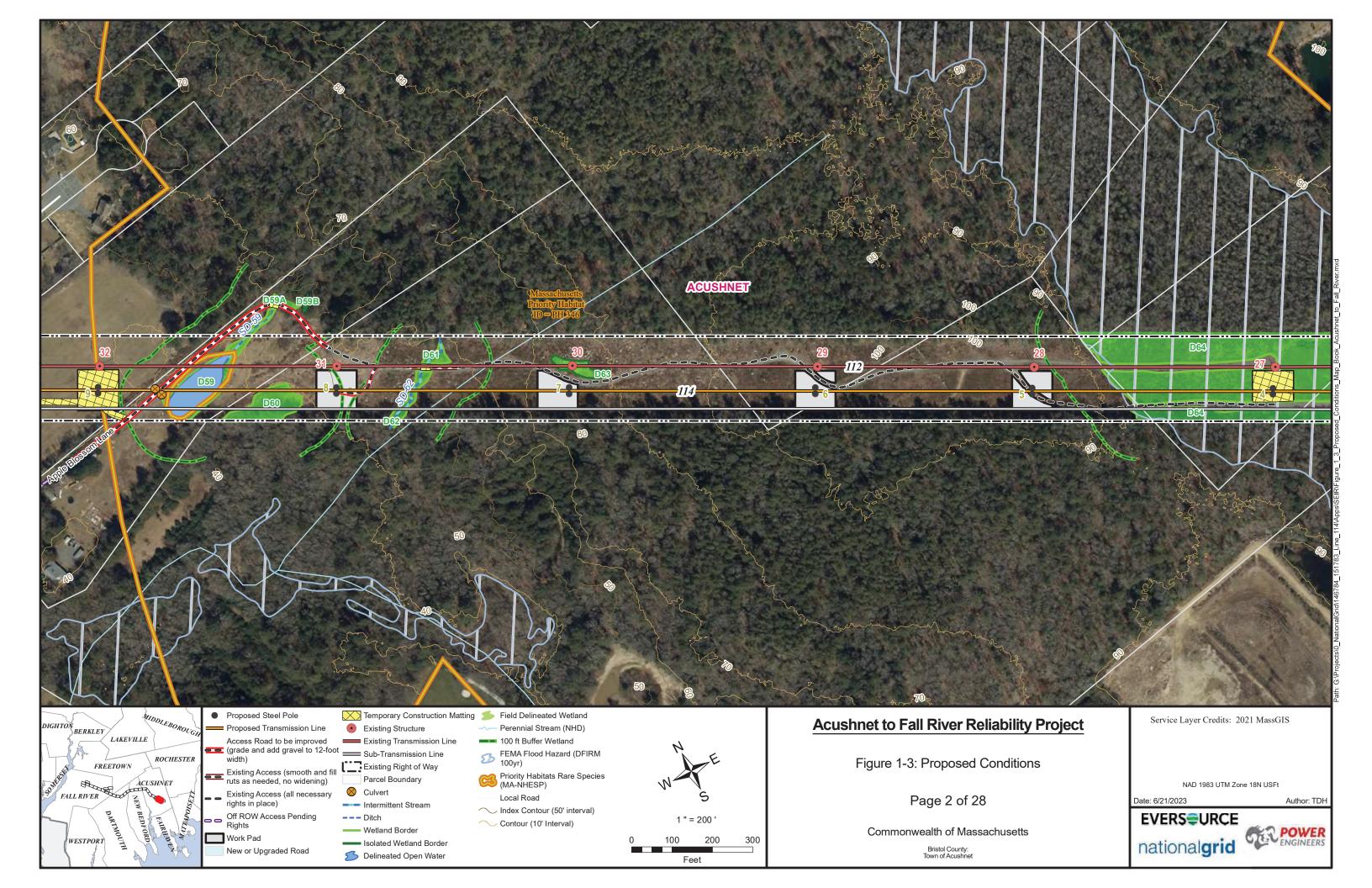


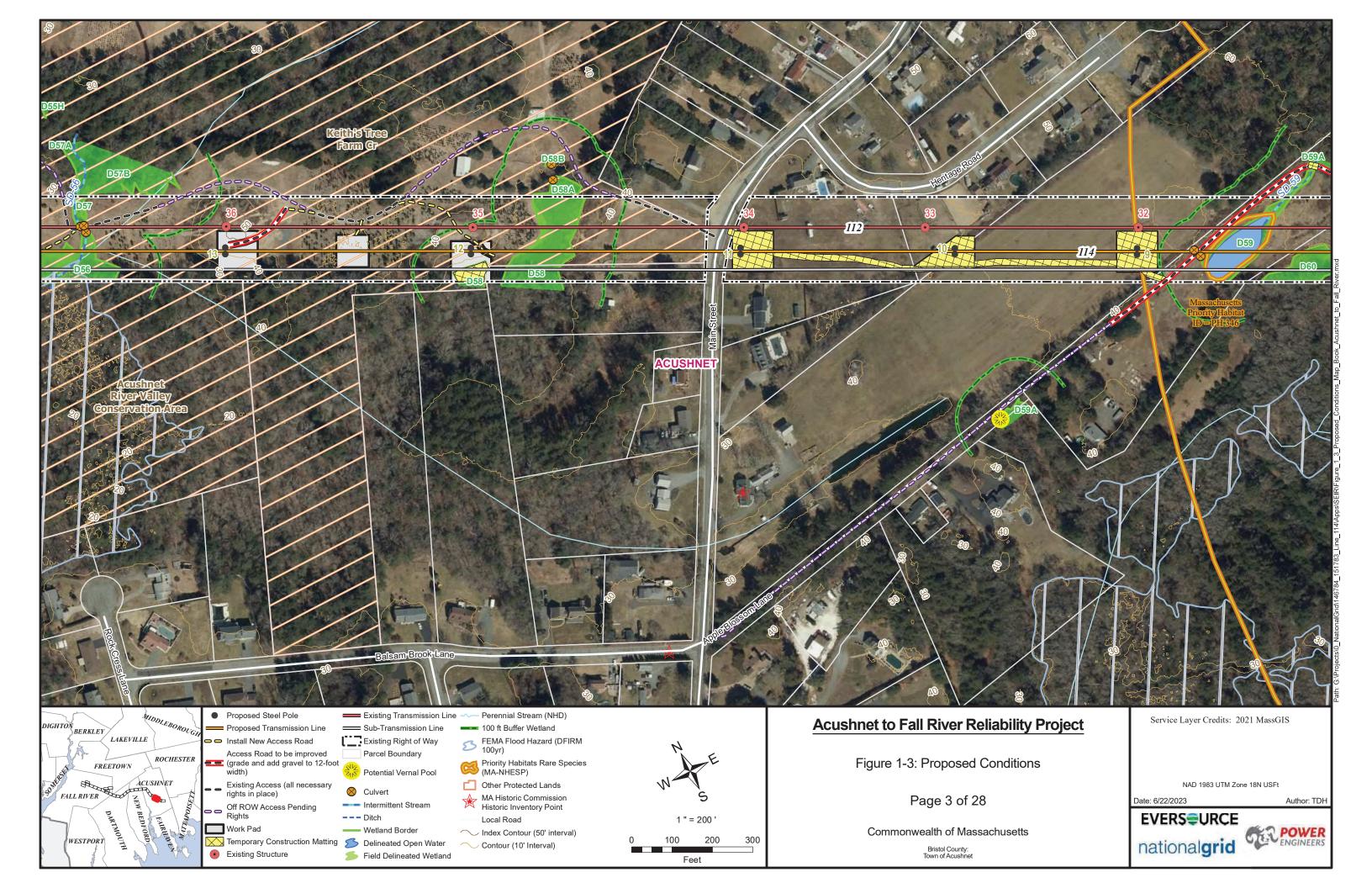


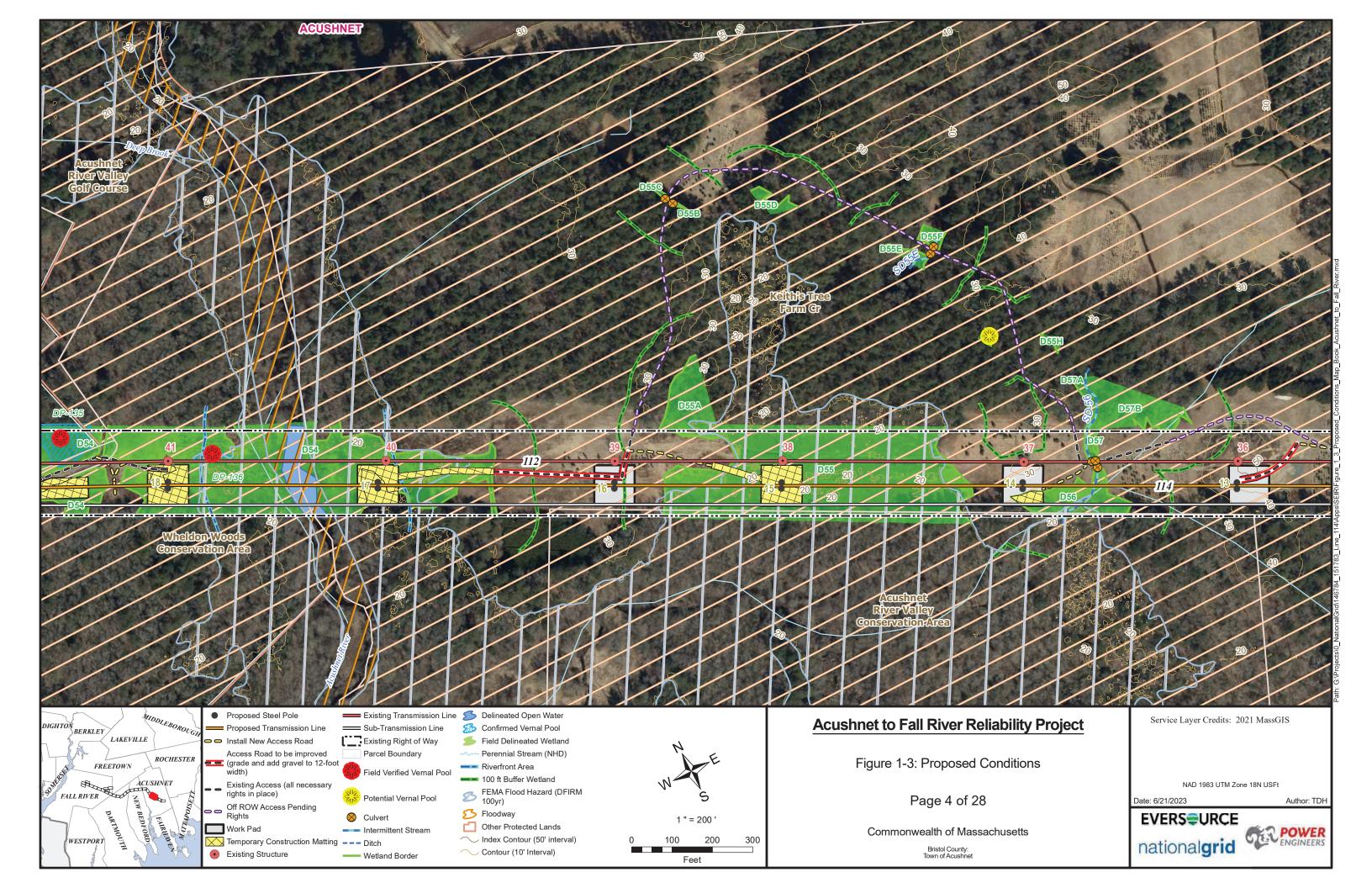


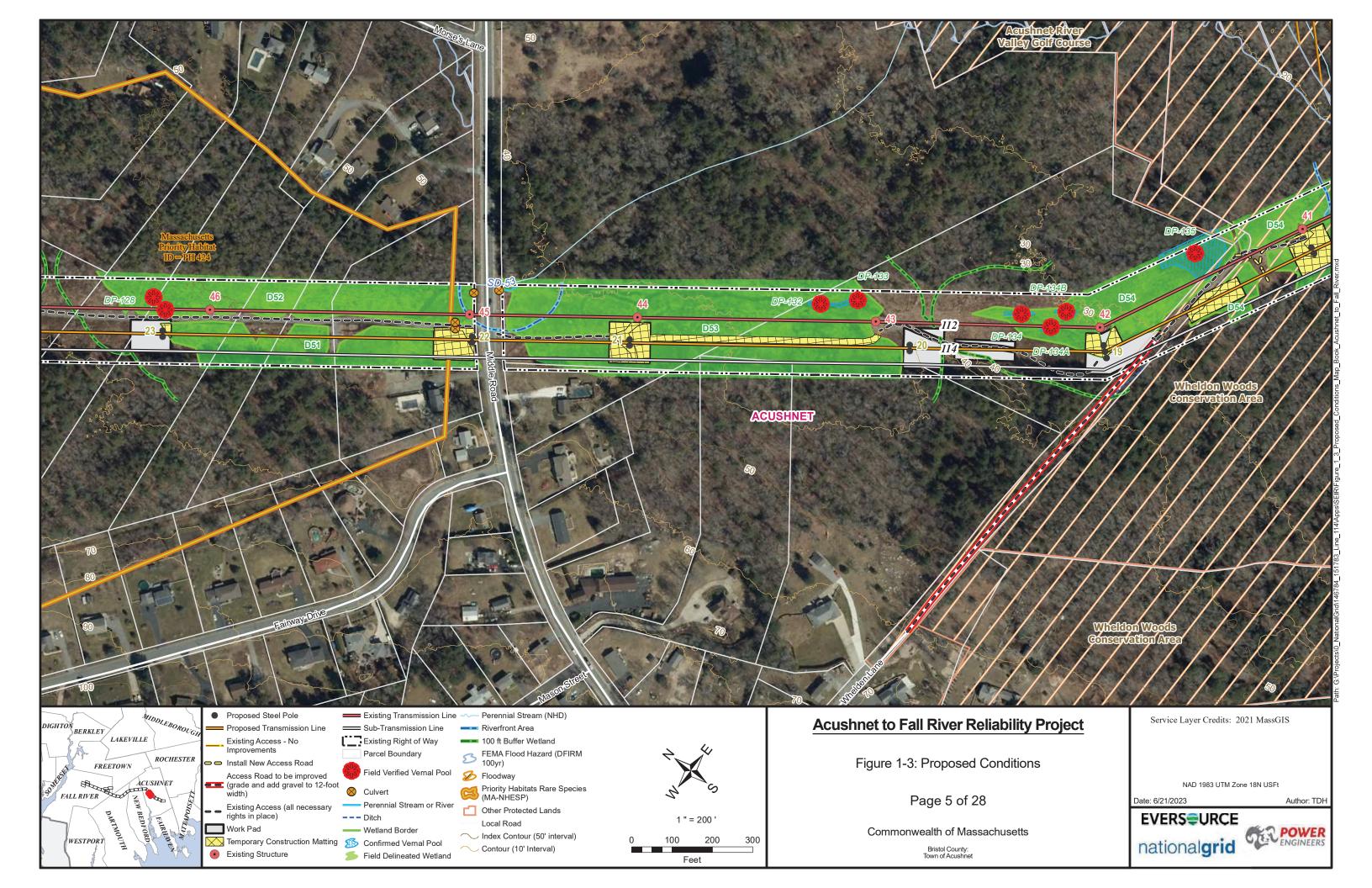


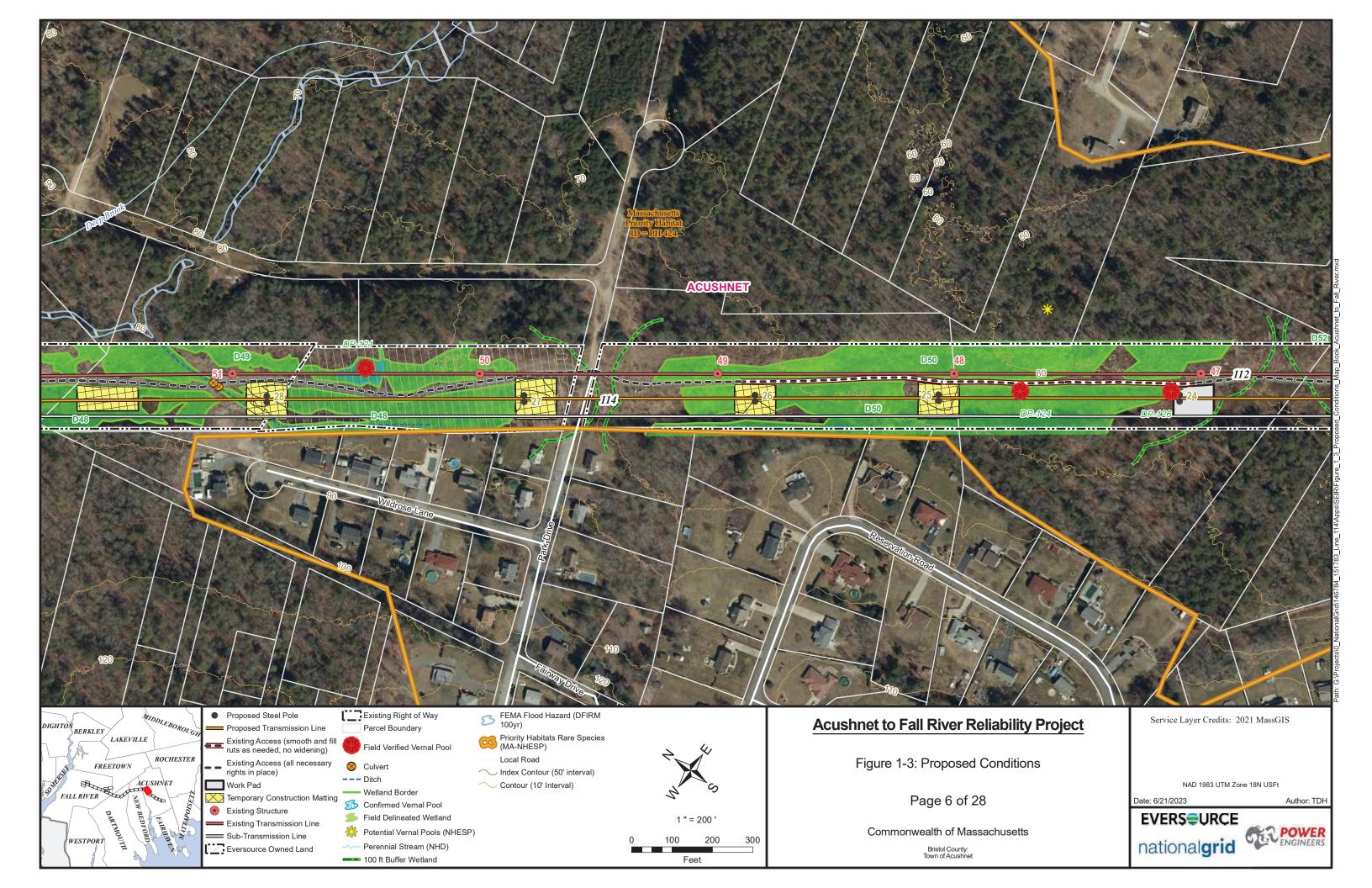


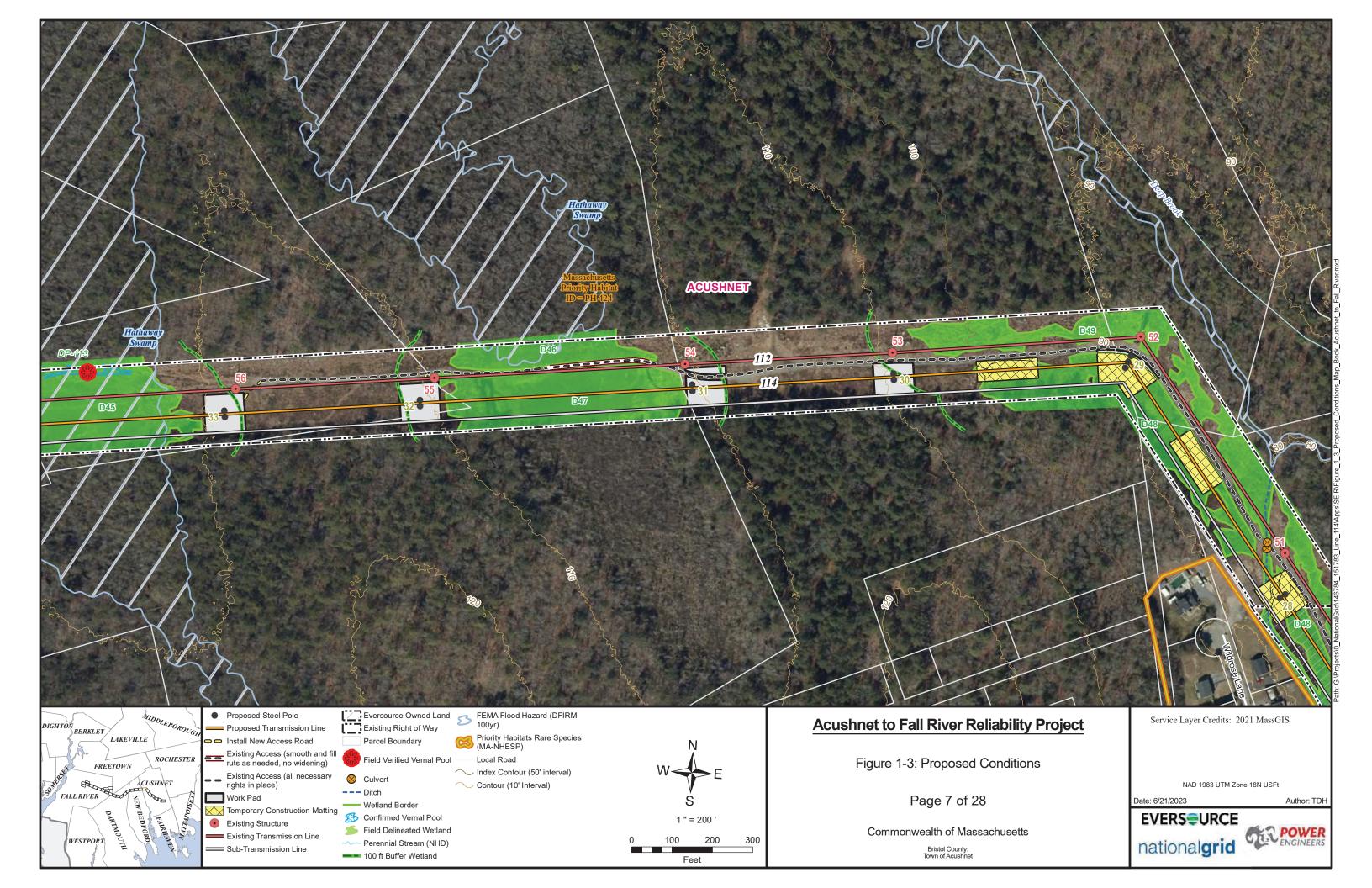


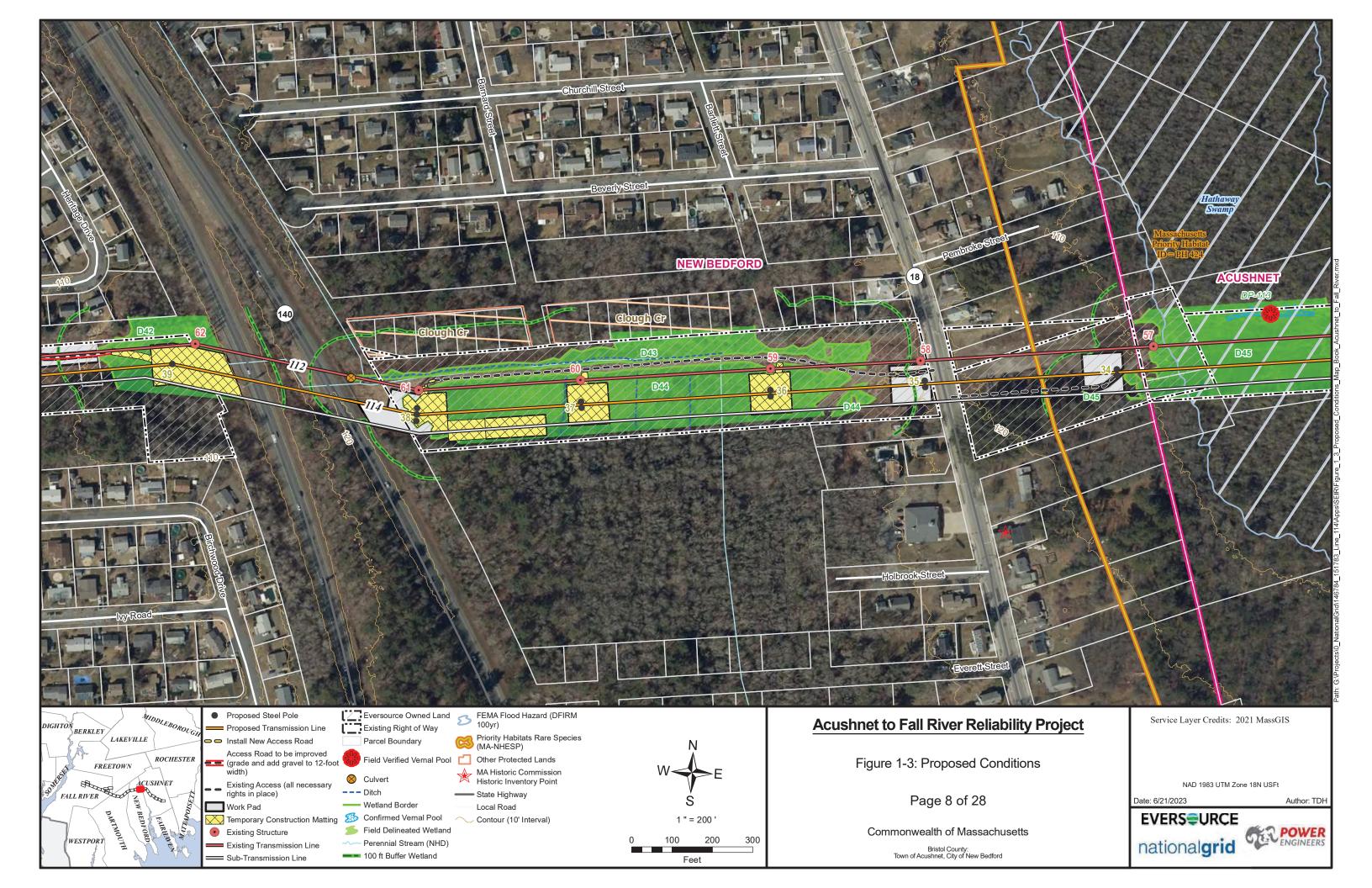


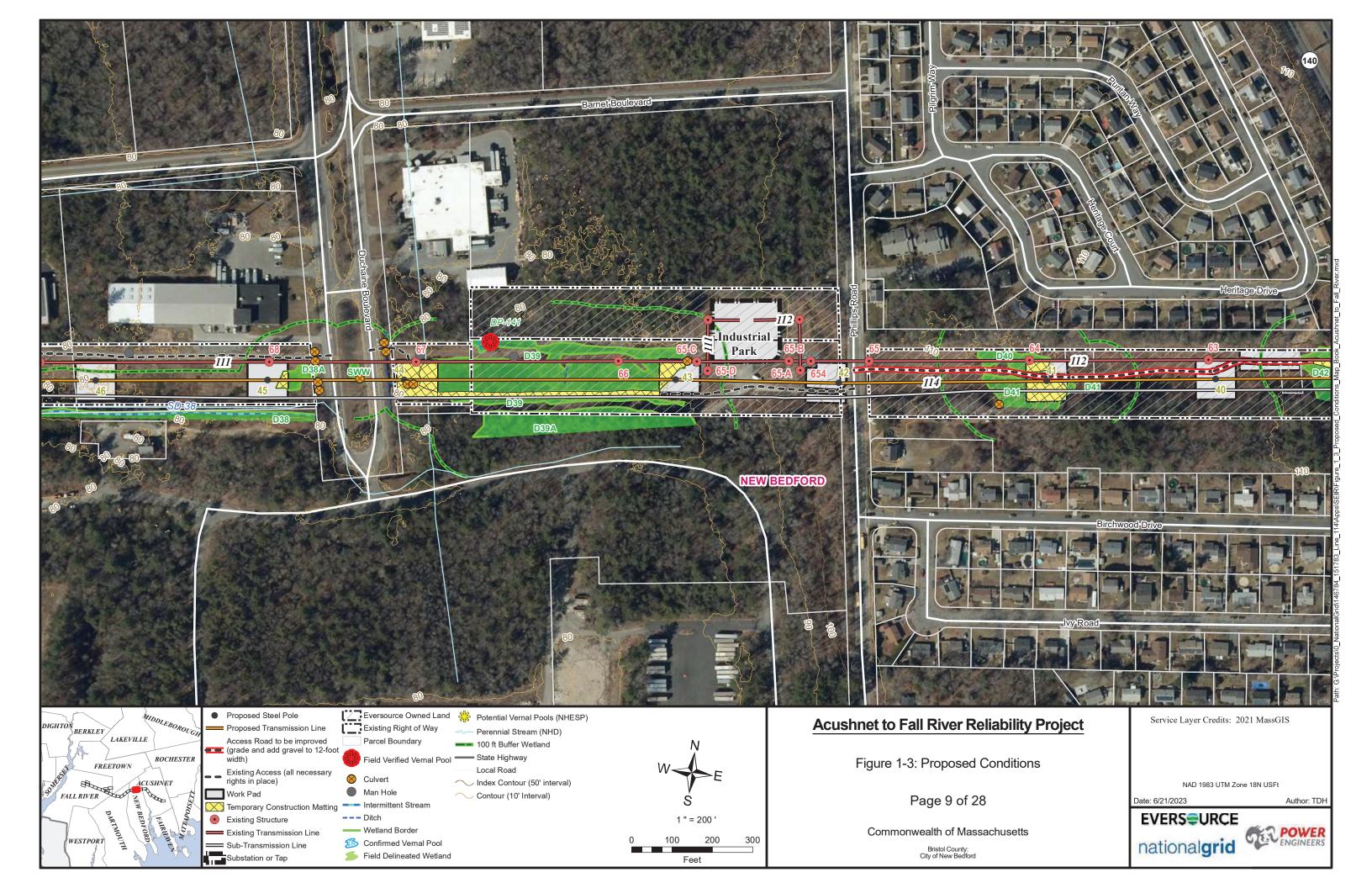


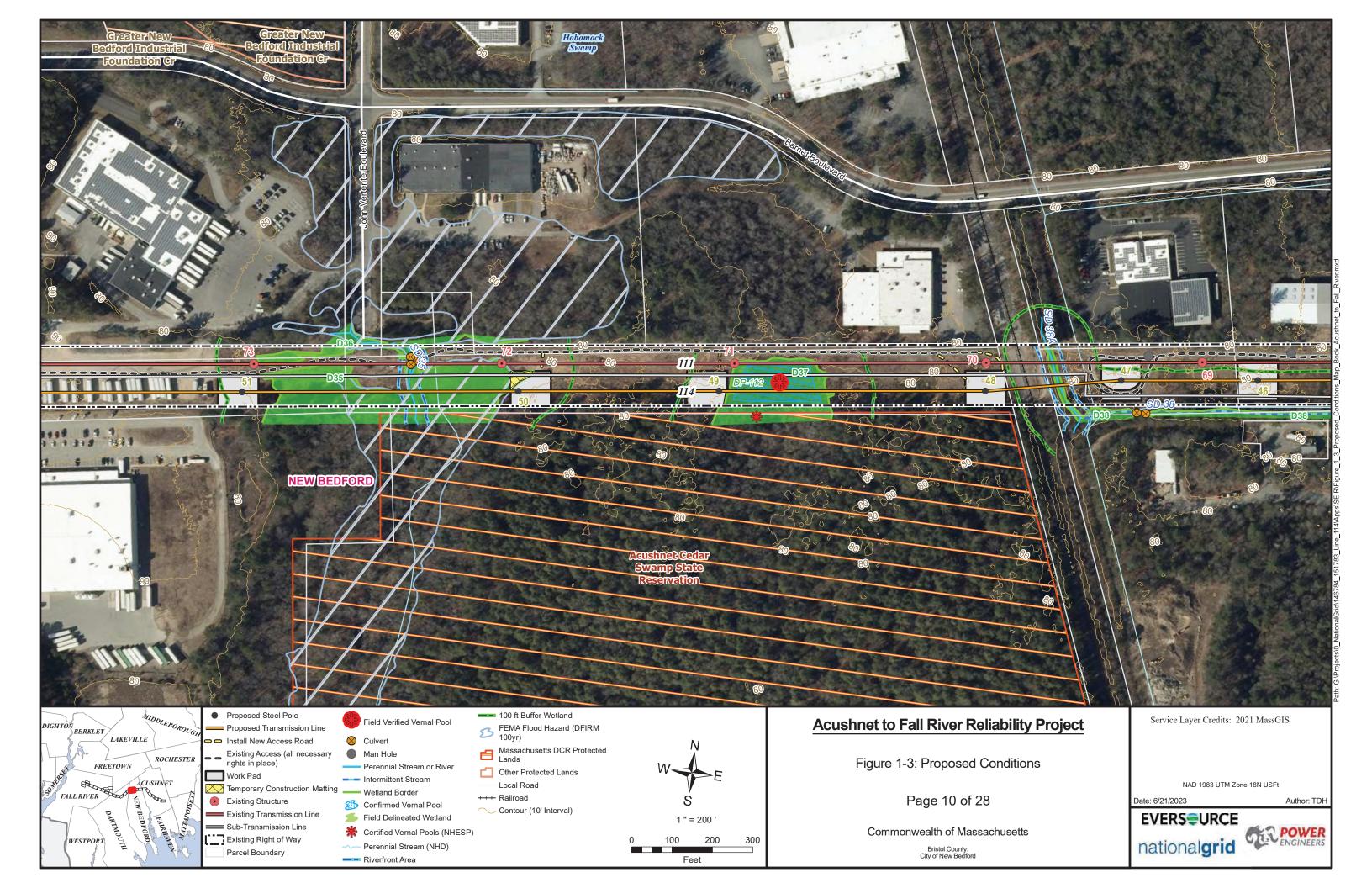


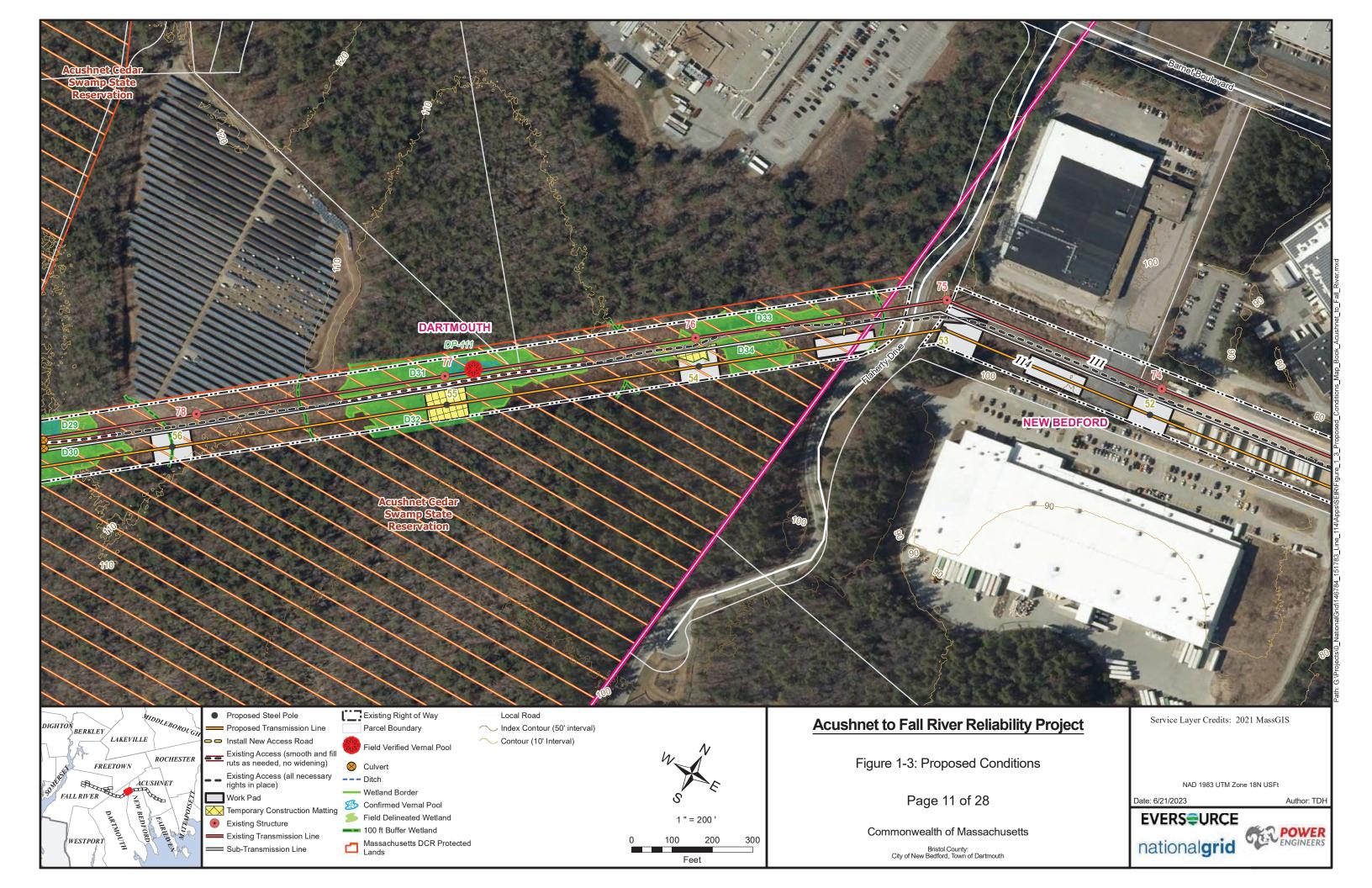


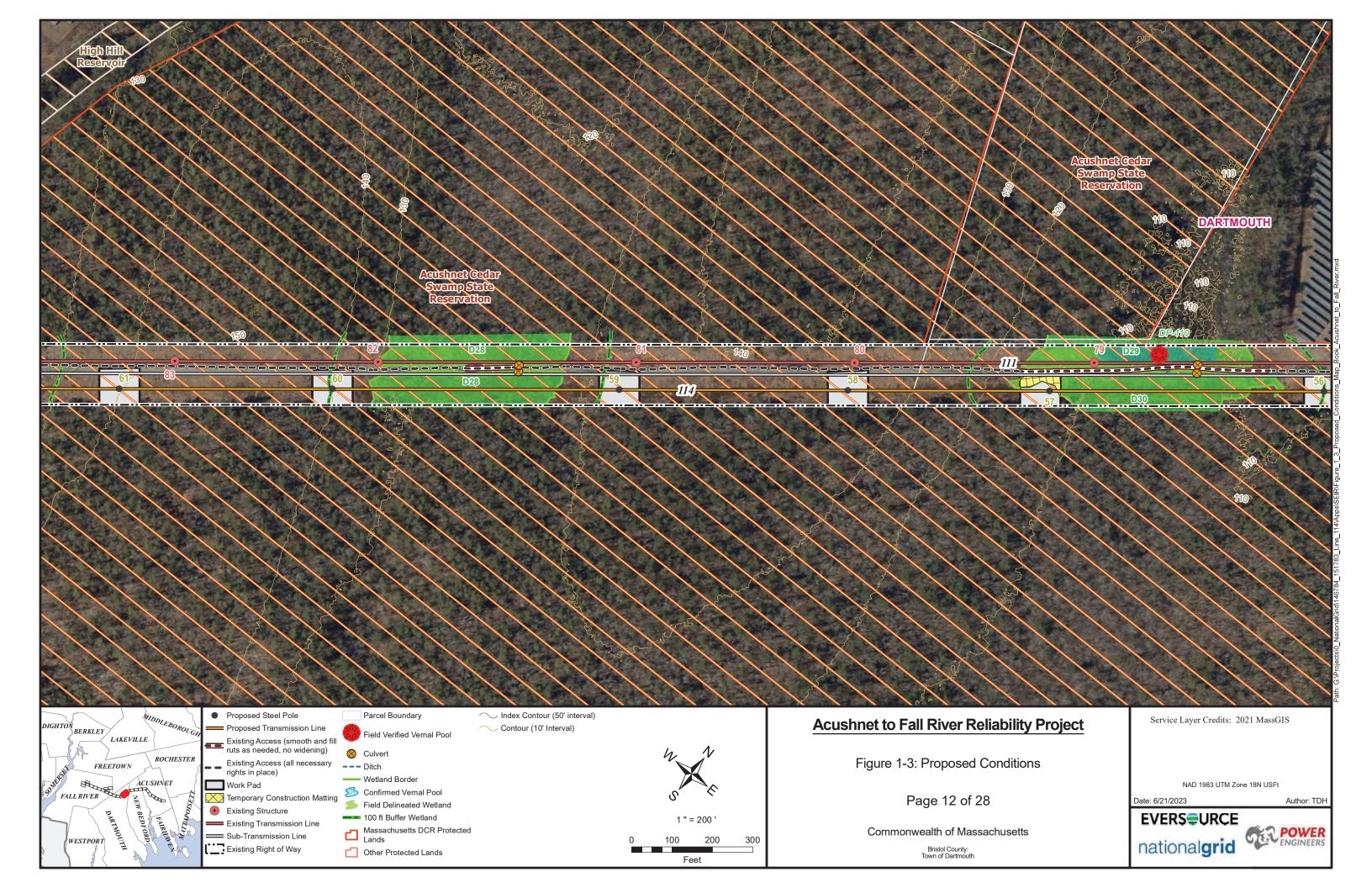


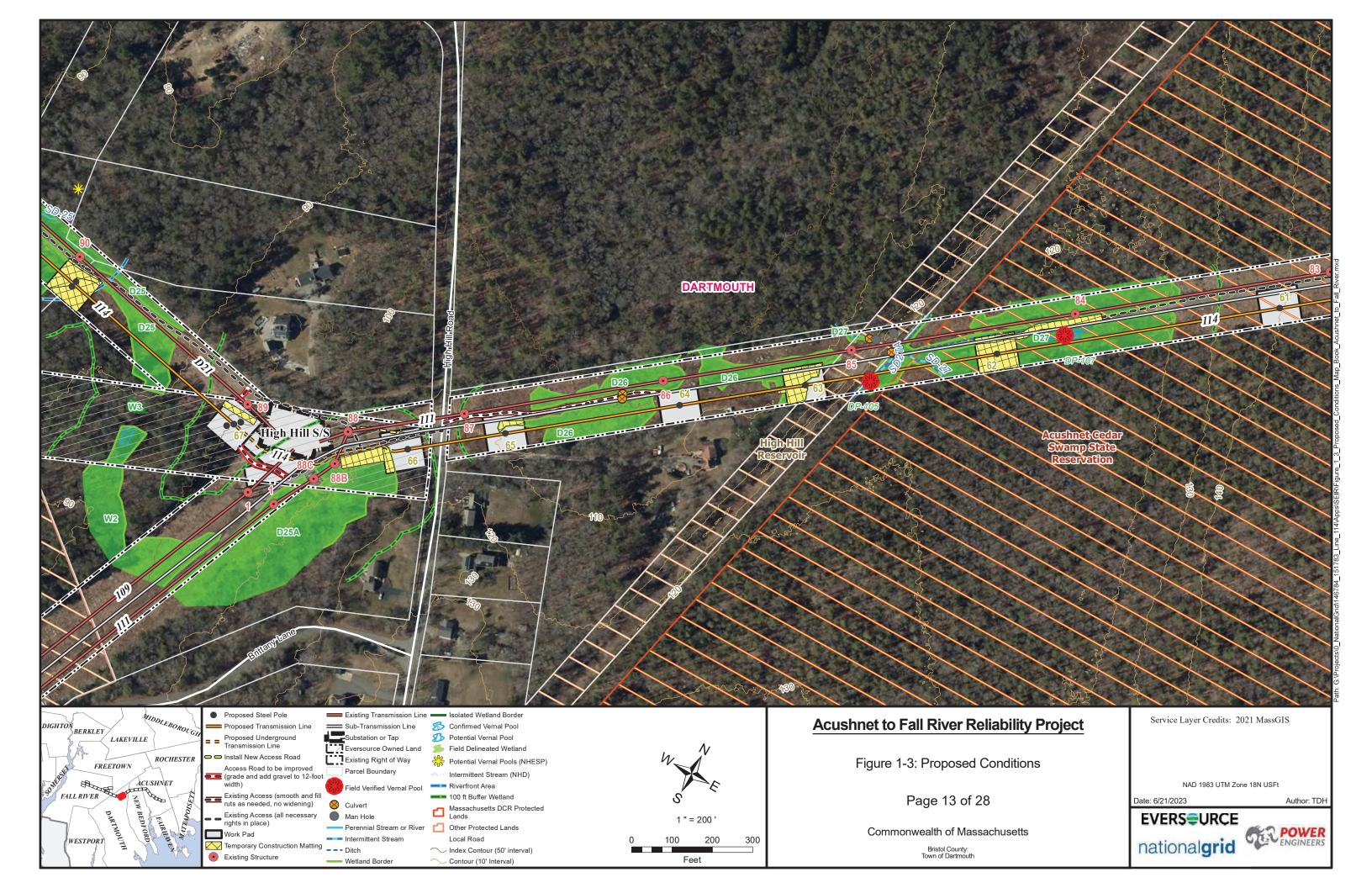


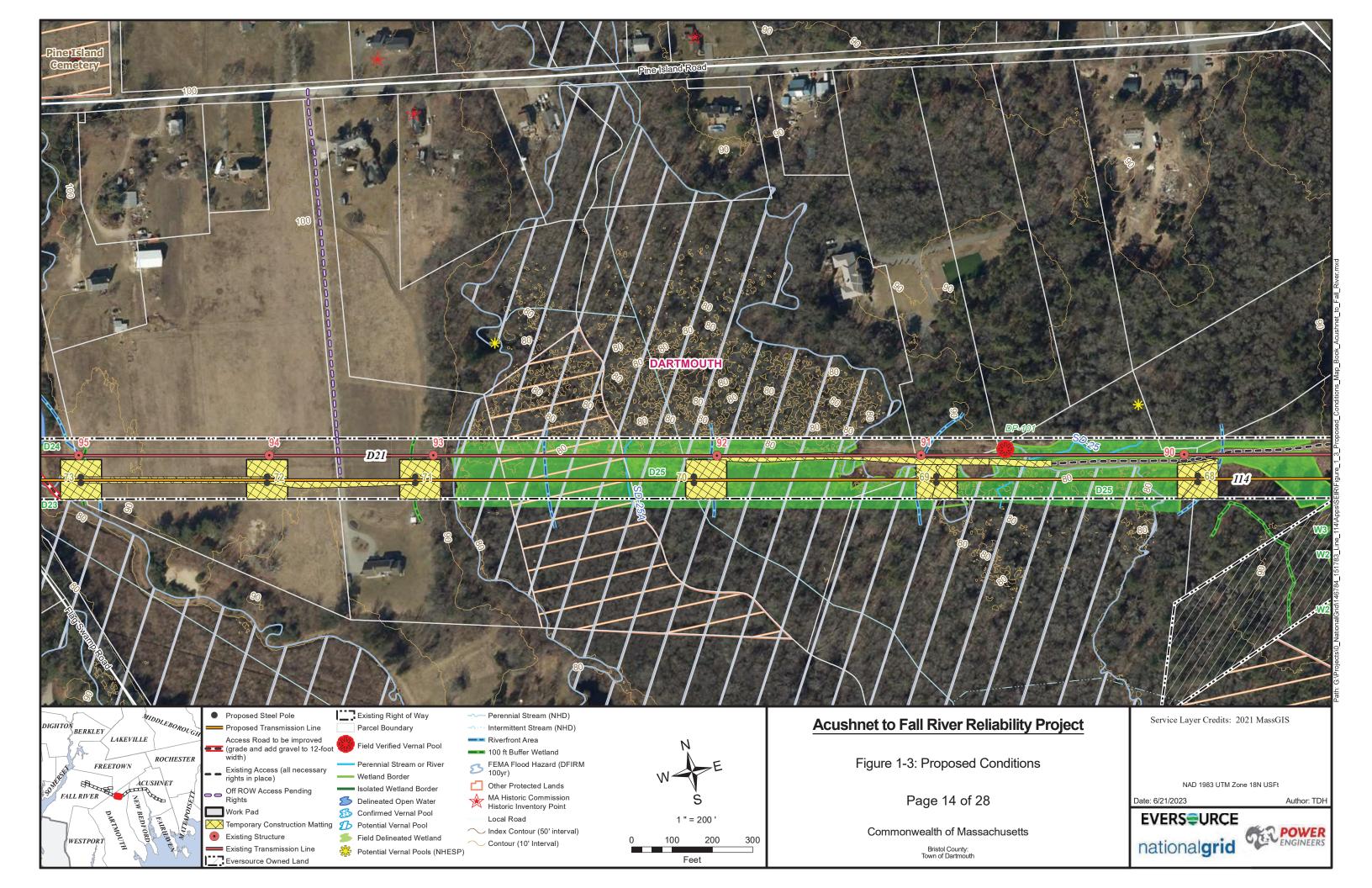


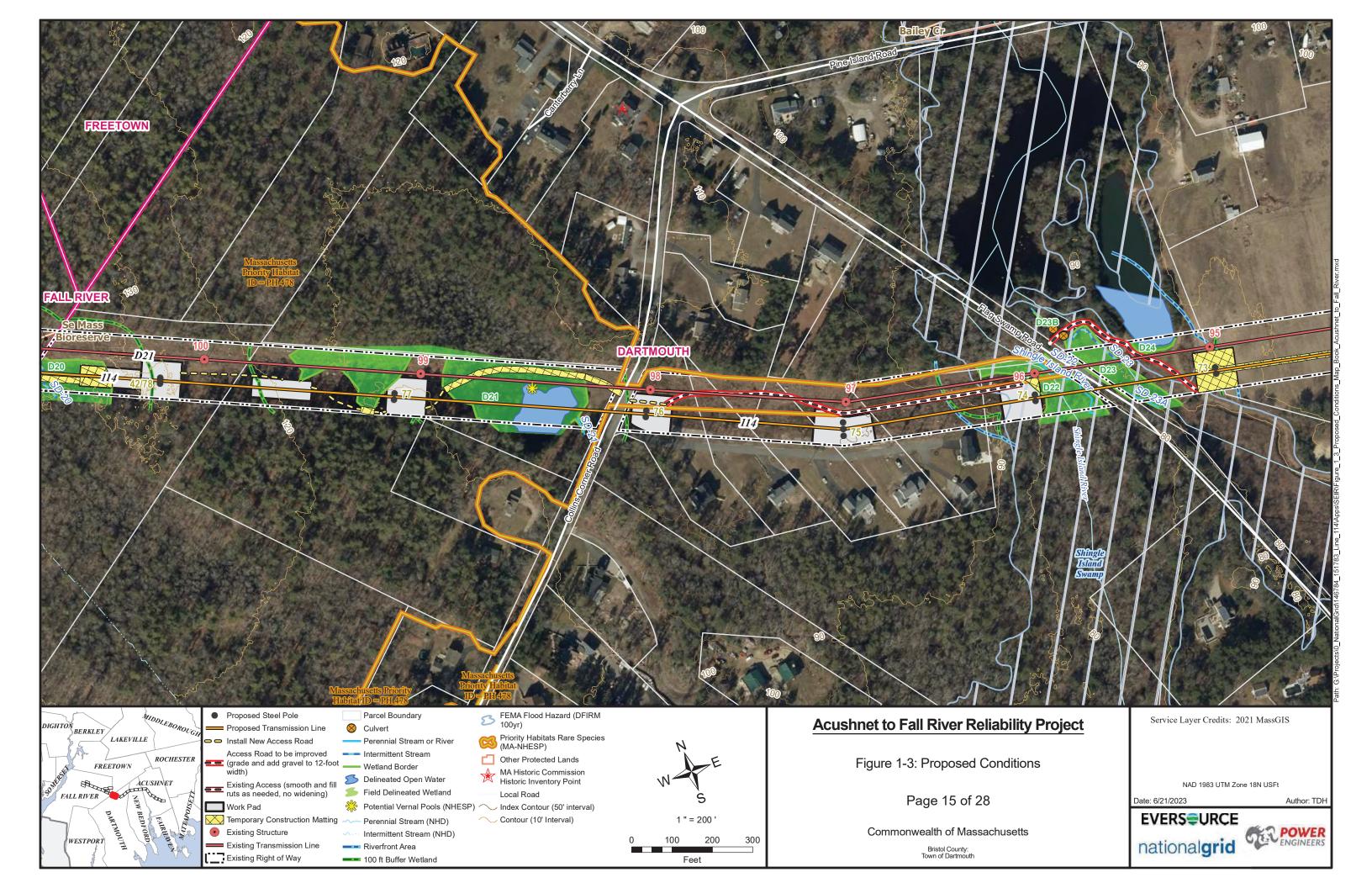


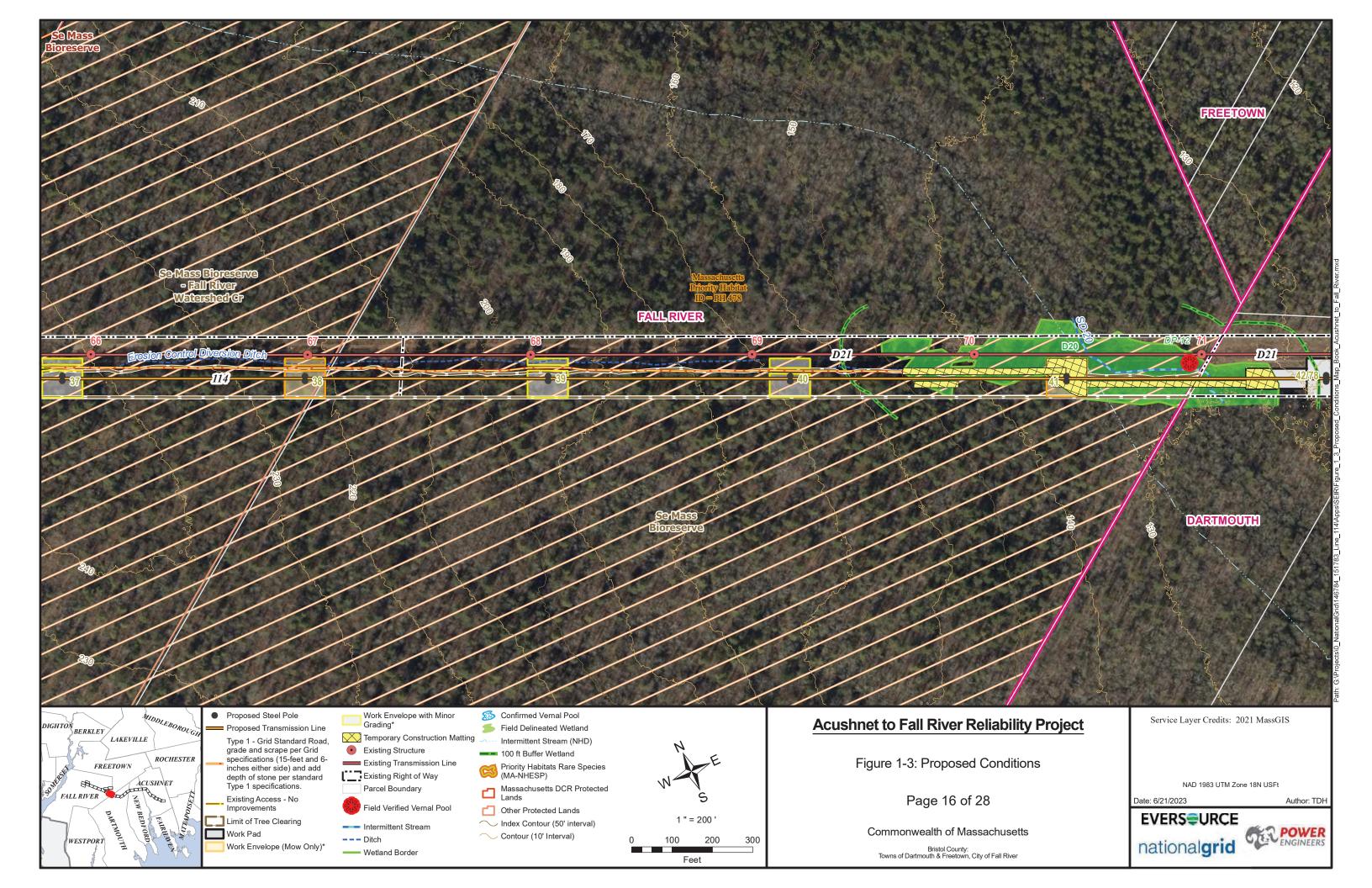


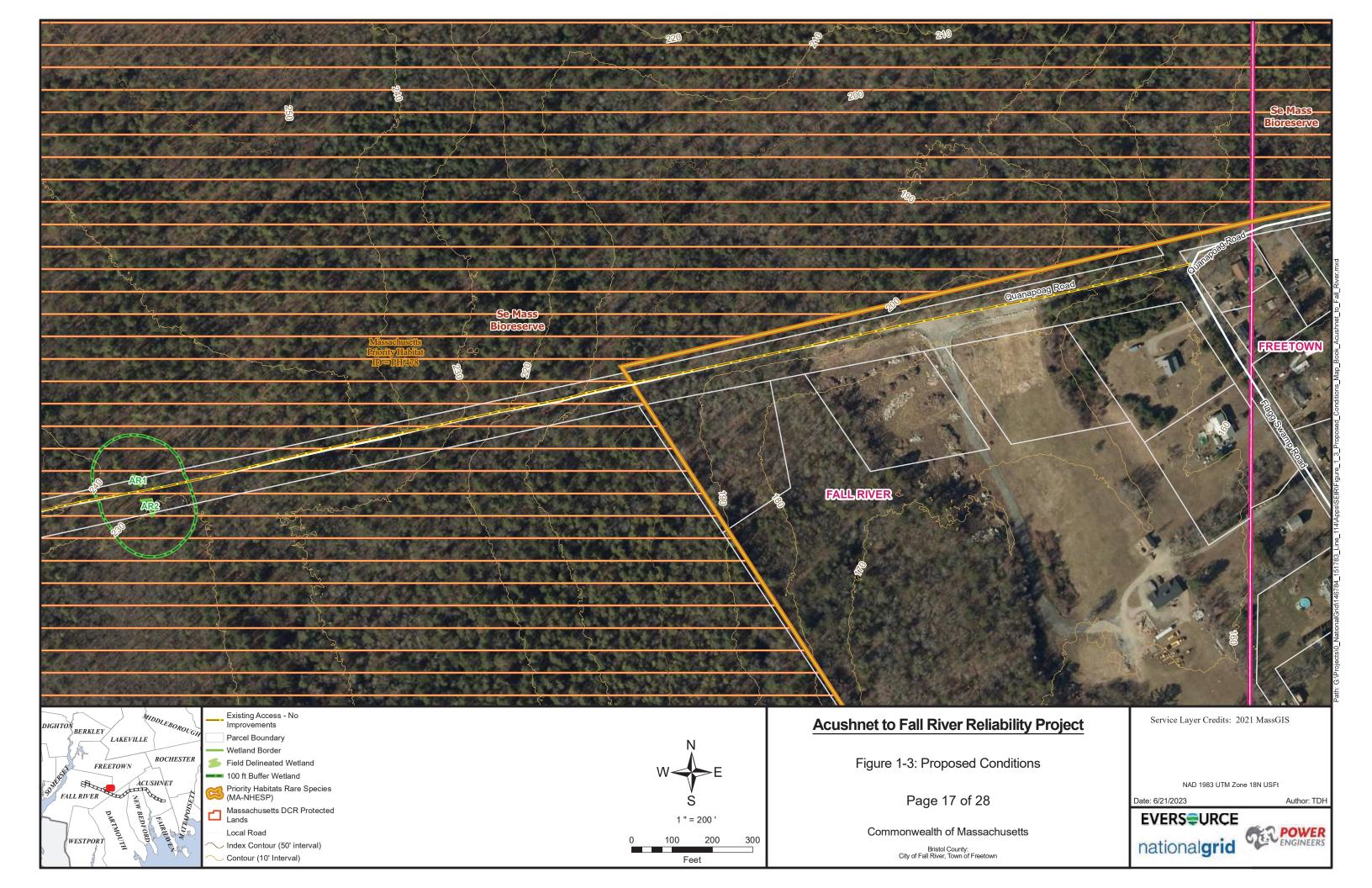


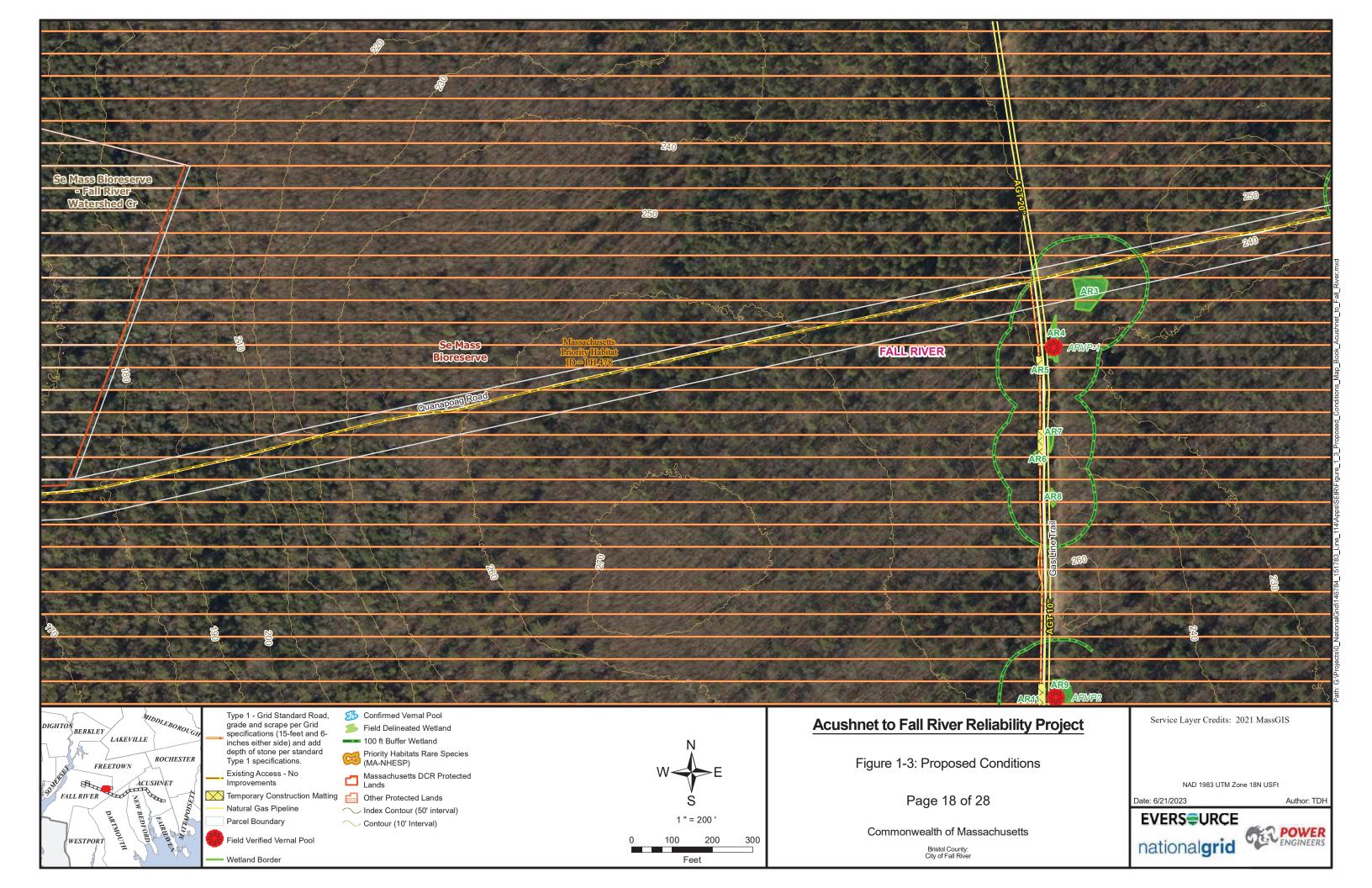


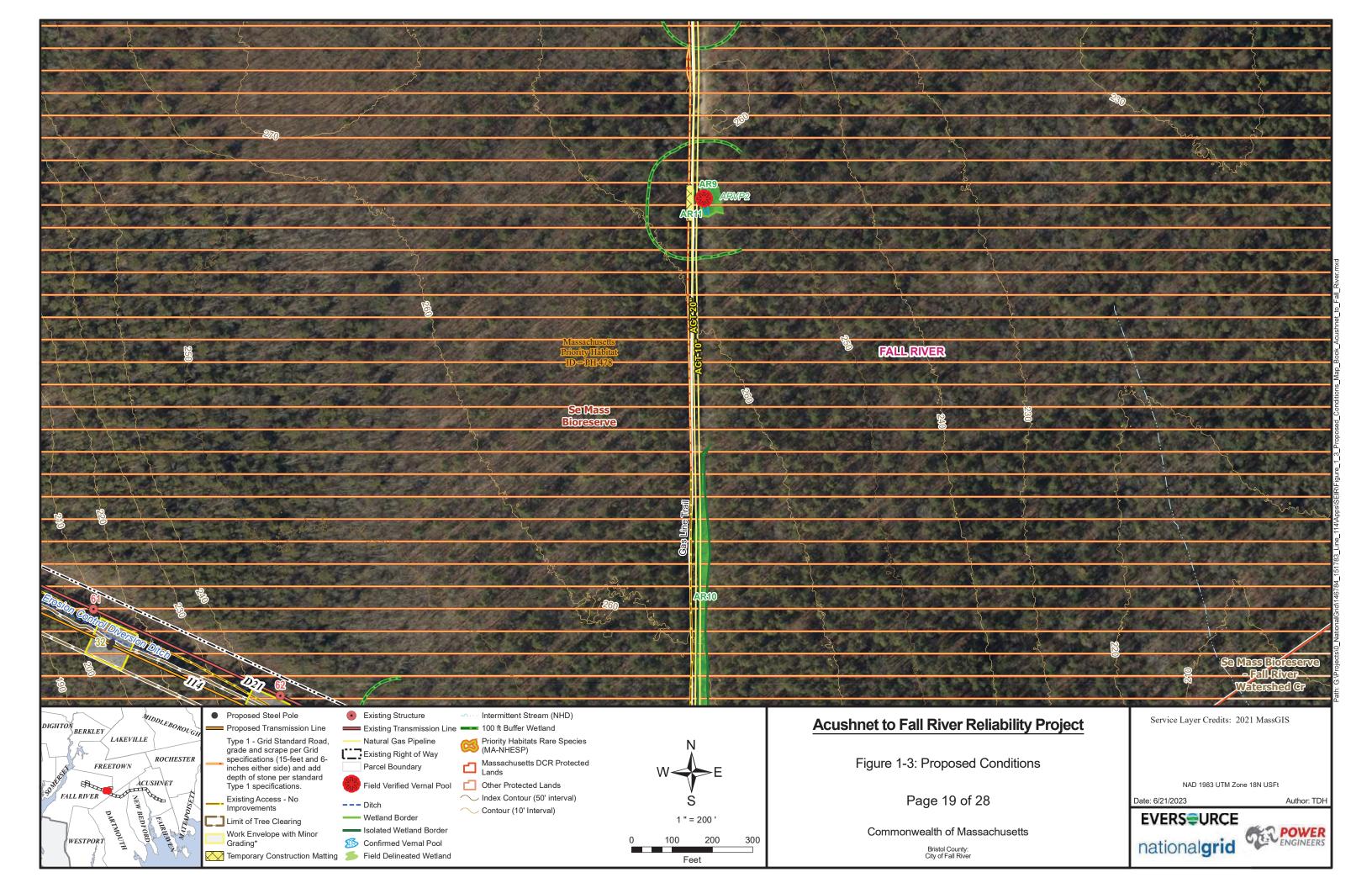


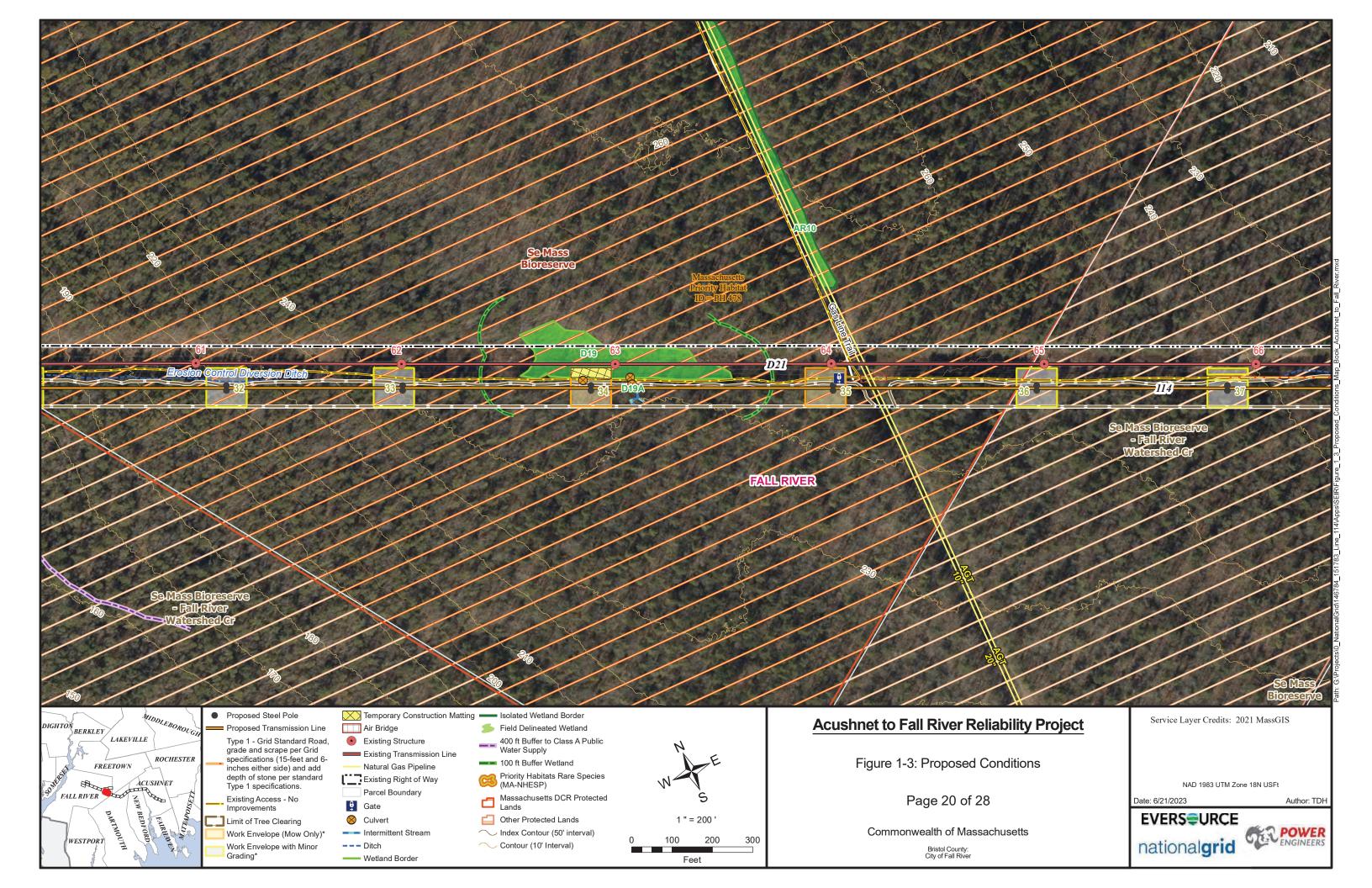


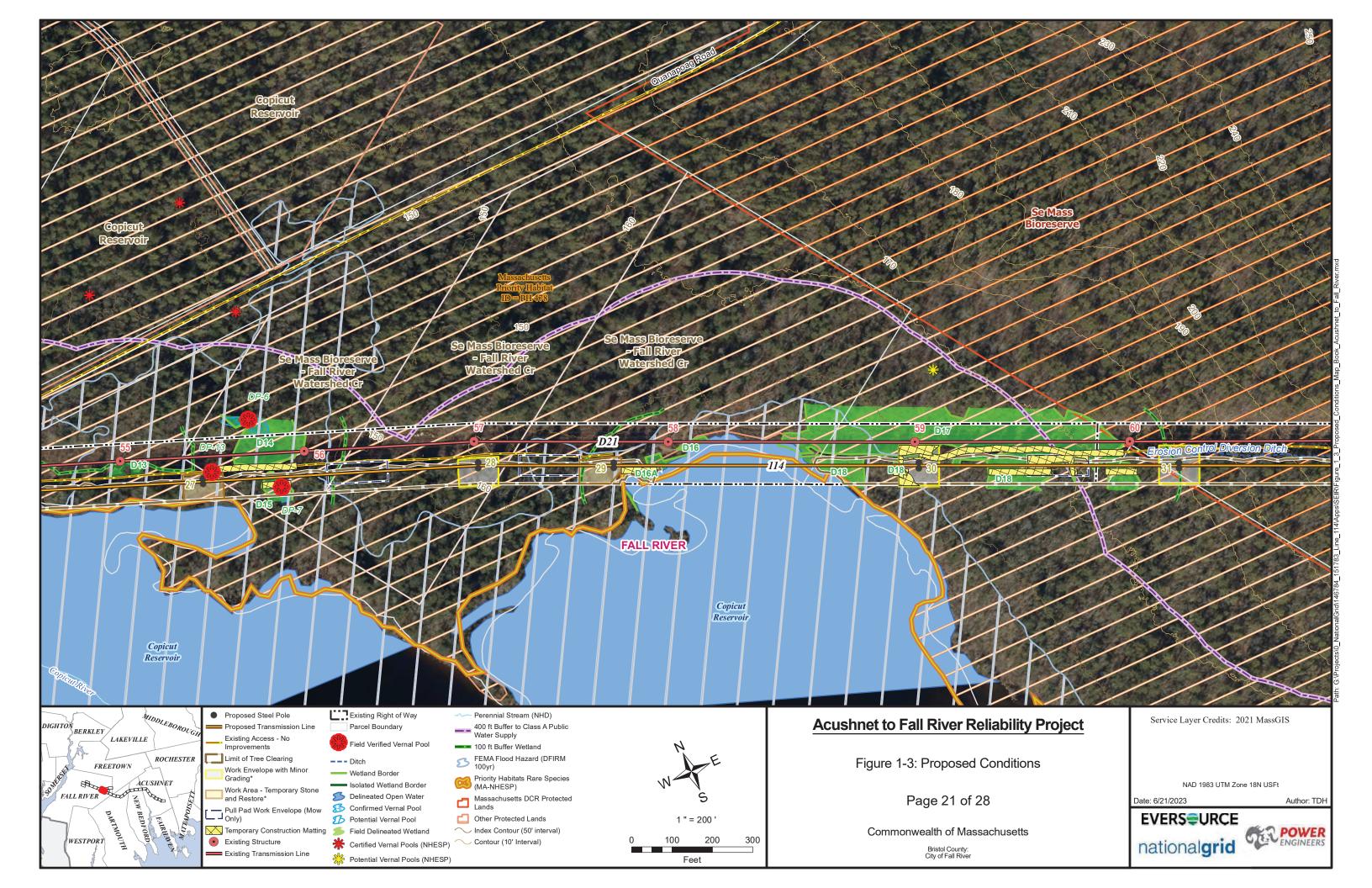


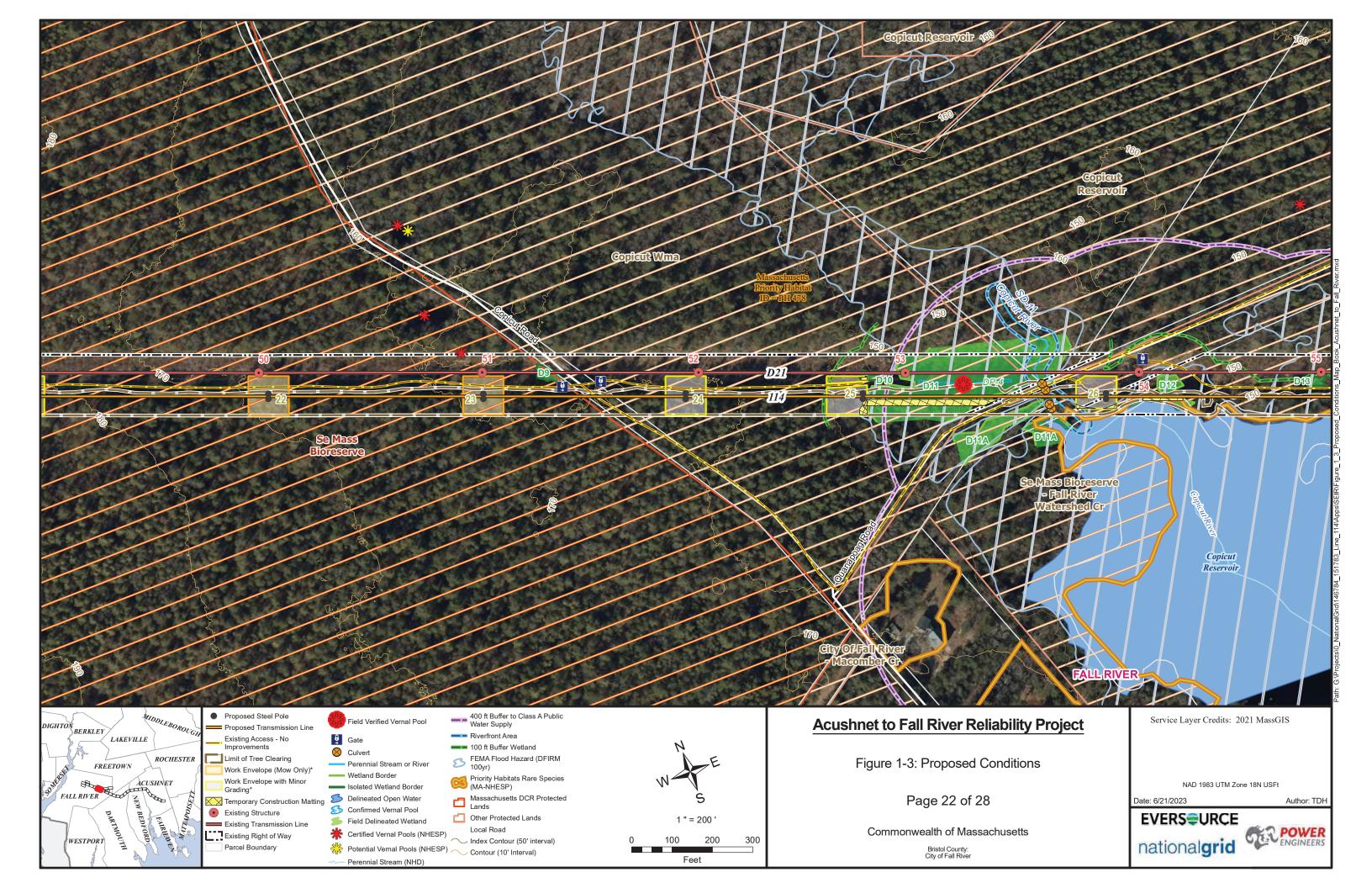


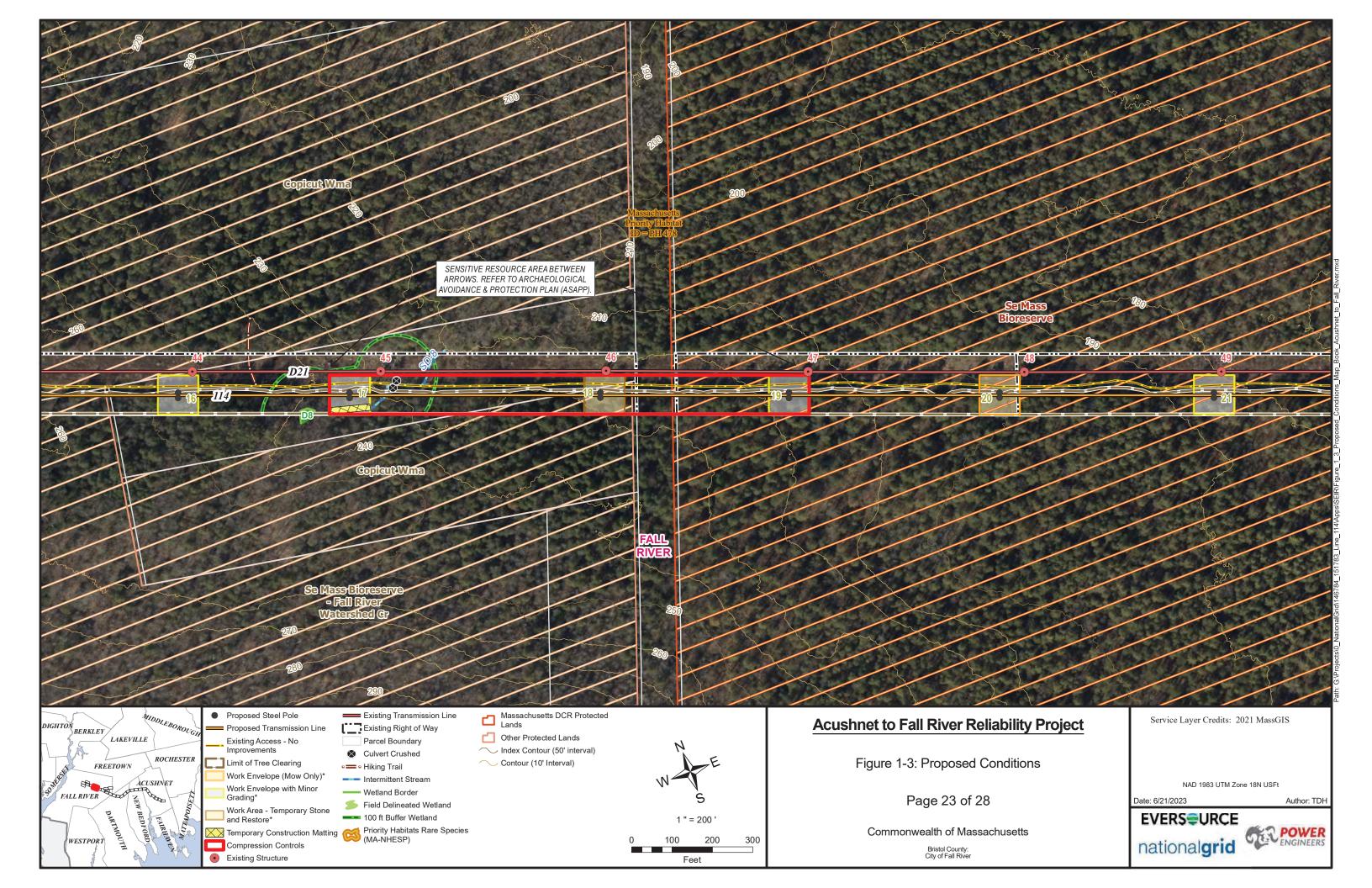


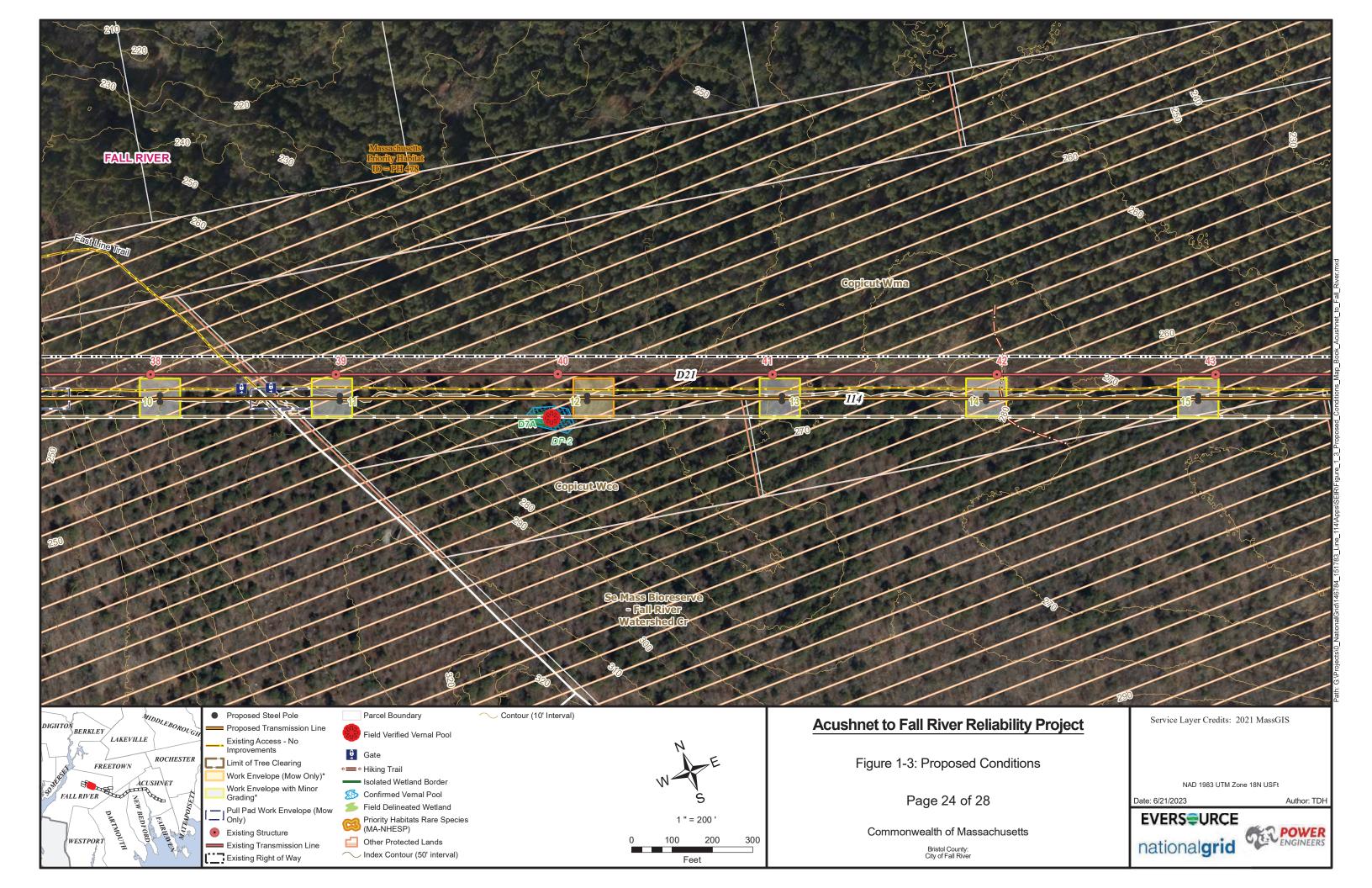


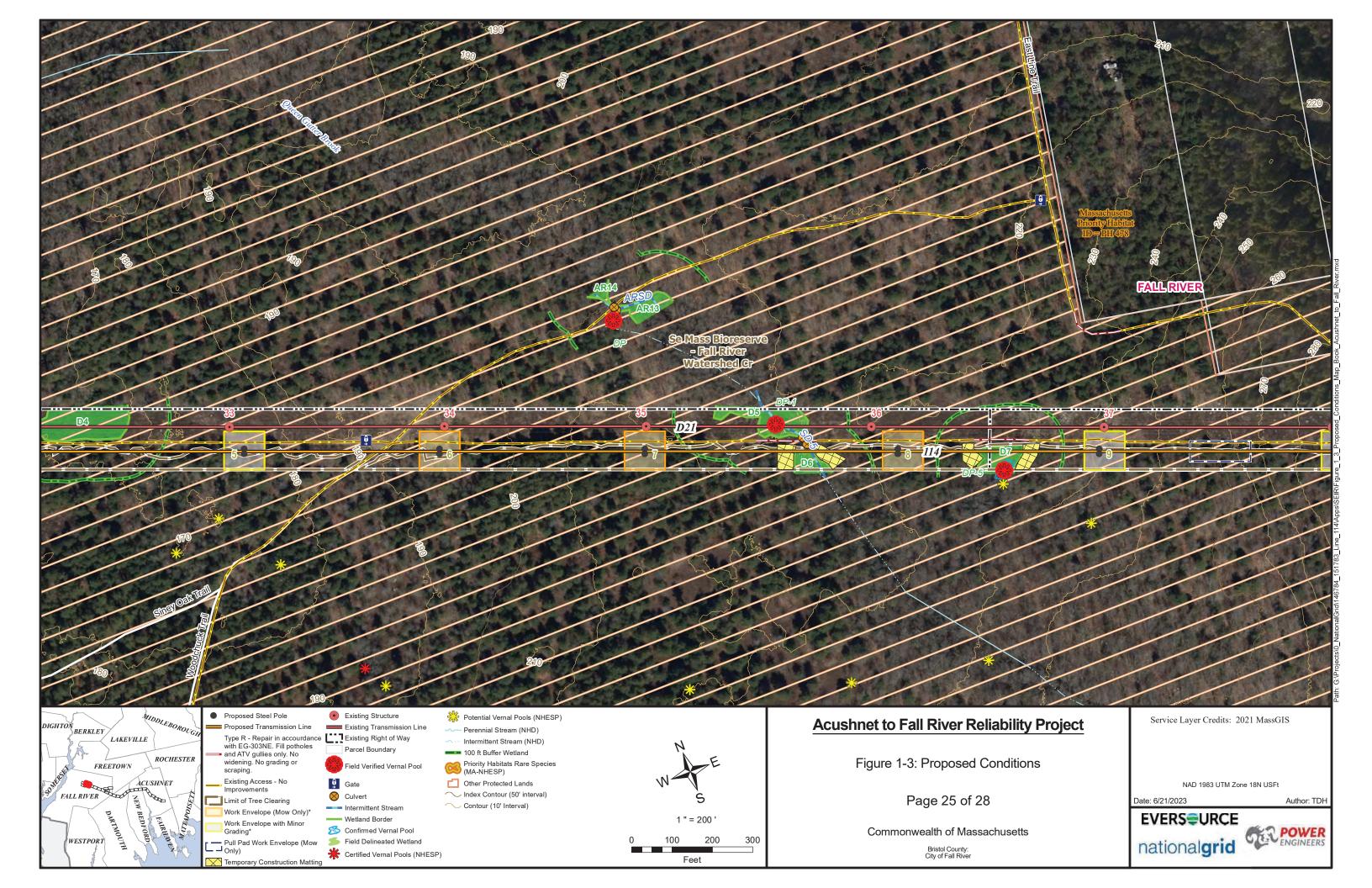


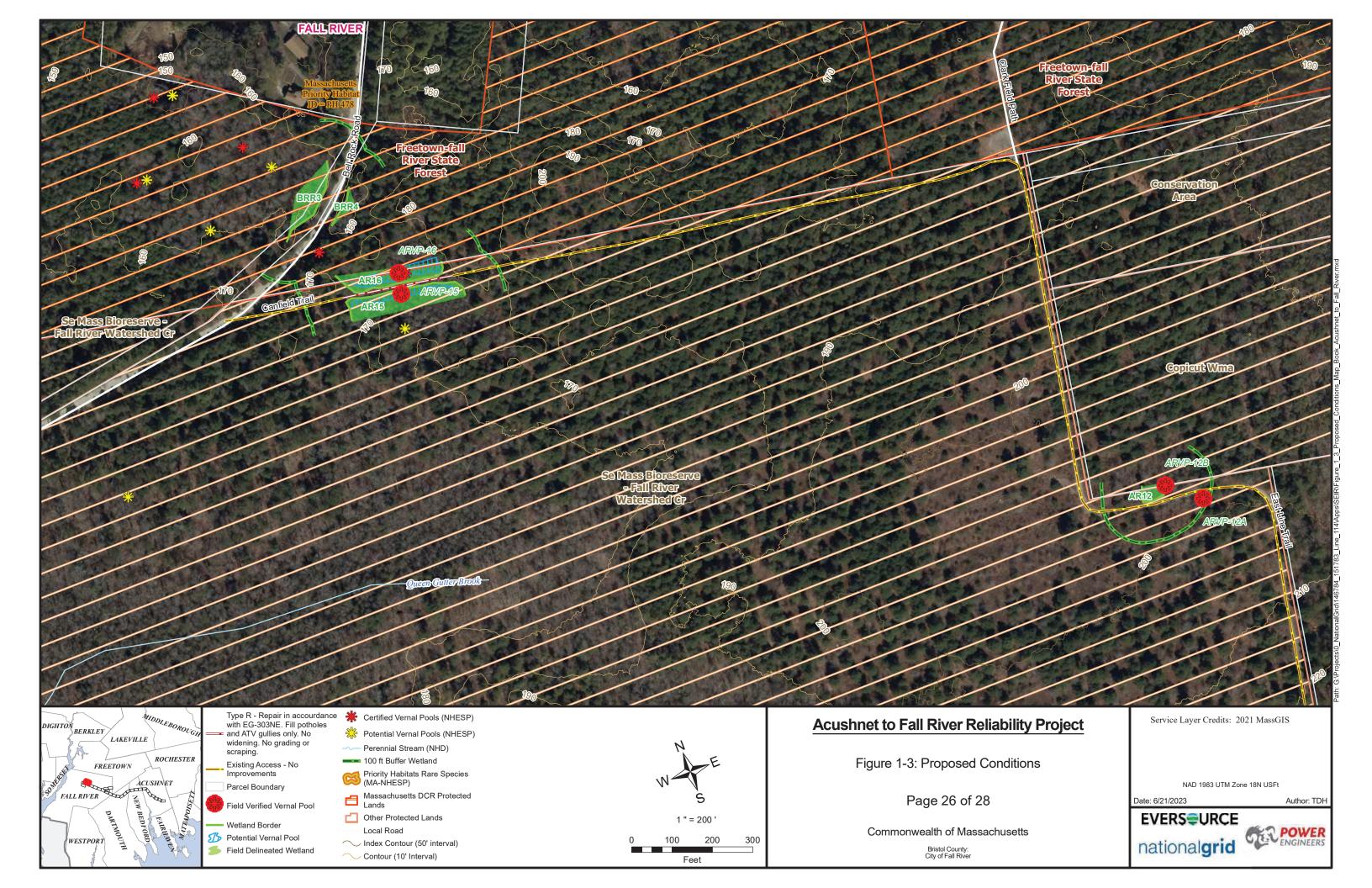


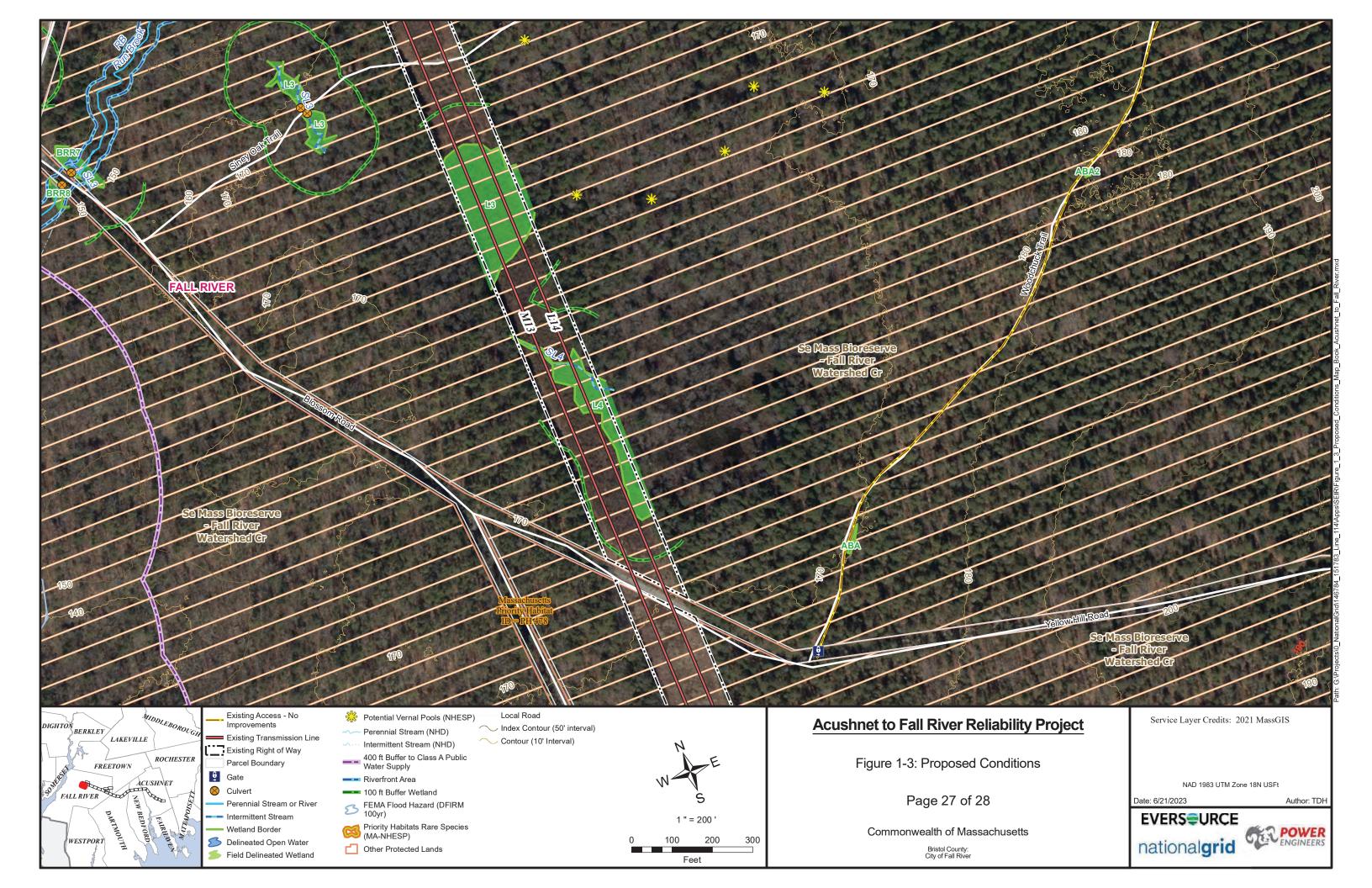


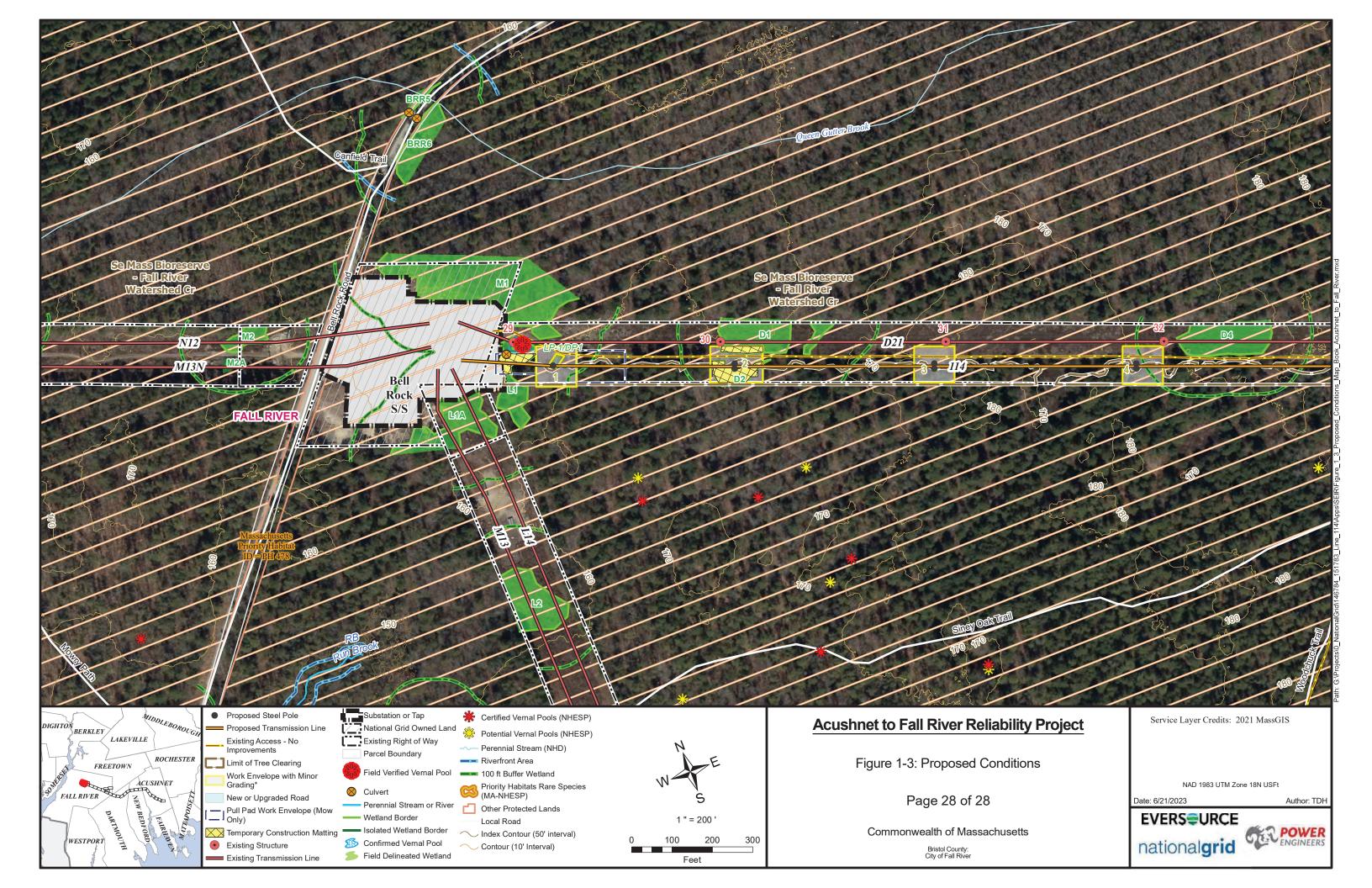


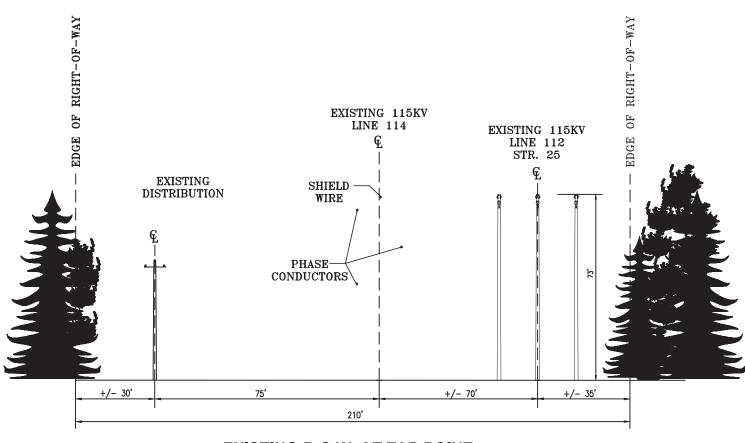








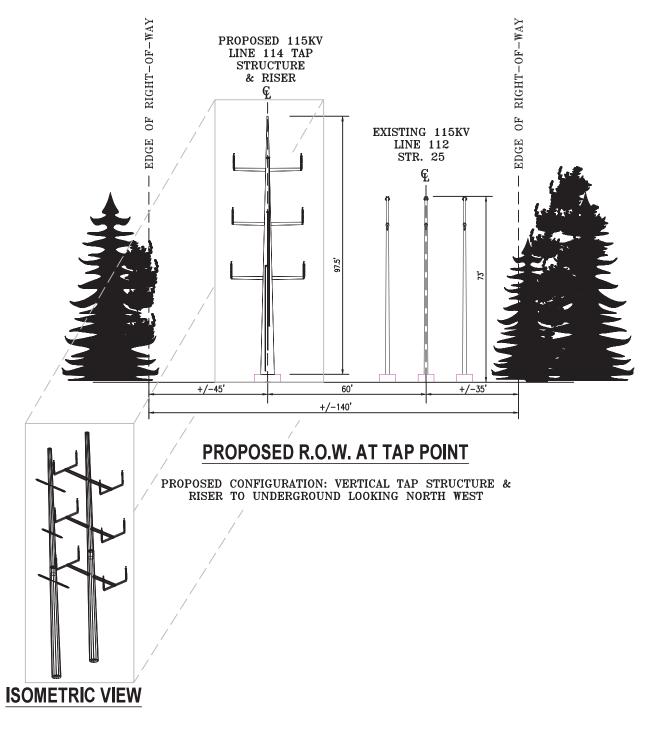




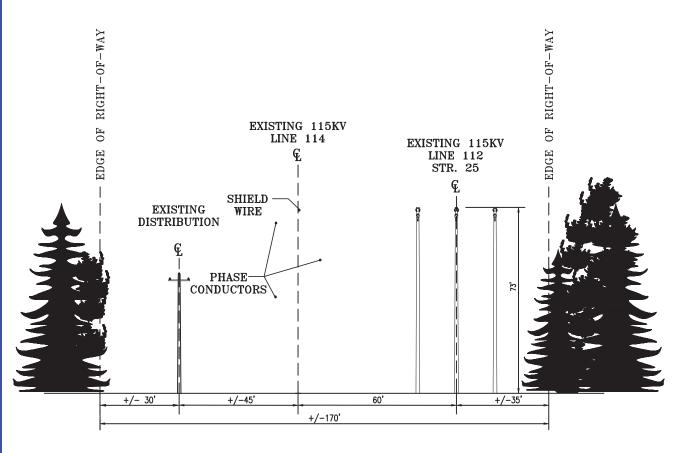
## **EXISTING R.O.W. AT TAP POINT**

EXISTING CONFIGURATION: SINGLE CIRCUIT DELTA MONO POLES (STEEL) &  $\rm H\text{-}FRAME\ LOOKING\ NORTH\ WEST$ 

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 1 of 23



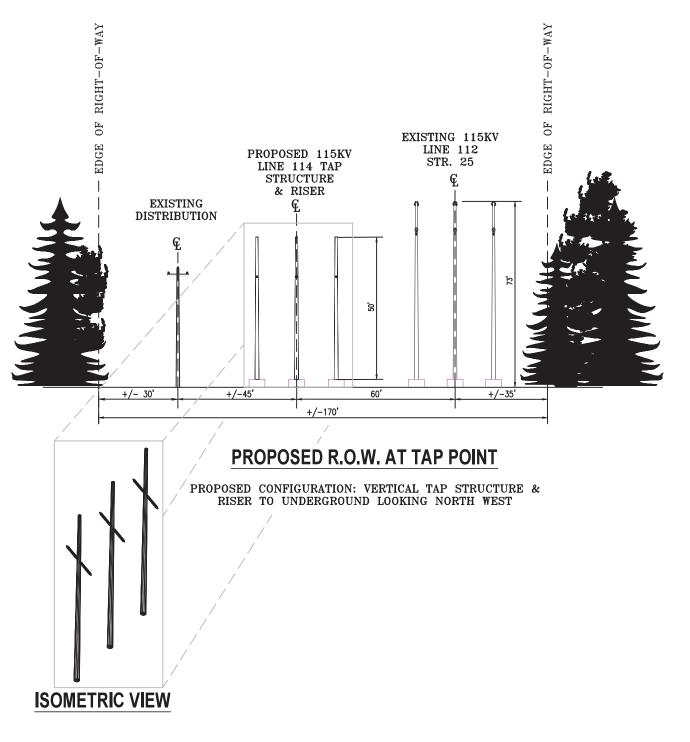
							EVERS\(\Display\) URCE ENERGY								
							LINE 114 EXTENSION								
							LINE 114 TAP TO NATIONAL GRID INTERCONNECTION TYPICAL ROW CROSS SECTION								
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GE0	TRB		ACUSHNET/NEW BEDFORD, MASS								
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC CHKD BAF/TRC APP TRB/TRC APP								
	0, 20, 10	DE IOQUED FOR DEVIEW	,,,_,	J, "			DATE 4/30/18 DATE 4/30/18 DATE 4/30/18								
В	5/18/18	re-issued for review	KLB	BAF	TRB		H-SCALE N.T.S. SIZE ANSIB FIELD BOOK & PAGES								
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S. R.E.DWG. 291684-T0001-SH1								
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	- R.E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH1								



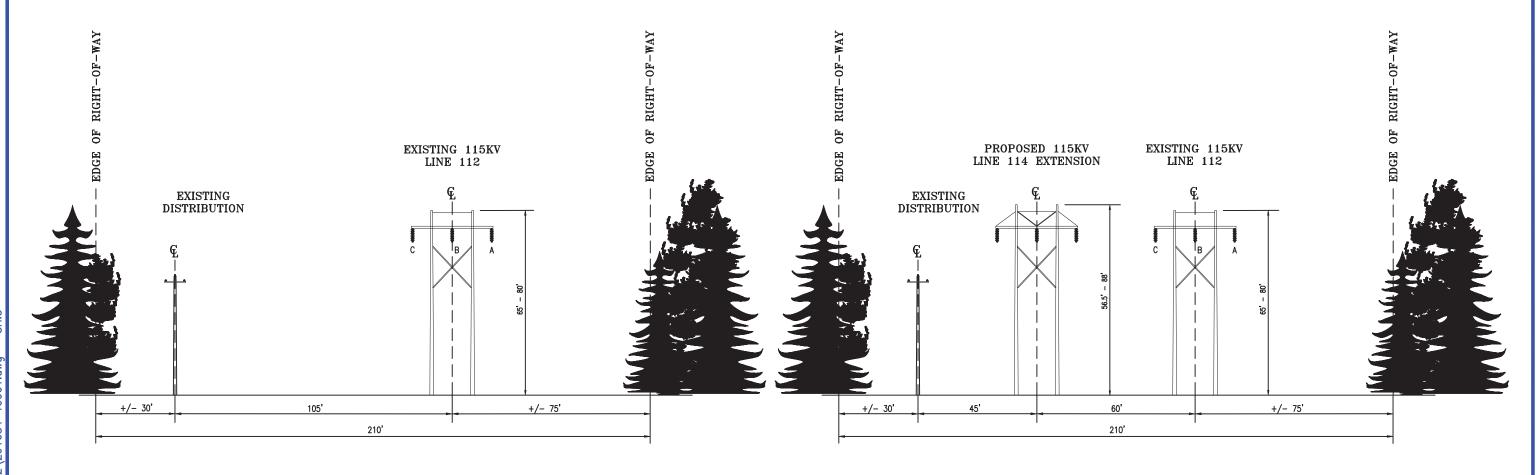
#### **EXISTING R.O.W. AT TAP POINT**

EXISTING CONFIGURATION: SINGLE CIRCUIT DELTA MONO POLES (STEEL) &  $\rm H\text{-}FRAME\ LOOKING\ NORTH\ WEST$ 

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 2 of 23



							EVERS\(\pi\)URCE ENERGY							
							TITLE	INIE 111 T		NE 114 E			CONNECTION	
										CAL ROW (				
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB					SHNET/NEW				
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB			JUD/ IKC	CHKD	BAF/IRC	APP	TRB/TRC	APP	
	0, 20, 10	DE ICCLIED FOR DEVIEW		D, "			DATE	4/30/18	DATE	4/30/18	DATE	4/30/18	DATE	
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE	N.T.S.	SIZE	ANSI B	FIELD BO	OK & PAGES		
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE	N.1.3.	V.S.		R.E.DWG.	291684	-T0001-SH2	
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ	. NUMBER		291684	DWG NO.	291684	-T0001-SH2	



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRUCTURES (WOOD)
FROM TAP TO LINE 112 STR. 62 4.0 MILES
LOOKING NORTH WEST

# Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings Sheet 3 of 23

## PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME (STEEL)
NEW 115KV LINE 114 EXTENSION FROM TAP TO RT 140 CROSSING
4.0 MILES LOOKING NORTH WEST
2 POLE H-FRAME TANGENT STRUCTURES
NUMBERS 3 TO 18, 20 TO 28, 30 TO 37

							ΕV	/ERS	<b></b> UR0	CE
										RGY
							TITLE	LINE 114 E	XTENSION	
							LINE 114 T	AP TO NATIONA	AL GRID INTER(	CONNECTION
							Т	YPICAL ROW (	RASS SECTIO	M
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB			ACUSHNET/NEW		
	2 /22 /12	RE-ISSUED FOR REVIEW					BY JJD/TRC	CHKD BAF/TRC	APP TRB/TRC	APP
С	6/29/18		KLB	BAF	TRB		DATE 4/30/18	DATE 4/30/18	DATE 4/30/18	DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S.	SIZE ANSI B	FIELD BOOK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		M.I.J.	v.s.		I-T0001-SH3
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ. NUMBER	291684	DWG NO. 291684	I-T0001-SH3



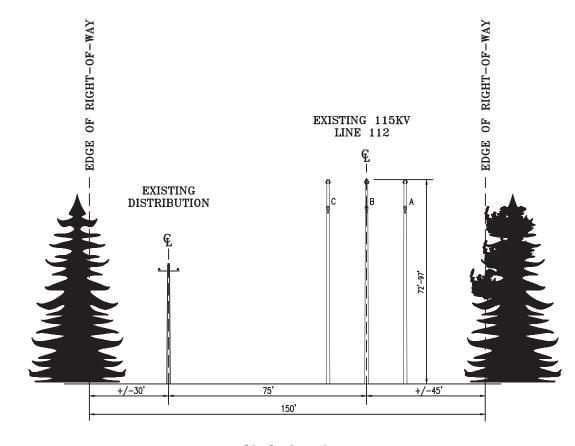
EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRUCTURES (WOOD)
FROM TAP TO LINE 112 STR. 62 4.0 MILES
LOOKING NORTH WEST

#### PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME (STEEL)
NEW 115KV LINE 114 EXTENSION FROM TAP TO RT 140 CROSSING
4.0 MILES LOOKING NORTH WEST
3 POLE DEADEND STRUCTURES
NUMBERS 19, 29 AND 38

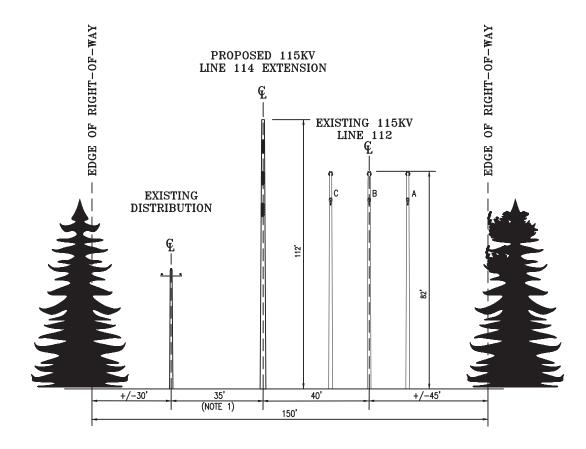
Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 4 of 23

							<b>EVERS©URCE</b>
							ENERGY
							LINE 114 EXTENSION
							LINE 114 TAP TO NATIONAL GRID INTERCONNECTION TYPICAL ROW CROSS SECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB		ACUSHNET/NEW BEDFORD, MASS
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC CHKO BAF/TRC APP TRB/TRC APP  DATE 4/30/19 DATE 4/30/19 DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		DATE 4/30/18 DATE 4/30/18 DATE 4/30/18 DATE H-SCALE N.T.S. SIZE ANSI B FIELD BOOK & PAGES
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S. R.E.DWG. 291684-T0001-SH4
NO.	DATE	AS BUILT REVISIONS	BY	СНК	APP	APP	R.E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH4



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. RT 140 CROSSING TO INDUSTRIAL PARK TAP 0.27 MILES LOOKING WEST

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 5 of 23

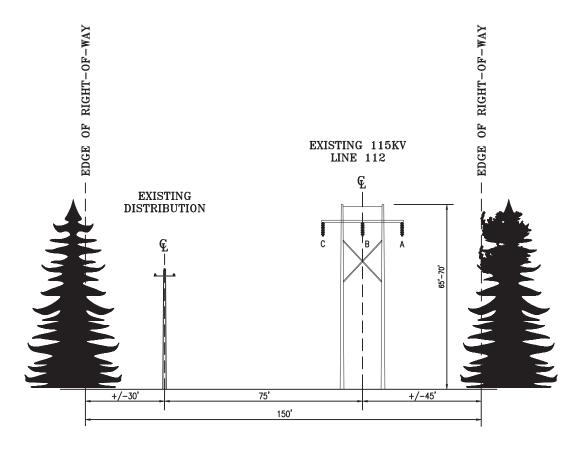


#### PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT MONOPOLE (STEEL)
RT 140 CROSSING TO INDUSTRIAL PARK TAP 0.27 MILES
LOOKING WEST
MONOPOLE DEADEND STRUCTURE
STRUCTURE 39

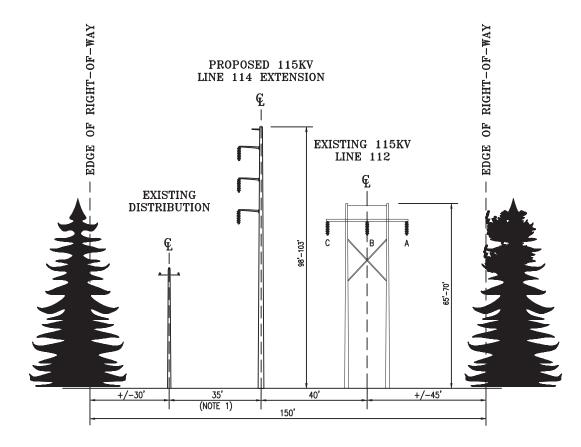
NOTE 1: NON-STANDARD ROW SPACING.

							EVERS URCE ENERGY	1
							LINE 114 EXTENSION	
							LINE 114 TAP TO NATIONAL GRID INTERCONNECTION TYPICAL ROW CROSS SECTION	
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB		ACUSHNET/NEW BEDFORD, MASS	
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		Y JJD/TRC CHKD BAF/TRC APP TRB/TRC APP	
_	0, 20, 10	DE 10011ED EAR DE 11511		J			ATE 4/30/18 DATE 4/30/18 DATE 4/30/18 DATE	
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		-SCALE N.T.S. SIZE ANSIB FIELD BOOK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		-SCALE N.T.S. V.S. R.E.DWG. 291684-T0001-SH	_
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH	5



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. RT 140 CROSSING TO INDUSTRIAL PARK TAP 0.27 MILES LOOKING WEST

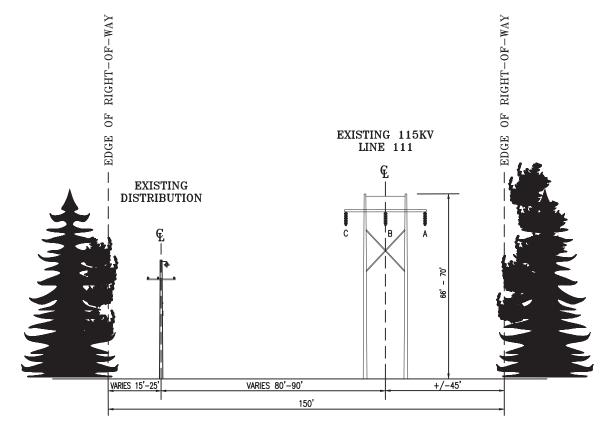
Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 6 of 23



## PROPOSED R.O.W.

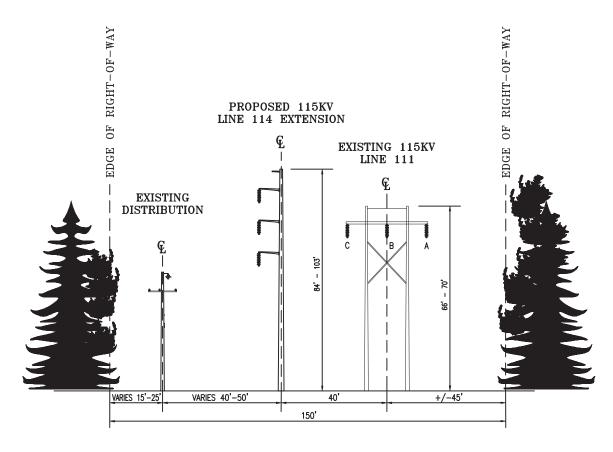
PROPOSED CONFIGURATION: SINGLE CIRCUIT MONOPOLE (STEEL)
RT 140 CROSSING TO INDUSTRIAL PARK TAP 0.27 MILES
LOOKING WEST
MONOPOLE TANGENT STRUCTURES
NUMBERS 40 TO 42

							EVERS\(\pi\)URCE ENERGY
							LINE 114 EXTENSION
							LINE 114 TAP TO NATIONAL GRID INTERCONNECTION TYPICAL ROW CROSS SECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GE0	TRB		ACUSHNET/NEW BEDFORD, MASS
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC CHKD BAF/TRC APP TRB/TRC APP
·	0/23/10		KLD	DAI	IIVD		DATE 4/30/18 DATE 4/30/18 DATE 4/30/18 DATE
В	5/18/18	re-issued for review	KLB	BAF	TRB		H-SCALE N.T.S. SIZE ANSIB FIELD BOOK & PAGES
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S. R.E.DWG. 291684-T0001-SH6
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	-R.E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH6



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. FROM INDUSTRIAL PARK TAP TO LINE 111 STR. 70 0.41 MILES LOOKING WEST

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 7 of 23



## PROPOSED R.O.W.

EXISTING CONFIGURATION: SINGLE CIRCUIT MONO POLE (STEEL)

NEW 115KV LINE 114 EXTENSION FROM INDUSTRIAL PARK TAP TO LINE 111

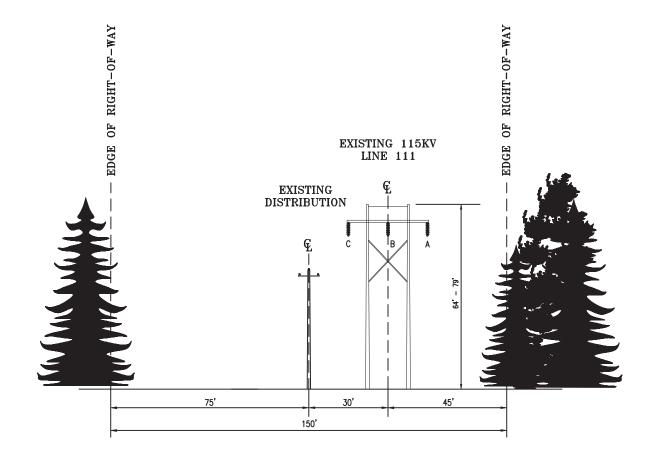
STR. 70 0.41 MILES

LOOKING WEST

MONOPOLE TANGENT STRUCTURES

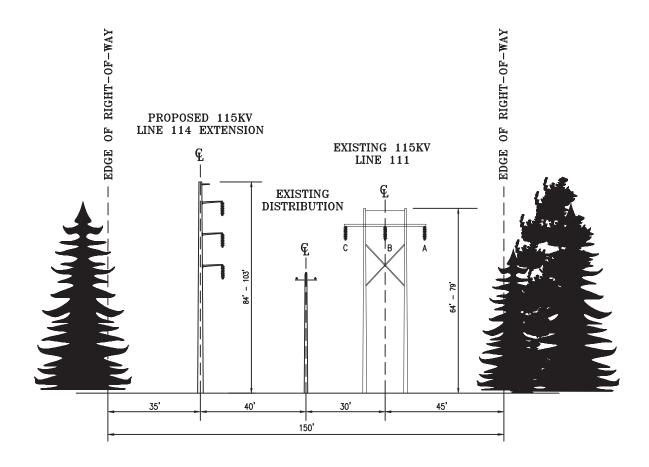
STRUCTURES 43 TO 47

								E۱	<b>/E</b>	RS	•		CE RGY
							TITLE			NE 114 E			
							LI			IO NATIONA CAL ROW (			CONNECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB					SHNET/NEW			S
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB			JJD/TRC	CHKD	DAF/ IKC	APP	TRB/TRC	APP
	0, 20, 10	DE IONIES ESS DEVEN		··			DATE	4/30/18	DATE	4/30/18	DATE	4/30/18	DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE	N.T.S.	SIZE		FIELD BO	OK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE	N.T.S.	V.S.		R.E.DWG.		4-T0001-SH7
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ.	NUMBER		291684	DWG NO.	29168	4-T0001-SH7



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRUCTURES (WOOD)
FROM LINE 111 STR. 70 TO HIGH HILL S/S 2 MILES
LOOKING WEST

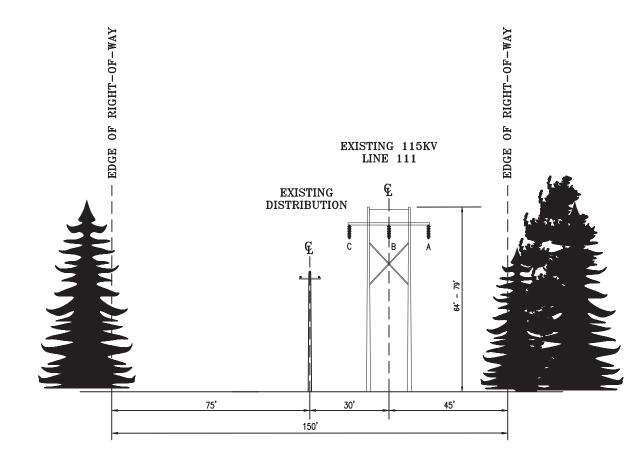
Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 8 of 23



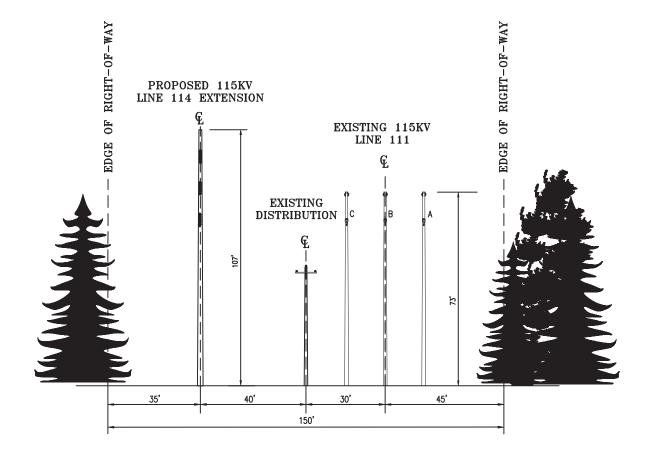
#### PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT MONO POLES (STEEL)
NEW 115KV LINE 114 EXTENSION FROM LINE 111 STR. 70 TO
HIGH HILL S/S 2 MILES
LOOKING WEST
MONOPOLE TANGENT STRUCTURES
STRUCTURES 48 TO 52 AND 54 TO 65

							EVERS URCE ENERGY
							LINE 114 EXTENSION
							LINE 114 TAP TO NATIONAL GRID INTERCONNECTION
							TYPICAL ROW CROSS SECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB		NEW BEDFORD/DARTMOUTH, MASS
С	c /20 /10	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC CHKD BAF/TRC APP TRB/TRC APP
C	6/29/18		KLB	BAF	IKB		DATE 4/30/18 DATE 4/30/18 DATE 4/30/18
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S. SIZE ANSIB FIELD BOOK & PAGES
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S. R.E.DWG. 291684-T0001-SH8
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH8



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRUCTURES (WOOD)
FROM LINE 111 STR. 70 TO HIGH HILL S/S 2 MILES
LOOKING WEST

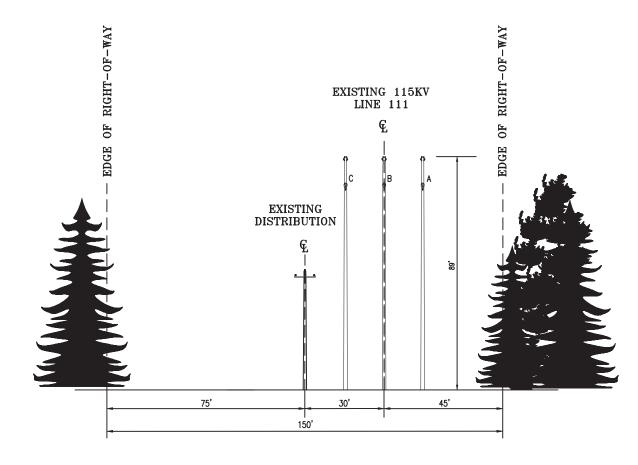


## PROPOSED R.O.W.

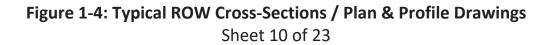
PROPOSED CONFIGURATION: SINGLE CIRCUIT MONO POLES (STEEL)
NEW 115KV LINE 114 EXTENSION FROM LINE 111 STR. 70 TO
HIGH HILL S/S 2 MILES
LOOKING WEST
MONOPOLE DEADEND STRUCTURE
STRUCTURE 53

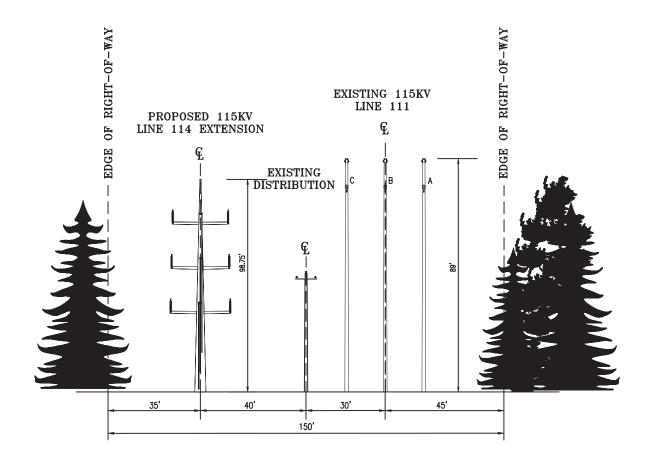
Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 9 of 23

								EDC:		
							EVI	EK3	<b>⊕</b> UR	
									EN	IERGY
							mre L	INE 114 E	XTENSIO	V
			+				LINE 114 TAP	TO NATIONA	AL GRID INTE	ERCONNECTION
							TYPI	CAL ROW (	CROSS SECT	ION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB		NEW	BEDFORD/D	ARTMOUTH, M	ASS
^	c /oo /40	RE-ISSUED FOR REVIEW	I/I D	DAE	TOO		BY JJD/TRC CHKD	BAF/TRC	APP TRB/TRC	APP
С	6/29/18		KLB	BAF	TRB		DATE 4/30/18 DATE	4/30/18	DATE 4/30/18	DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S. SIZE	ANSI B	FIELD BOOK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S.			84-T0001-SH9
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ. NUMBER	291684	DWG NO. 2916	84-T0001-SH9



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRUCTURES (WOOD)
FROM LINE 111 STR. 70 TO HIGH HILL S/S 2 MILES
LOOKING WEST

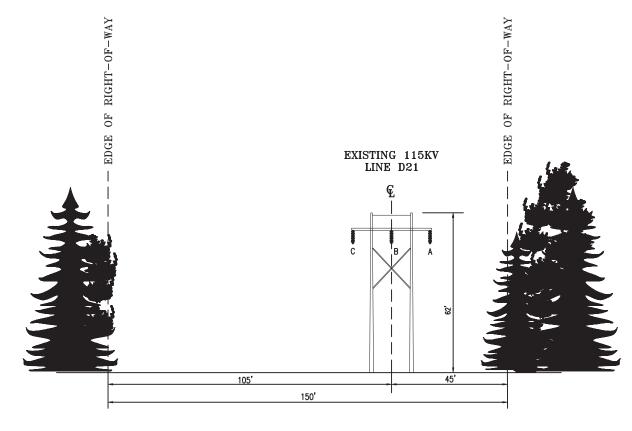




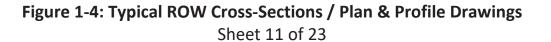
#### PROPOSED R.O.W.

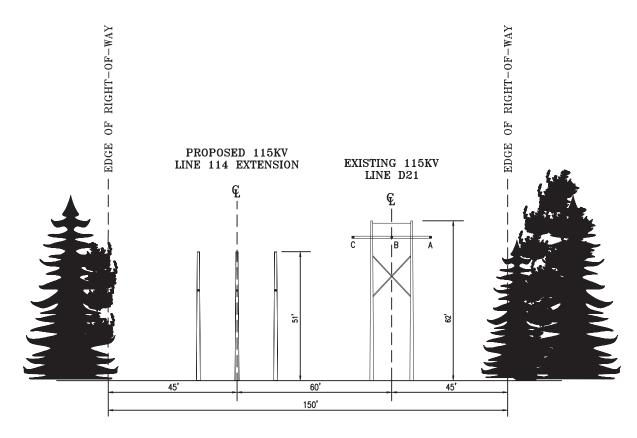
PROPOSED CONFIGURATION: SINGLE CIRCUIT MONO POLES (STEEL)
NEW 115KV LINE 114 EXTENSION FROM LINE 111 STR. 70 TO
HIGH HILL S/S 2 MILES
LOOKING WEST
MONOPOLE DEADEND STRUCTURE
STRUCTURE 66

							EVERS\(\beta\)URCE ENERGY
							LINE 114 EXTENSION  LINE 114 TAP TO NATIONAL GRID INTERCONNECTION
							TYPICAL ROW CROSS SECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GE0	TRB		NEW BEDFORD/DARTMOUTH, MASS
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC CHKO BAF/TRC APP TRB/TRC APP
Ů	0, 20, 10		1,120	D/ 11			DATE 4/30/18 DATE 4/30/18 DATE 4/30/18
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S. SIZE ANSIB FIELD BOOK & PAGES
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S. V.S. REDWG. 291684-T0001-SH10
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ. NUMBER 291684 DWG NO. 291684-T0001-SH10



EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS.
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES
LOOKING WEST

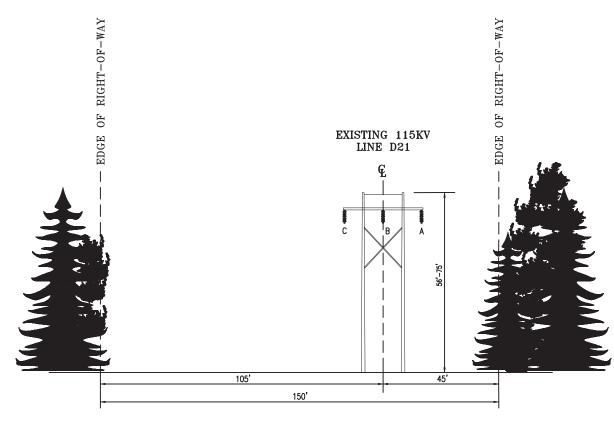




#### PROPOSED R.O.W.

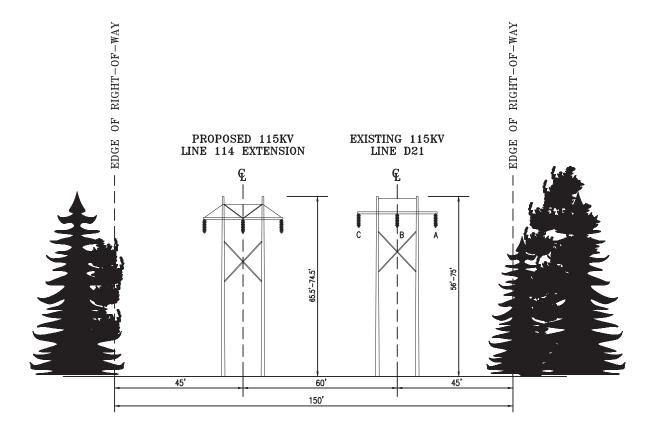
PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. (STEEL)
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES
LOOKING WEST
3 POLE OH/UG TRANSITION STRUCTURE
STRUCTURE 67

									<b>URC</b>	
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB		Т	AP TO NATIONA YPICAL ROW (	EXTENSION AL GRID INTERC CROSS SECTION DARTMOUTH, MASS	N
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC	CHKD BAF/TRC	APP TRB/TRC	APP DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S.	SIZE ANSI B	FIELD BOOK & PAGES	
A	4/30/18 DATE	ISSUED FOR REVIEW  AS BUILT REVISIONS	JJD	BAF	TRB	APP	V-SCALE N.T.S. R.E. PROJ. NUMBER			Γ0001-SH11 Γ0001-SH11



## **EXISTING R.O.W.**

EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS.
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES LOOKING WEST

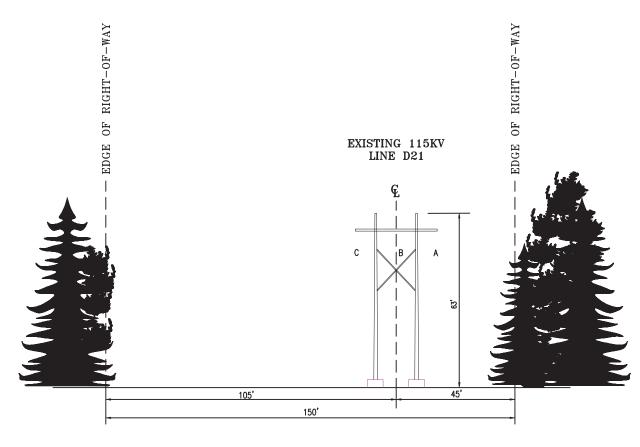


### PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. (STEEL)
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES
LOOKING WEST
2 POLE H-FRAME TANGENT STRUCTURES
STRUCTURES 68 TO 74 AND 76 TO 77

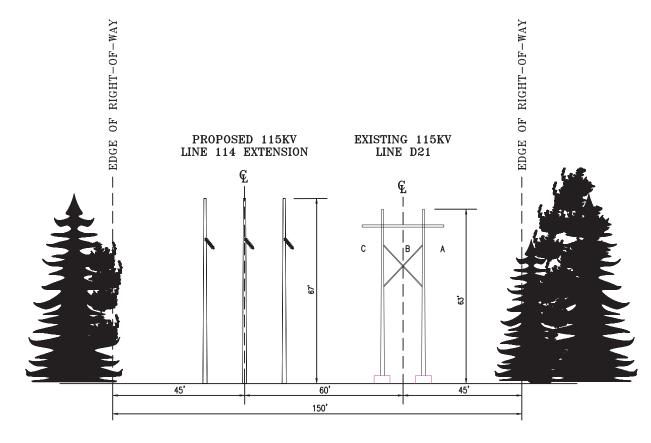
Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 12 of 23

								VERS  URCE  ENERGY
							LINE 114	LINE 114 EXTENSION TAP TO NATIONAL GRID INTERCONNECTION
								TYPICAL ROW CROSS SECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB			NEW BEDFORD/DARTMOUTH, MASS
C	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY JJD/TRC	CHKD BAF/TRC APP TRB/TRC APP
<u> </u>	0, 20, 10		INLE	D/ 11			DATE 4/30/18	DATE 4/30/18 DATE 4/30/18 DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE N.T.S.	SIZE ANSI B FIELD BOOK & PAGES
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE N.T.S.	vs. 291684-T0001-SH12
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ. NUMBER	291684 DWG NO. 291684-T0001-SH12



## **EXISTING R.O.W.**

EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS.
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES LOOKING WEST

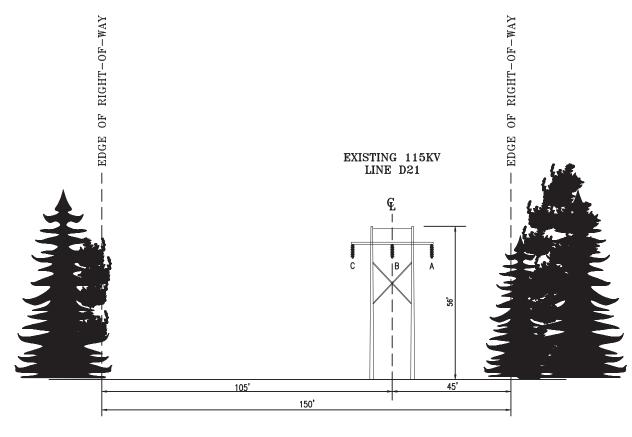


## PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. (STEEL)
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES
LOOKING WEST
3 POLE RUNNING ANGLE STRUCTURE
STRUCTURE 75

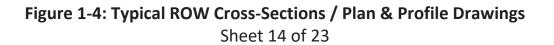
Figure 1-4: Typical ROW C	Cross-Sections /	Plan & Profile Drawings
	Sheet 13 of 23	

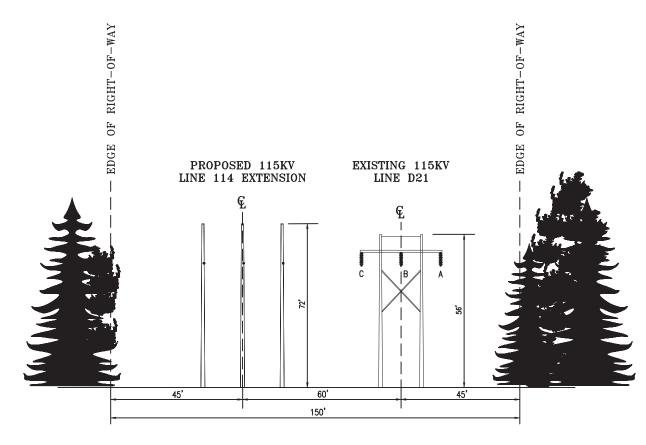
								E	VI	ERS			CE RGY
							TITLE	INIE 11 <i>1</i>		NE 114 E			CONNECTION
								IINL 114		CAL ROW			
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB				NEW	BEDFORD/	ARTN		S
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB			JJD/TRC	CHKD	BAF/TRC	APP	TRB/TRC	APP
	0, 20, 10	DE 1001/ED EAR DE 151/	1112	J			DATE	4/30/18	DATE	4/30/18	DATE	4/30/18	DATE
В	5/18/18	re-issued for review	KLB	BAF	TRB		H-SCALE	N.T.S.	SIZE	ANSI B	FIELD B	DOK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE	N.T.S.	V.S.		R.E.DWG	291004	-T0001-SH13
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ	. NUMBER		291684	DWG NO	· 291684	-T0001-SH13



## **EXISTING R.O.W.**

EXISTING CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS.
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES LOOKING WEST

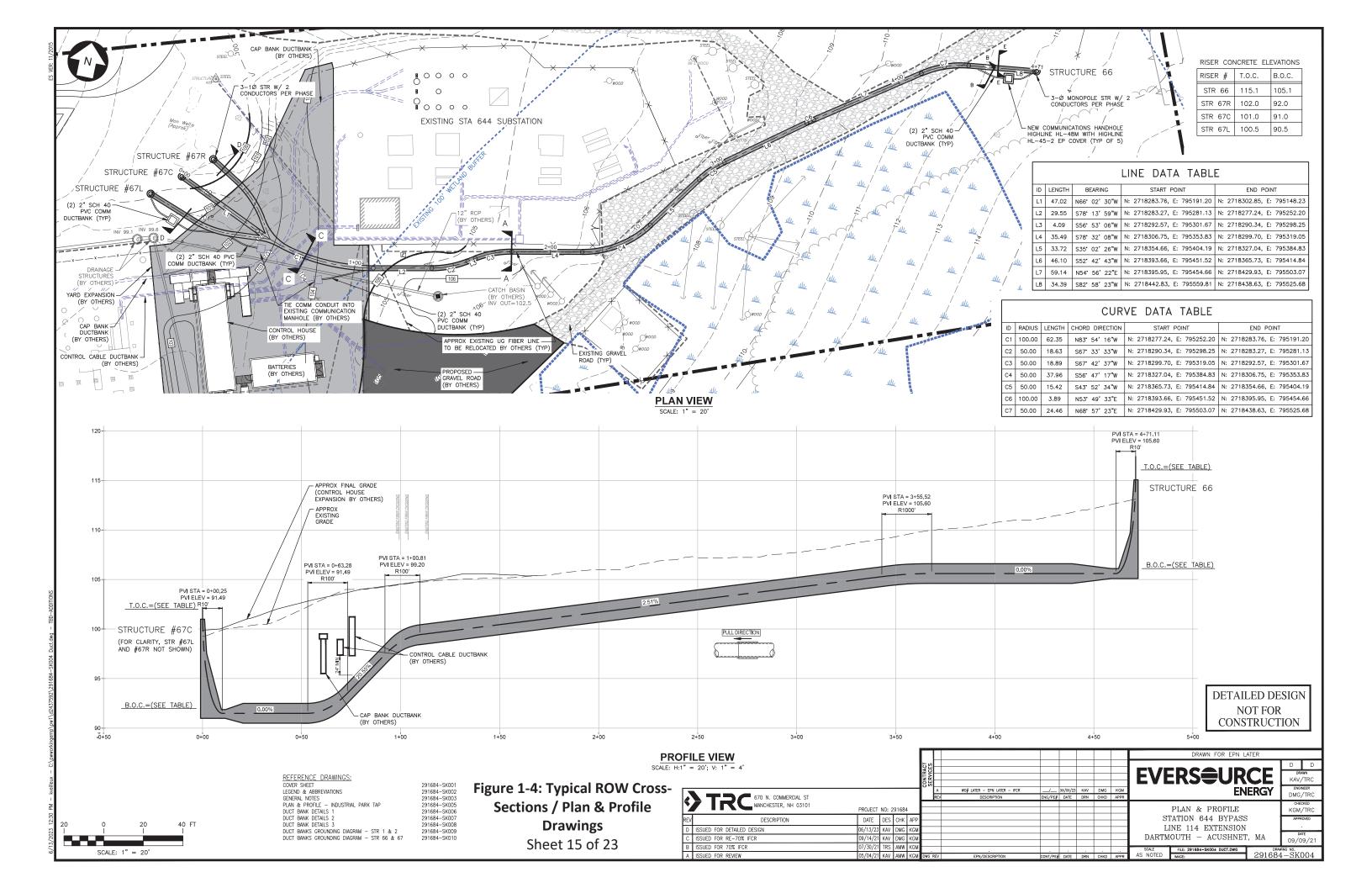


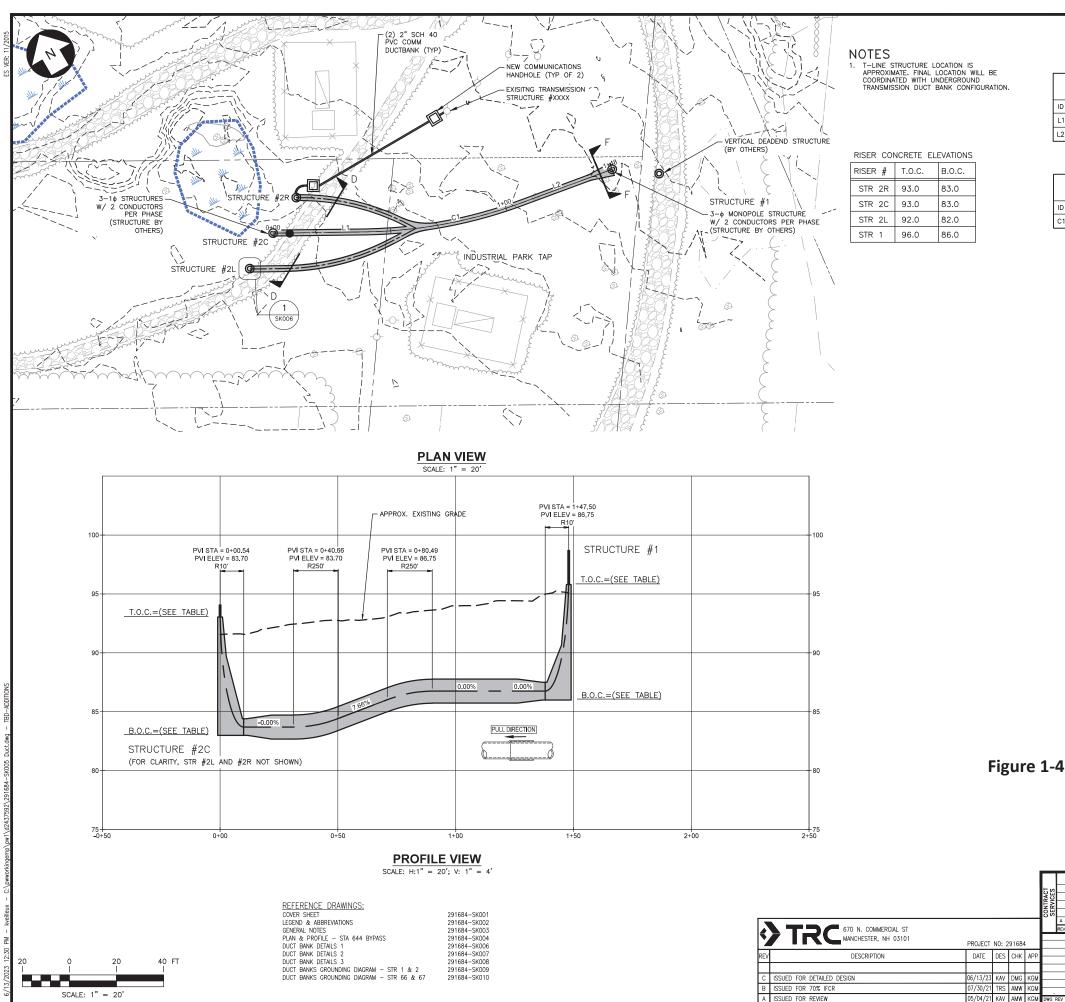


## PROPOSED R.O.W.

PROPOSED CONFIGURATION: SINGLE CIRCUIT H-FRAME STRS. (STEEL)
FROM HIGH HILL S/S TO NATIONAL GRID INTERCONNECT 1.2 MILES
LOOKING WEST
3 POLE DEADEND ANGLE STRUCTURE
STRUCTURE 78

								E	/[	ERS			<b>CE</b> ERGY
							TITLE	INIT 111		NE 114 E			CONNECTION
										CAL ROW			CONNECTION
D	6/16/21	REVISED PER CLIENT COMMENTS	KLB	GEO	TRB				NEW	BEDFORD/D	ARTN		S
С	6/29/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		BY	JJD/TRC	CHKD	BAF/TRC	APP	TRB/TRC	APP
	0, 20, 10	DE IONIED FOR DEVIEW		- · · ·			DATE	4/30/18	DATE	4/30/18	DATE	4/30/18	DATE
В	5/18/18	RE-ISSUED FOR REVIEW	KLB	BAF	TRB		H-SCALE	N.T.S.	SIZE	ANSI B	FIELD B	DOK & PAGES	
Α	4/30/18	ISSUED FOR REVIEW	JJD	BAF	TRB		V-SCALE	N.T.S.	V.S.		R.E.DWG	291004	-T0001-SH14
NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP	R.E. PROJ	J. NUMBER		291684	DWG NO	· 291684-	-T0001-SH14





			LINE DATA TABL	E
ID	LENGTH	BEARING	START POINT	END POINT
L1	38.91	S60° 29' 54"E	N: 2714065.68, E: 824876.13	N: 2714046.52, E: 824909.99
L2	40.76	S80° 04' 10"E	N: 2714023.59, E: 824973.99	N: 2714016.56, E: 825014.13

			(	CUR	۷E	DATA	TABLE				
D	RADIUS	LENGTH	CHORD DIR	ECTION		START P	OINT		END P	OINT	Г
C1	200.00	68.32	S70° 17'	02"E	N:	2714046.52,	E: 824909.99	N:	2714023.59,	E:	824973.99

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings
Sheet 16 of 23

DETAILED DESIGN

NOT FOR

CONSTRUCTION

		П							DRAWN FOR EPN LATER
	ភ្ន	<u>.</u>							D C
	CONTRACT	≹H							EVERS URCE KAV/TRC
	8	<u> </u>							
	1	Α	WO∦ LATER - EPN LATER - IFCR		XX/XX/23		DMG	KGM	ENERGY DMG/TRC
	_	REV	DESCRIPTION	ENG/PE#	DATE	DRN	CHKD	APPR	
PROJECT NO: 291684									PLAN & PROFILE CHECKED KGM/TRC
DATE DES CHK APP	1_								INDUSTRIAL PARK TAP APPROVED
	⊢							_	LINE 114 EXTENSION
06/13/23 KAV DMG KGM									DARTMOUTH - ACUSHNET, MA 09/17/18
07/30/21 TRS AMW KGM	⊩								SCALE FILE: 291684-SK005 DUCT.DWG DRAWING NO.
05/04/21 KAV AMW KGM	DWG	REV	EPN/DESCRIPTION	CONT/PE#	DATE	DRN	CHKD	APPR	AS NOTED IMAGE: 291684-SK005

#### LEGEND

#### LINE 114 DUCTBANK CAP BANK DUCTBANK COMMUNICATION DUCTBANK COMMUNICATION HANDHOLE 0 RISER STRUCTURE EXISTING BUILDING EXISTING TRANSMISSION STRUCTURE -----× ----- EXISTING CHAIN LINK FENCE EXISTING CONCRETE WALL / RETAINING WALL EXISTING MANHOLE EXISTING LIGHT POLE - - -90- - EXISTING MAJOR CONTOUR ----- EXISTING MINOR CONTOUR x93.95 EXISTING SPOT GRADE <u>业 业</u> EXISTING WETLANDS

#### ABBREVIATIONS

LA	LAUH
ELEV	ELEVATION
FTB	FLOWABLE THERMAL BACKFILL
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
ОН	OVERHEAD
R	RADIUS
STA	STATION
BOC	BOTTOM OF CONCRETE
TOC	TOP OF CONCRETE
TYP	TYPICAL
UG	UNDERGROUND
W/	WITH
STR	STRUCTURE
SCH	SCHEDULE
PVI	POINT OF VERTICAL INTERSECTION

REFERENCE DRAWINGS:
COVER SHEET
GENERAL NOTES
PLAN & PROFILE - STA 644 BYPASS
PLAN & PROFILE - INDUSTRIAL PARK TAP
DUCT BANK DETAILS 1
DUCT BANK DETAILS 2
DUCT BANK DETAILS 3
DUCT BANKS GROUNDING DIAGRAM - STR 1 & 2
DUCT BANKS GROUNDING DIAGRAM - STR 66 & 67 291684-SK001 291684-SK003 291684-SK004 291684-SK005 291684-SK005 291684-SK007 291684-SK008 291684-SK009 291684-SK010

DETAILED DESIGN NOT FOR CONSTRUCTION

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings Sheet 17 of 23

						П								DRAWN FOR EPN LATER	
						CONTRACT SERVICES								<b>EVERS©URCE</b>	D B  DRAWN  KAV/TRC  ENGINEER
N	670 N. COMMERCIAL ST						REV	WO# LATER - EPN LATER - IFCR DESCRIPTION	/ ENG/PE#			DMG	KGM APPR	ENERGY	DMG/TRC
<b>5</b> 2	TRC 670 N. COMMERCIAL ST MANCHESTER, NH 03101	PROJECT	NO: 2	29168	4										CHECKED KGM/TRC
REV	DESCRIPTION	DATE	DES	CHK	APP	⊢	+							LEGEND & ABBREVIATIONS	APPROVED
П						1	+							LINE 114 EXTENSION	·
П		1												DARTMOUTH - ACUSHNET, MA	DATE 09/17/18
В	ISSUED FOR DETAILED DESIGN	06/13/23	KAV	DMG	KGM	<b>⊢</b>	+							SCALE FILE: 291684-SK002 DUCT.DWG DRAWIN	
Α	ISSUED FOR 70% IFCR	07/30/2	TRS	AMW	KGM	DWG R	EV	EPN/DESCRIPTION	CONT/PE#	DATE	DRN	CHKD	APPR	AS NOTED IMAGE: 291684-	-SK002

- 2. HORIZONTAL DATUM: MASSACHUSETTS MAINLAND (2001), NORTH AMERICAN DATUM OF 1983.
- 3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
- 4. TOPOGRAPHY IS BASED ON A COMPILATION OF LIDAR AND GROUND SURVEY SOURCE FILES
- 5. UNDERGROUND UTILITIES ARE BASED ON RECORD DRAWINGS FOR THE HIGH HILL SUBSTATION (STA 644) AND INDUSTRIAL PARK TAP. BASE EXISTING GPR RECEIVED FROM EVERSOURCE 05/04/2021.
- 6. 115KV CAP BANK DUCT BANK LINE WORK IS BASED ON DRAWING 644-7201
- WETLAND FILES ARE BASED ON EVERSOURCE ENVIRONMENTAL MEPA SEIR PERMIT APPLICATION DELINEATION DRAWING RECEIVED ON 05/02/2023.
- 8. STORMWATER DRAINAGE LINE WORK IS BASED ON TIGHE AND BOND DESIGN RECEIVED ON 01/19/2023.

#### GENERAL SAFETY NOTES

- SMOKING IS PROHIBITED EXCEPT WITHIN DESIGNATED SMOKING AREAS.
- PROJECT TASKS WILL BE PERFORMED IN THE VICINITY OF ENERGIZED OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION CIRCUITS. THE CONTRACTOR SHALL COMPLY WITH ALL SAFETY REQUIREMENTS AS OUTLINED IN THE EVERSOURCE CONTRACTOR WORK RULES, MUNICIPAL, STATE AND FEDERAL REQUIREMENTS.
- PROVIDE FIRE WATCH WITH CLASS A-B-C FIRE EXTINGUISHERS AT EACH LOCATION OF HOT WORK KEEP ONE SPARE EXTINGUISHER ON SITE AT ALL TIMES.
- 4. CONTRACTOR SHALL REQUEST UTILITY MARK—OUT BY CONTACTING DIG—SAFE TEL 811 PRIOR TO ANY EXCAVATION. MARK OUT OF NON—PARTICIPATING UTILITIES SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY EACH NON-PARTICIPATING UTILITY AND/OR CONTRACT WITH A PRIVATE UTILITY LOCATING SERVICE PROVIDER.
- UNDERGROUND UTILITY LOCATIONS AND ELEVATIONS SHOWN ON THE DRAWINGS ARE CONSIDERED APPROXIMATE AND SHALL BE VERIFIED BY VACUUM EXCAVATION, HAND EXCAVATION OR OTHER SUITABLE MEANS PRIOR TO HEAVY EQUIPMENT EXCAVATION. ALL UNDERGROUND UTILITIES MAY NOT BE SHOWN ON THESE DRAWINGS.
- TRENCHES SHALL BE EXCAVATED AND SHORED OR SLOPED IN ACCORDANCE WITH EVERSOURCE CONTRACTOR WORK RULES, STATE AND FEDERAL REGULATION. SHORED EXCAVATIONS WITHIN 20 FEET OF TRANSMISSION LINE STRUCTURES, UTILITY POLES, STRUCTURE GUY ANCHORS, OR RETAINING WALLS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN

#### GENERAL NOTES

- 1. 115kV CABLE SYSTEM TO BE INSTALLED BY OTHERS.
- 2. THE POINT OF DEMARCATION FOR COORDINATION OF THE OVERHEAD TRANSMISSION WORK WITH THAT OF THE UNDERGROUND WORK IS THE POINT OF CONNECTION FOR THE OVERHEAD TRANSMISSION SYSTEM AT THE LIGHTNING/SURGE ARRESTOR AND CABLE TERMINATION.
- POINT OF DEMARCATION FOR INSTALLATION AND INTERFACE WITH THE OVERHEAD TRANSMISSION WORK FOR THE COMMUNICATIONS DUCT AND CABLE SHALL BE AT THE SPLICE CONTAINER MOUNTED ON THE TRANSMISSION STRUCTURE AT EACH END OF THE UNDERGROUND TRANSMISSION SYSTEM. PROVISION OF THE SPLICE CANISTER AND CABLE SPLICING IS BY THE OVERHEAD TRANSMISSION CONTRACTOR.
- 4 THE SCOPE OF WORK SPECIFIED HEREIN ALSO INCLUDES
  - a. INSTALLATION OF THE COMMUNICATIONS DUCT BANK TO AND INCLUDING THE HANDHOLES LOCATED OUTSIDE THE PROPOSED HIGH HILL CAPACITOR BANK CONTROL HOUSE FENCE. DUCT BANK INSTALLATION FROM THESE HANDHOLES INTO THE SUBSTATION IS BY OTHERS.
  - b. RELATED WORK NOT OTHERWISE SPECIFIED TO BE DONE BY OTHERS.
- 5. INSTALLATION OF ADSS FIBER OPTIC CABLE IS BY OTHERS.
- 6. UNLESS OTHERWISE INDICATED, THE 115 KV DUCT BANK SHALL BE CONSTRUCTED IN ACCORDANCE WITH EVERSOURCE TECHNICAL STANDARDS, INCLUDING, BUT NOT LIMITED TO, UTRM 234, 235, 237, 077 AS OUTLINED IN THE CIVIL SPECIFICATION. COMMUNICATION MANHOLES SHALL BE PROCURED AND INSTALLED PER THE CIVIL SPECIFICATION.
- UNLESS OTHERWISE SPECIFIED, AREAS DISTURBED BY THE WORK, SHALL BE RESTORED TO MATCH UNLESS OTHERWISE SPECIFIED, AREAS DISTURBED BY THE WORK, SHALL BE RESTORED TO MATCH THE EXISTING TOPOGRAPHY AND GROUND COVER. TRAVEL WAYS SHALL BE RESTORED TO MATCH EXISTING, INCLUDING THE PROVISION OF COMPACTED ROAD BASE MATERIAL AND PAVEMENT AS APPROPRIATE. VEGETATED AREAS SHALL BE RESTORED PROVIDING A MINIMUM OF 3 INCHES OF SUITABLE TOPSOIL, GRASS SEED, LIME, STARTER FERTILIZER AND MULCH. GRASS SEED, LIME AND FERTILIZER SHALL BE AS RECOMMENDED BY THE LOCAL COUNTY EXTENSION SERVICES AND APPLIED AT THE RATES RECOMMENDED. SURFACE RESTORATION PLANS SHALL BE APPROVED BY EVERSOLIDES.
- FOR CLARITY, OVERHEAD LINES, SUBSTATION GROUNDING AND CONDUITS ASSOCIATED WITH THE SUBSTATION AND SITE LIGHTING HAVE NOT BEEN SHOWN ON THE PLAN AND PROFILE DRAWINGS.
- PRIOR TO THE START OF EXCAVATION, THE LOCATION OF EXISTING UNDERGROUND UTILITIES ALONG THE PLANNED EXCAVATION ALIGNMENT SHALL BE DOCUMENTED BY THE CONTRACTOR AND SUBMITTED TO EVERSOURCE FOR REVIEW AND RECORD PURPOSES. NO EXCAVATION SHALL TAKE PLACE UNTIL EVERSOURCE DETERMINES DOCUMENTATION OF THE EXISTING UNDERGROUND UTILITY LOCATING SHALL BE IN ACCORDANCE WITH ASCE 38–22 STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SURPEIRED AND ACCORDANCE WITH ASCE 38–22 STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SURPEIRED AND ACCORDANCE WITH STANDARD METERS AND ACCORDANCE WITH ASCE 38–22 STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SURPEIRED AND ACCORDANCE WITH A CALLATIVE SECTION AND ACCORDANCE WITH A CALLATIVE EXISTING SUBSURFACE UTILITY DATA, QUALITY LEVEL A.
- 10. OUTDOOR YARD EQUIPMENT SIGNS AND LABELS WILL BE PROVIDED BY EVERSOURCE FOR CONTRACTOR INSTALLATION. SIGNS AND LABELS INCLUDE BUT ARE NOT LIMITED TO:
- a. SAFETY AND SECURITY SIGNS ON GATES AND FENCES
- b. RISER STRUCTURE LABEL
- c. COMMUNICATIONS CABLE ID LABEL IN HANDHOLES

#### DUCT BANK CONSTRUCTION

- 1. EIGHT INCH (8 IN) NOMINAL DUCTS SHALL BE POLYVINYL CHLORIDE (PVC) SCHEDULE 40 (TYPE EPC40) ELECTRICAL GRADE. PVC CONDUIT SHALL BE NEW IN COMPLIANCE WITH NEMA TC-2 WITH FITTINGS IN ACCORDANCE WITH NEMA TC-3. CELLULAR CORE PVC IS NOT ACCEPTABLE FOR USE.
- 2. CHANGES IN DIRECTION OF THE DUCTS SHALL UTILIZE BENDS OF THE RADIUS INDICATED IN THE DESIGN DRAWINGS. IN NO CASE SHALL 8 INCH DUCT BE FIELD BENT TO RADII OF LESS THAN 50
- 3. DUCT SHALL BE SUPPORTED AND POSITIONED IN THE DUCT BANK USING PLASTIC, PRE-FORMED DUCT SPACERS AS MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS. DUCT SPACER ASSEMBLY AND HARDWARE SPECIFICATIONS SHALL BE ADVANCE PRODUCTS & SYSTEMS DRAWING AND HARDWARE SPECIFICATIONS STALL BE ADVANCE PRODUCT S & STSTEMS DRAWING DBS-0802-39X26-2 OR EVERSOURCE APPROVED EQUAL. IN NO CASE SHALL CONDUCTIVE MATERIAL BE USED IN THE DUCT BANK TO SUPPORT OR SURROUND CONDUCTORS. ANY USE OF CONDUCTIVE MATERIAL WITHIN THE DUCT BANK SHALL BE SUBJECT TO EVERSOURCE APPROVAL. DUCTS SHALL BE RESTRAINED USING THE DUCT BANK SPACER ASSEMBLY TIE DOWN METHOD
- 4. PVC DUCTS SHALL BE JOINED USING SOLVENT JOINTS OF LONG-BELL AND SPIGOT. BELL AND SPIGOT JOINTS SHALL BE LAID SUCH THAT THE SPIGOT POINTS IN THE DIRECTION OF THE PLANNED CABLE PULL. THE INSIDE EDGE OF THE SPIGOT SHALL BE CHAMFERED AT NO MORE THAN 45 DEGREES TO AXIS OF THE PIPE.
- 5. SOLVENT JOINTS SHALL BE MADE UP SQUARE TO THE AXIS OF THE PIPE, PREPARED, PRIMED AND SOLVENT APPLIED IN ACCORDANCE WITH THE SOLVENT MANUFACTURERS WRITTEN INSTRUCTIONS. PIPE ENDS SHALL BE FULLY SEATED INTO THE COUPLING OR BELL FITTING.
- OPEN ENDS OF DUCTS SHALL BE CLOSED WITH PLUGS OR CAPS AS THE WORK PROGRESSES. AT NO POINT SHALL OPEN DUCTS BE ALLOWED TO REMAIN OPEN DURING NON-WORK PERIODS OF DURING WORK PERIODS WITH INCLEMENT WEATHER WHEN DEBRIS AND MUD MIGHT ENTER THE
- 7. DUCT BANK WALLS SHALL BE FORMED, STRAIGHT AND VERTICAL USING COMMERCIALLY AVAILABLE CONCRETE FORMS OR WOOD FORMS BUILT ON-SITE. DUCT BANK WALLS CAST AGAINST THE EARTH
- 8. CONCRETE FOR DUCT BANK CONSTRUCTION SHALL BE A 3000 PSI MINIMUM COMPRESSIVE STRENGTH THERMAL CONCRETE AND SHALL HAVE THERMAL RESISTIVITY PROPERTIES PER UTRM
- 9. BACKFILL FOR THE 115 KV DUCT BANK SHALL UTILIZE A LOW STRENGTH FLOWABLE THERMAL BACKFILL (FTB) AS SPECIFIED IN UTRM 234.
- 10. DUCT BANK CONCRETE AND FLOW FILL SHALL BE SAMPLED AS SPECIFIED IN THE REFERENCED EVERSOURCE TECHNICAL STANDARD. THERMAL RESISTANCE SAMPLES SHALL BE FORWARDED TO GEOTHERM USA OR OTHER PRE-APPROVED TEST FACILITY FOR PRE- APPROVAL AND QUALITY
- 11. 115 KV DUCT BANK EXCAVATION IN NON-PAVED AREAS SHALL BE BACKFILLED WITH FLOWABLE THERMAL BACKFILL (FTB) TO WITHIN SIX (6) INCHES OF FINISHED GRADE. THE TOP SIX (6) INCHES SHALL BE BACKFILLED WITH NATIVE SOIL AND LOAM, OR CRUSHED STONE TO MATCH THE SURROUNDING AREA AS APPROPRIATE.
- 12. AT THE COMPLETION OF DUCT BANK CONSTRUCTION EACH DUCT SHALL BE CLEANED BY SWABBING FOLLOWED BY MANDREL TESTING. THE MANDREL SHALL BE IN ACCORDANCE WITH THE DIMENSIONS PROVIDED IN UTRM 237 AND SUBMITTED TO EVERSOURCE FOR APPROVAL.
- 13. UPON COMPLETION OF THE DUCT BANK, EACH DUCT SHALL HAVE A PULLING LINE (MULE TAPE) RATED AT NO LESS THAN 6000 LBS TENSION INSTALLED.
- 14 OPEN ENDS OF SPARE DUCTS SHALL BE CLOSED OFF LISING SHRINK WRAP OR APPROVED RUBBER CAP AND CLAMP. SIMILARLY, AFTER CABLE INSTALLATION, THE OPEN ANULUS SHALL BE CLOSED OFF USING THE APPROVED SHRINK WRAP DUCT SEALANT.
- 15. TRENCH BACKFILL AROUND COMMUNICATION DUCT BANKS MAY BE DONE USING APPROVED FTB OR NATIVE SOIL BACKFILLED IN 8 INCH MAXIMUM LIFTS AND COMPACTED TO 93 PERCENT OF THE ASTM D 1557 MAXIMUM THEORETICAL DENSITY.
- 16. EACH DUCT BANK OR DUCT BANK SEGMENT SHALL BE MARKED BY RED UTILITY WARNING TAPE WITH BLACK LETTERS. TAPE SHALL BE 4 MIL PLASTIC OF NO LESS THAN 6 INCHES WIDE WITH 4 INCH LETTERS.
- 17. TRENCH BOTTOM THAT BECOMES UNSTABLE DUE TO DISTURBING THE IN-SITU SOIL, EXPOSURE TO WATER OR FREEZING, SHALL BE OVER EXCAVATED AND REPLACED WITH COMPACTED EVERSOURCE APPROVED STRUCTURAL BACKFILL. STRUCTURAL BACKFILL SHALL BE PLACED IN THE TRENCH BOTTOM AND COMPACTED TO NOT LESS THAN 95% OF ASTM D 1557 MAXIMUM THEORETICAL
- 18. LINES AND CURVE DATA TABLES SHOW NORTHINGS AND EASTING ON THE PLAN AND PROFILE DRAWINGS. STATIONING OF PC AND PT'S ARE SHOWN ON THE PLAN.
- 19. FOR CLARITY ON PLAN AND PROFILE, ONLY THE CENTER PHASE OF THE DUCT BANK HAS BEEN SHOWN IN PROFILE, INCLUDING CENTER PHASE STATIONING AND CURVE DATA. CURVE DATA FOR OUTSIDE PHASES ARE SHOWN AS APPROXIMATE IN PLAN VIEW.
- 20. AS BUILT RECORDS OF THE INSTALLED DUCT BANKS SHALL BE IN ACCORDANCE WITH AS BUILT RECORDS OF THE INSTALLED DUCT BANKS SHALL BE IN ACCORDANCE WITH TIME 254 EXCEPT AS MODIFIED HEREIN. IN ADDITION TO THE FINAL DUCTBANK RECORDS REQUIRED UNDER UTRM 234, THE AS BUILT CONDITIONS SHALL INCLUDE DOCUMENTATION OF THE DUCT LOCATION AND ELEVATION PRIOR TO CONCRETE PLACEMENT. THE TOP OF THE CENTER DUCT IN EACH DUCTBANK SEGMENT SHALL BE RECORDED PRIOR TO THE CONCRETE PLACEMENT. ALL AS—BUILT RECORDING SHALL UTILIZE SURVEY GRADE INSTRUMENTATION OPERATED BY A LICENSED LAND SURVEYOR OR OTHERWISE APPROVED, QUALIFIED INDIVIDUAL.
- 21. IN ADDITION TO THE REQUIREMENTS OF UTRM 234, DUCT BANK AS-BUILT INFORMATION SHALL BE PROVIDED TO EVERSOURCE IN AN AUTOCAD COMPATIBLE FILE SUCH AS .DXF, DWG, OR .SHP. AN ELECTRONIC COPY OF THE GIS DATA OR FIELDBOOK FILE SHALL ALSO BE PROVIDED.

#### SUBMITTALS

- 1. THE FOLLOWING MINIMUM TECHNICAL SUBMITTALS RELATED TO THE UNDERGROUND DUCT BANK CONSTRUCTION SHALL BE PROVIDED TO EVERSOURCE FOR REVIEW APPROVAL AND/OR RECORD PURPOSES. ADDITIONAL ADMINISTRATIVE AND TECHNICAL SUBMITTALS MAY BE REQUIRED AND ARE
- 2. ANY CHANGE IN MATERIAL SOURCE, PRODUCT OR COMPONENT FOR SUBMITTAL ITEMS INCLUDED IN THE ABOVE LIST SHALL BE SUBJECT TO EVERSOURCE REVIEW AND APPROVAL.

#### SUBMITTALS

1. THE FOLLOWING MINIMUM TECHNICAL SUBMITTALS RELATED TO THE UNDERGROUND DUCT BANK CONSTRUCTION SHALL BE PROVIDED TO EVERSOURCE FOR REVIEW, APPROVAL AND/OR RECORD PURPOSES. ADDITIONAL ADMINISTRATIVE AND TECHNICAL SUBMITTALS MAY BE REQUIRED AND ARE NOT LISTED HEREIN.

NO.	NOTE	DESCRIPTION	FOR RECORD	FOR APPROVAL	COMMENT
1		PROPOSED THERMAL TEST LABORATORY	Х		IF OTHER THAN GEOTERM USA
2		PROPOSED CONCRETE MIX AND TEST DATA		Х	EACH PRODUCT SOURCE AD MIX
3		PROPOSED THERMAL FLOW FILL MIX AND TEST DATA		X	EACH PRODUCT SOURCE AD MIX
4		PROPOSED THERMAL SAND AND TEST DATA		X	USE SUBJECT TO EVERSOURCE APPROVAL
5		PROJECT SAFETY PLAN	X		
6		PROJECT SCHEDULE		Х	BASELINE AND MONTHLY UPDATE
7		SHORING AND SHEETING PLAN	X		EACH LOCATION OVER 5 FEET DEEP
8		DUCT BANK SPACER		X	
9		DUCT BANK CONDUIT TECHNICAL DATA		Х	
10		DUCT BANK FORMING SYSTEM	X		
11		DUCT BANK CONCRETE FIELD TESTS FOR COMPRESSIVE STRENGTH	X		EVERY 50 CY
12		DUCT BANK CONCRETE TESTS FOR THERMAL PROPERTIES	Х		EVERY 50 CY
13		THERMAL FLOW-FILL AND COMPRESSIVE STRENGTH FIELD TEST	X		EVERY 50 CY
14		THERMAL SAND FIELD TEST FOR THERMAL PROPERTIES	Х		EVERY 50 CY
15		THERMAL SAND FIELD TEST FOR COMPACTION	X		EVERY 50 CY AND EACH LIFT
16		PROOF TEST RECORD	X		MUST INCLUDE EVERSOURCE SITE REPRESENTATIVE APPROVAL SIGNATURES
17		VIDEO RECORD OF DUCT BANK INTERIOR CONDITION FOLLOWING PROOF TEST (REF UTRM 234)	Х		SUBMIT ON DVD DISK WITH SEPARATE FILE PER DUCT VIDEO RECORD SHALL NOTE: FOOTAGE RECORD, ON—SCREEN CAMERA INSERTION LOCATION, DUCT DESIGNATION AND OTHER DATA AS REQUIRED BY UTRM
18		CABLE PULLING PLAN AND TENSION ESTIMATE		Х	INCLUDE SKETCH OF SYSTEM SET UP AND STEP-WISI DESCRIPTION OF OPERATION INCLUDING LUBRICATION APPLICATION
19		CABLE PULLING EQUIPMENT TECHNICAL DATA		Х	INCLUDE TENSION RECORDER PULL CABLE TECHNICAL DA
20		CABLE PULLING LUBRICANT		Х	
21		115KV CABLE SPLICER AND TERMINATOR QUALIFICATION		Х	
22		PROOF TEST MANDREL		X	
23	1	DUCT BANK PROOFING RECORD	X		EACH DUCT SEGMENT
24	2	CABLE CONTINUITY TEST	X		RECEIPT OF REEL, POST SEGMENT PULL, PRE-ENERGIZA
25	2	GROUND RESISTANCE TEST	X		EACH GROUND CONTACT
26	1	AC HIGH POT TEST REPORT		X	
27	1	PARTICAL DISCHARGE TEST REPORT		Х	
28		POSITIVE / NEGATIVE AND ZERO SEQUENCE IMPEDANCE TEST RESULTS	X		
29		AS-BUILT RECORDS	Х		PROVIDE RECORDS PER UTRM 077 INCLUDING COPY ( SURVEY FIELD BOOK FILE / GPS RECORD
OTES					

2. RANDOM TESTS SHALL BE WITNESSED BY THE EVERSOURCE ON-SITE REPRESENTATIVE 3. PROVIDE 48 HOUR WRITTEN NOTICE PRIOR TO PLANNED FIELD TESTS TO BE WITNESSED BY EVERSOURCE

4. SUBMITTALS LISTED ARE THE MINIMUM TECHNICAL SUBMITTALS FOR THE UNDERGROUND TRANSMISSION SYSTEM THAT REQUIRE FORMAL REVIEW AND/OR ENTRY IN THE PROJECT RECORD. ADDITIONAL TECHNICAL SUBMITTALS MAY BE REQUIRED BY VARIOUS EVERSOURCE STANDARDS AND PROCEDURES. FURTHER, ADMINISTRATIVE SUBMITTALS REQUIRED BY THE PROJECT CONTRACT DOCUMENTS ARE NOT LISTED.

2. ANY CHANGE IN MATERIAL SOURCE, PRODUCT OR COMPONENT FOR SUBMITTAL ITEMS INCLUDED IN THE ABOVE LIST SHALL BE SUBJECT TO EVERSOURCE REVIEW AND APPROVAL.

REFERENCE DRAWINGS: COVER SHEET 291684-SK001 291684-SK002 291684-SK004 LEGEND & ABBREVIATIONS PLAN & PROFILE - STA 644 BYPASS PLAN & PROFILE - INDUSTRIAL PARK TAP 291684-SK005 DUCT BANK DETAILS 1 291684-SK006 DUCT BANK DETAILS 2 291684-SK007 DUCT BANK DETAILS 3
DUCT BANKS GROUNDING DIAGRAM — STR 1 & 2
DUCT BANKS GROUNDING DIAGRAM — STR 66 & 67

291684-SK010

**DETAILED DESIGN** NOT FOR CONSTRUCTION

DRAWN FOR FPN LATER

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile Drawings Sheet 18 of 23

						CONTRACT SERVICES								<b>EVER</b>	S⊕UR	CE	D C DRAWN KAV/TRC
CZO N. CONNETCON. CT							Α	WO# LATER - EPN LATER - IFCR DESCRIPTION	/ ENG/PE#	XX/XX/23	KAV	DMG	KGM APPR			ERGY	ENGINEER DMG/TRC
670 N. COMMERCIAL ST MANCHESTER, NH 03101	PR	ROJECT	NO: 2	29168	4	F	REV	DESCRIPTION	ENG/PE#	DATE	DRIN	CHKD	APPR				CHECKED KGM/TRC
DESCRIPTION	[	DATE	DES	CHK	APP									GENE	ERAL NOTES		APPROVED
	#			$\vdash$			$\dashv$							LINE 1:	14 EXTENSION		
ISSUED FOR DETAILED DESIGN	06,	/13/23	KAV	DMG	KGM		_							DARTMOUTH	– ACUSHNET	, MA	DATE 09/17/18
ISSUED FOR 70% IFCR	07,	/30/21	TRS	AMW	KGM	٠.	-		<b>.</b>					SCALE FILE: 29	91684-SK003 DUCT.DWG		ING NO.
ISSUED FOR REVIEW	05,	/04/21	KAV	AMW	KGM	DWG R	REV	EPN/DESCRIPTION	CONT/PE#	DATE	DRN	CHKD	APPR	AS NOTED IMAGE:		291684	-SK003

TRANSITION ELEVATION DETAIL

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile **Drawings** Sheet 19 of 23

#### SCALE: 3/4"=1'-0"KAV/TRO **ENERGY** TRC 670 N. COMMERCIAL ST MANCHESTER, NH 03101 DMG/TRC CHECKED KGM/TRC PROJECT NO: 291684 DUCT BANK DETAILS 1 LINE 114 EXTENSION DARTMOUTH - ACUSHNET, MA ISSUED FOR DETAILED DESIGN 06/13/23 KAV DMG KG B ISSUED FOR 70% IFCR TRS AMW KG 291684-SK006

291684-SK002 291684-SK003 291684-SK004

291684-SK005

291684-SK007 291684-SK009 291684-SK010 **DETAILED DESIGN** NOT FOR **CONSTRUCTION** 

COORDINATE TRANSITION SUCH THAT DUCTBANK IS CENTERED ON THE APPROPRIATE STRUCTURE "FLAT" AND PARALLEL TO IT.

2. PROVIDE  $\frac{1}{2}$ " THICK ASPHALT-IMPREGNATED PRE-FORMED EXPANSION JOINT FILLER BETWEEN DUCTBANK TRANSITION AND CAISSON. APPLY  $\frac{1}{2}$ " x  $\frac{1}{2}$ " Joint sealant all around to seal the joint on top and sides. 3. PROVIDE SHROUD SHELF BY FLARING DUCTBANK CONCRETE BEGINNING 5'-0"

BELOW FINISHED GRADE 4. NOT TO SCALE. REFER TO FOUNDATION DRAWINGS.

TRANSITION COORDINATION DETAIL (3 PHASE RISER SHOWN, SINGLE PHASE SIMILAR W/ FEWER DUCTS)

SCALE: 1/2"=1'-0"

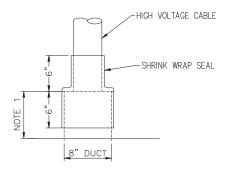
**BELL & SPIGOT DUCT DETAIL** 

2'-0" MAX

PULL DIRECTION

DUCT SPACER DETAIL

NOT TO SCALE



-OFFSET DUCT JOINTS MIN 6"

5'-0" MAX

-CHAMFER SPIGOT

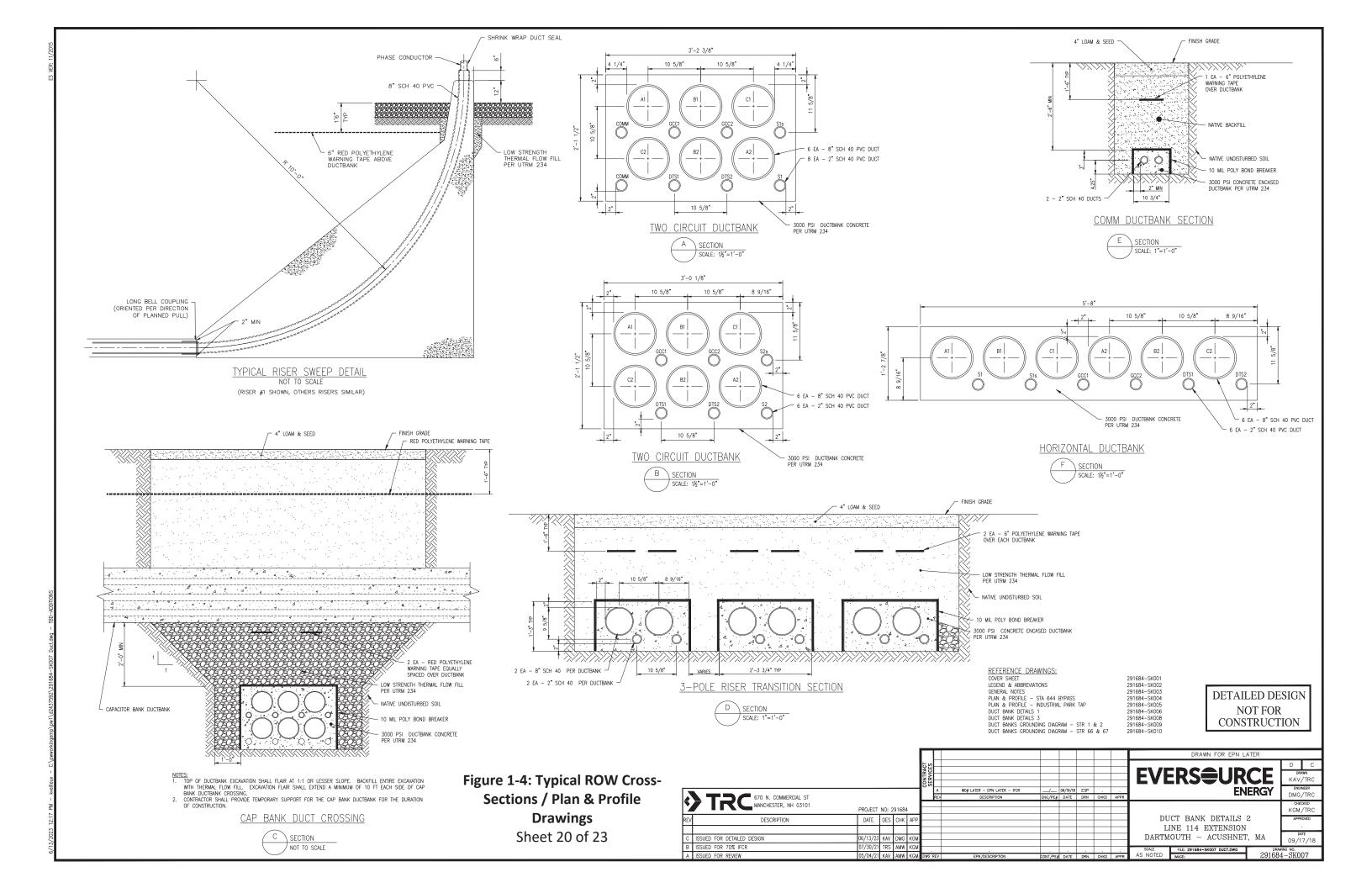
-SCH 40 PVC DUCT

#### **DUCT SEALING DETAIL**

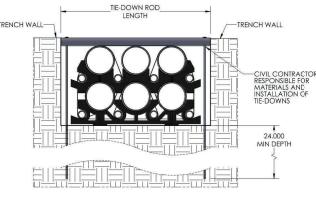
NOT TO SCALE

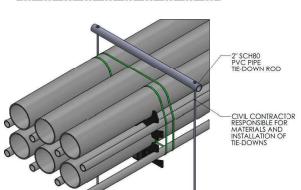
#### NOTES:

- 1. CUT DUCT SQUARE 6 TO 8 INCHES ABOVE CONCRETE.
- 2. CENTER CABLE IN DUCT AND APPLY SHRINK WRAP SEAL. SEAL SHALL EXTEND MIN 6" ONTO CABLE AND DUCT.
- 3. SHRINK WRAP TO BE APPLIED PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- 4. 115KV DUCT AND CABLE SHOWN, OTHERS TO BE SEALED SIMILARLY.
- 5. SHRINK WRAP ON COMMUNICATIONS DUCT TO BE APPLIED ABOVE INTERDUCT TERMINATION ELEVATION.

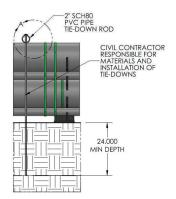


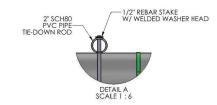


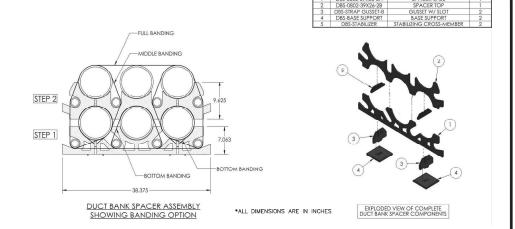


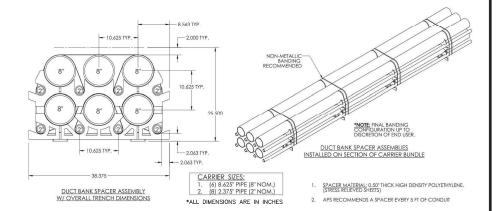


DUCT BANK SPACER ASSEMBLY
TIE DOWN METHOD
\*ALL DIMENSIONS ARE IN INCHES



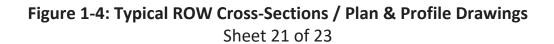




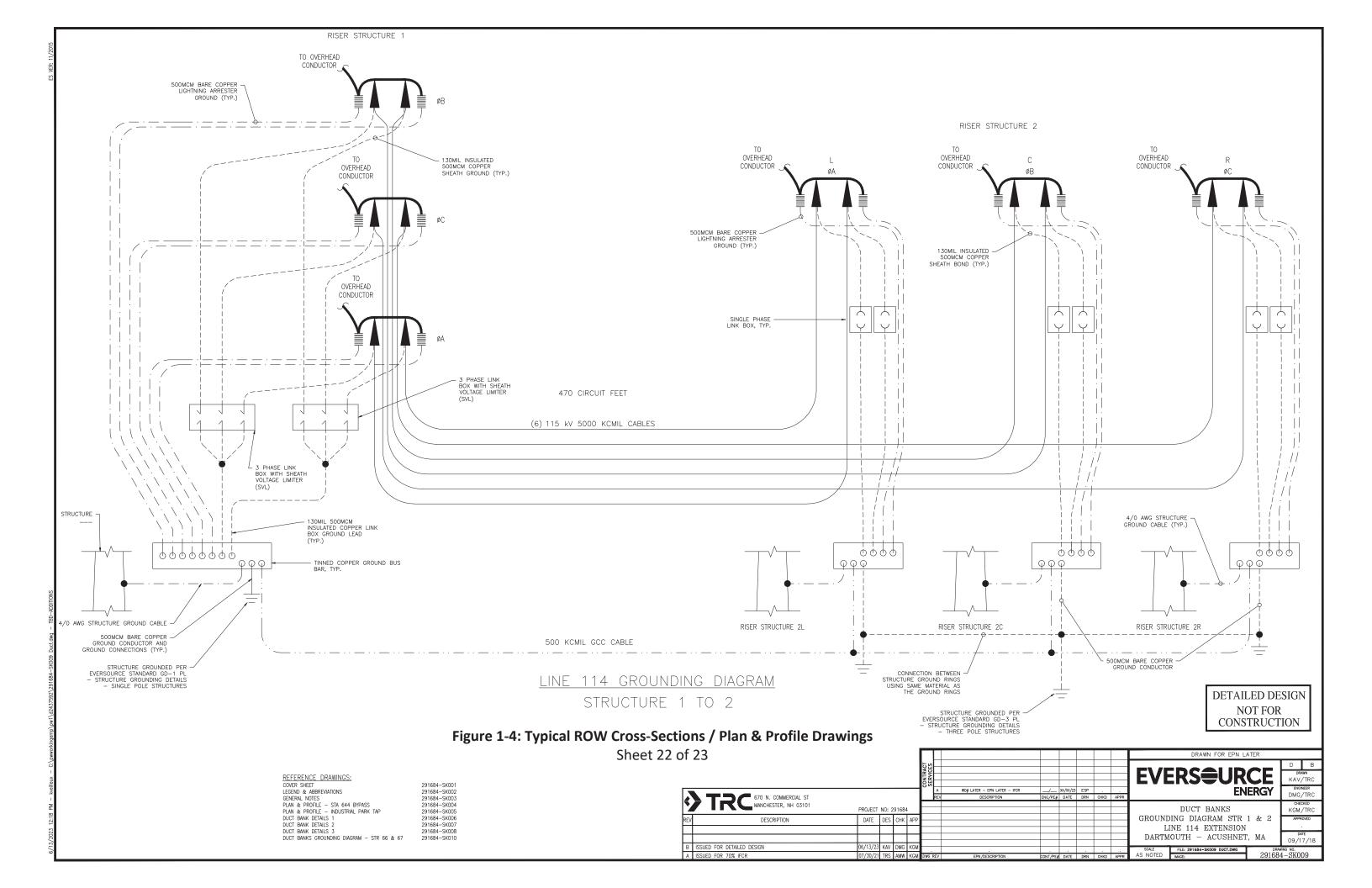


DETAILED DESIGN NOT FOR CONSTRUCTION

DRAWN FOR EPN LATER

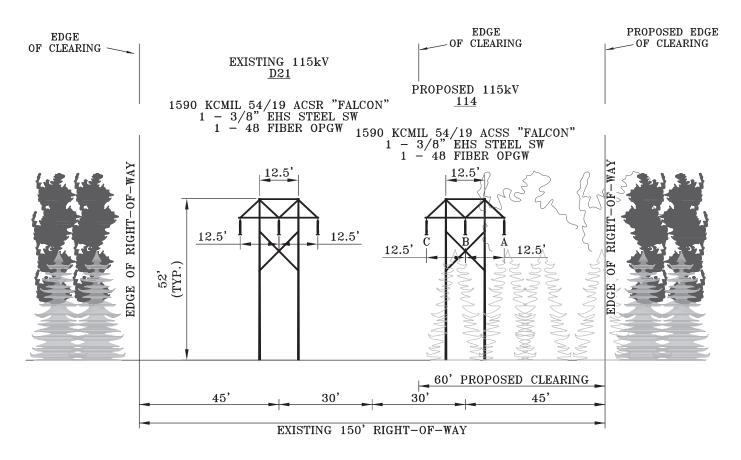


						CONTRACT								EVEKSTUKCE 🔀	C DRAWN V/TRC
1	670 N. COMMERCIAL ST						A REV	WO# LATER - EPN LATER - IFCR DESCRIPTION		09/19/18 DATE		CHKD	APPR		NGINEER IG/TRC
2	MANCHESTER, NH 03101	PROJECT	NO:	29168	4										M/TRC
٧	DESCRIPTION	DATE	DES	CHK	APP	$\vdash$	$\dashv$							Boot Billin Blilling	PPROVED
														LINE 114 EXTENSION	
	ISSUED FOR DETAILED DESIGN	06/13/23	KAV	DMG	KGM		$\dashv$							DARTMOUTH - ACUSHNET, MA 09	/17/18
٦	ISSUED FOR 70% IFCR	07/30/21	TRS	AMW	KGM	$\vdash$	$\dashv$							SCALE FILE: 291684-SKO08 DUCT.DWG DRAWING NO.	
	ISSUED FOR REVIEW	05/04/21	KAV	AMW	KGM	DWG	REV	EPN/DESCRIPTION	CONT/PE	DATE	DRN	CHKD	APPR	AS NOTED MAGE: 291684-SM	800



## - CONCEPTUAL -

FOR REFERENCE ONLY



TYPICAL PROPOSED RIGHT-OF-WAY CROSS SECTION

BELL ROCK SUBSTATION TO THE DARTMOUTH TOWN LINE

VIEW EAST

APPROXIMATELY 4.2 MILES FALL RIVER, MA

NOTE:
PROPOSED PHASING SHOWN IS TYPICAL. STRUCTURE 114-1 IS
VERTICALLY CONFIGURED TO ACCOMMODATE A TRANSPOSITION
AND TO MAINTAIN THE PHASING PROPOSED AT THE
SUBSTATION.

Figure 1-4: Typical ROW Cross-Sections / Plan & Profile

Drawings

Sheet 23 of 23

# nationalgrid

114 115kV NEW LINE
BELL ROCK TO DARTMOUTH TOWN LINE
MILE 0.0 TO 4.2
CROSS SECTION #1 OF 1

SCALE: NONE REV: D

DATE: 01/16/19

