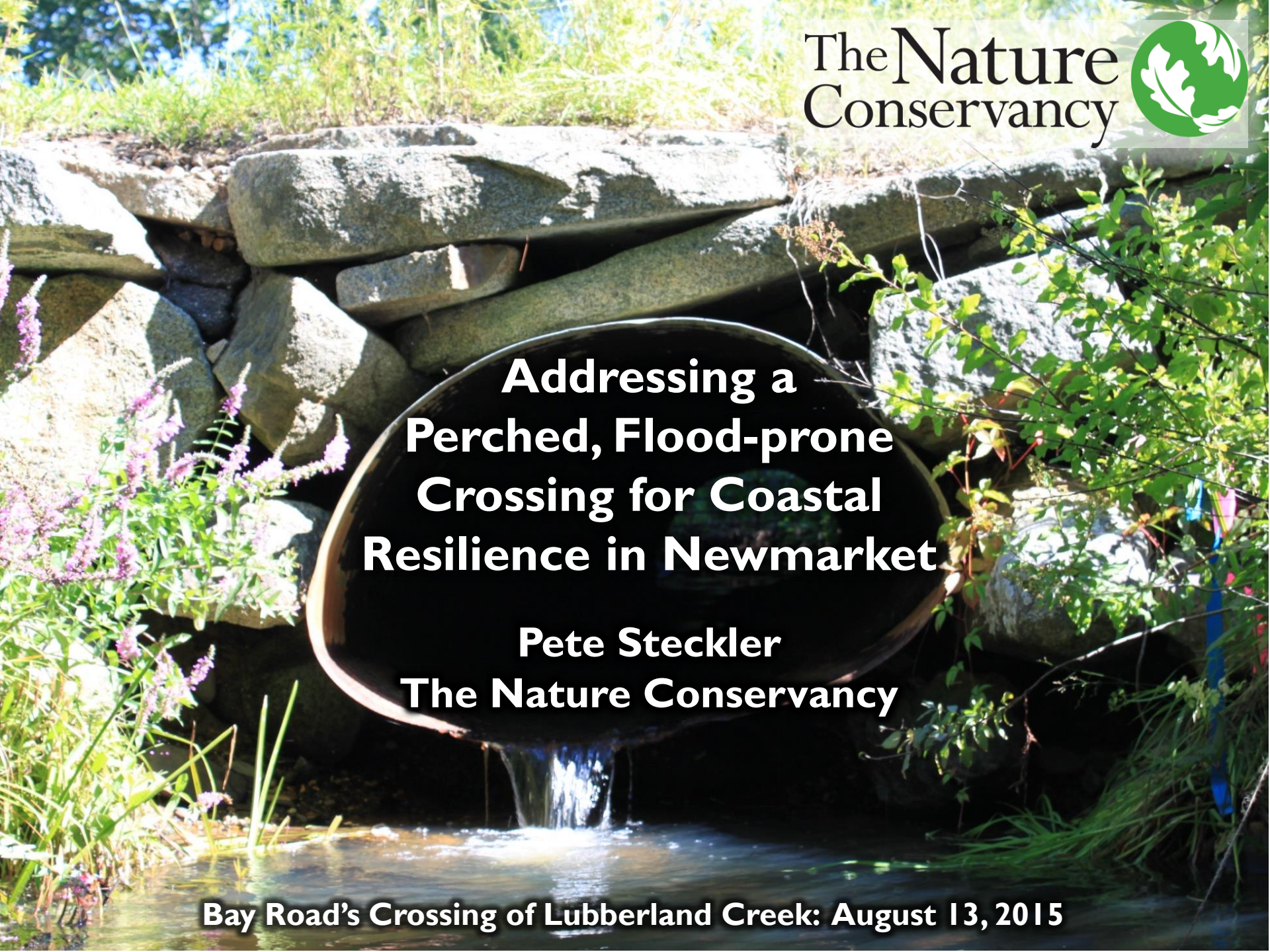
The Nature Conservancy
Addressing a Perched, Flood-prone Crossing for Coastal Resilience in Newmarket
Pete Steckler
The Nature Conservancy
Bay Road's Crossing of Lubberland Creek: August 13, 2015

Project Funders & Partners

This project was funded, in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the NH Department of Environmental Services Coastal Program.

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

NHCP

TOWN OF NEWMARKET, NH
EST. DEC. 15, 1727

WRIGHT-PIERCE
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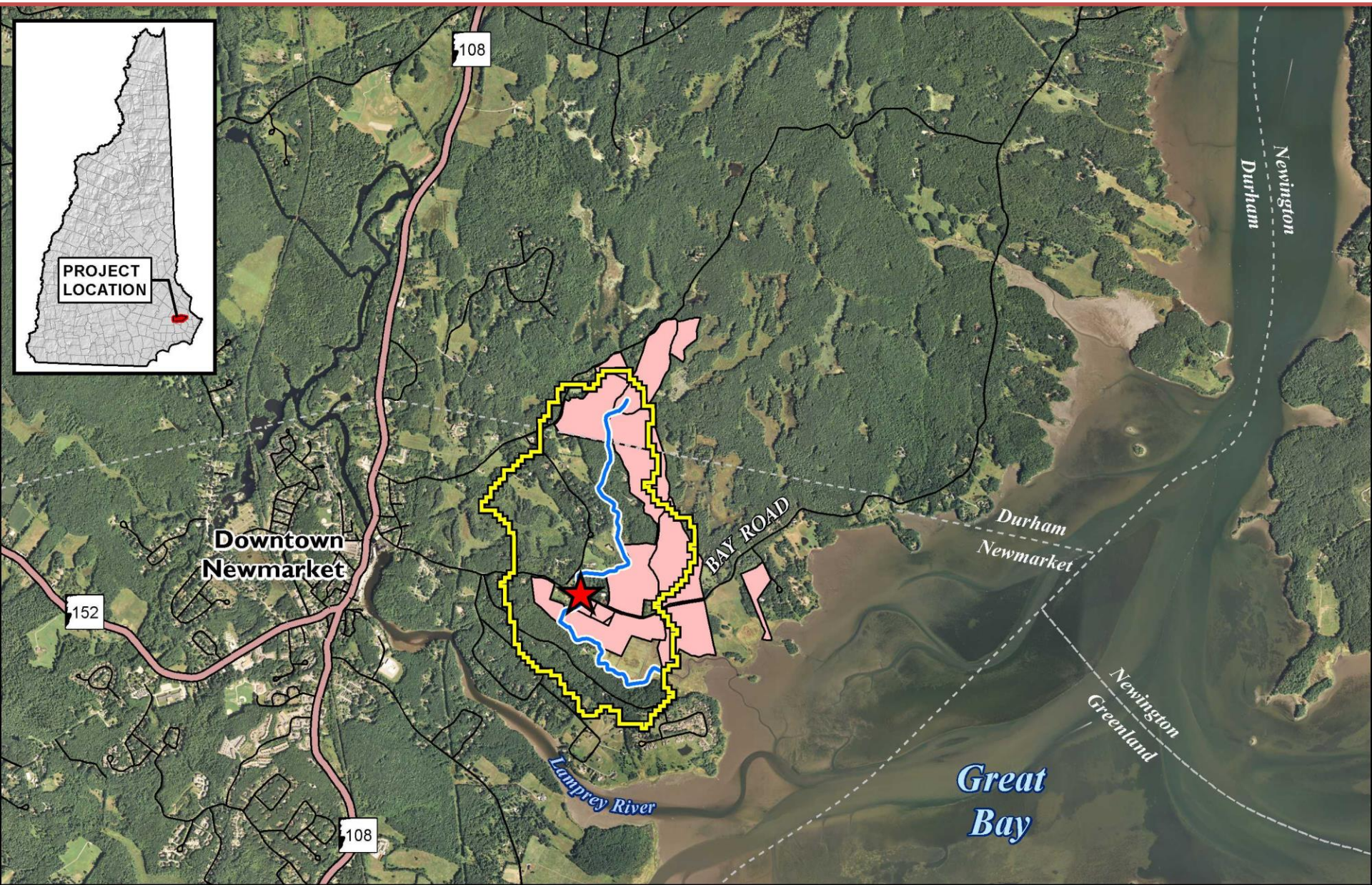
STATE OF NEW HAMPSHIRE
LIVE FREE OR DIE
FISH AND GAME

Sea Grant
New Hampshire

University of New Hampshire
Cooperative Extension

Project Location



What We Knew When We Started

What We Knew When We Started

What We Did

LUBBERLAND CREEK RESTORATION
BAY ROAD CULVERT ASSESSMENT
NEWMARKET, NH

Prepared for
The NATURE CONSERVANCY

October 2015

WRIGHT-PIERCE
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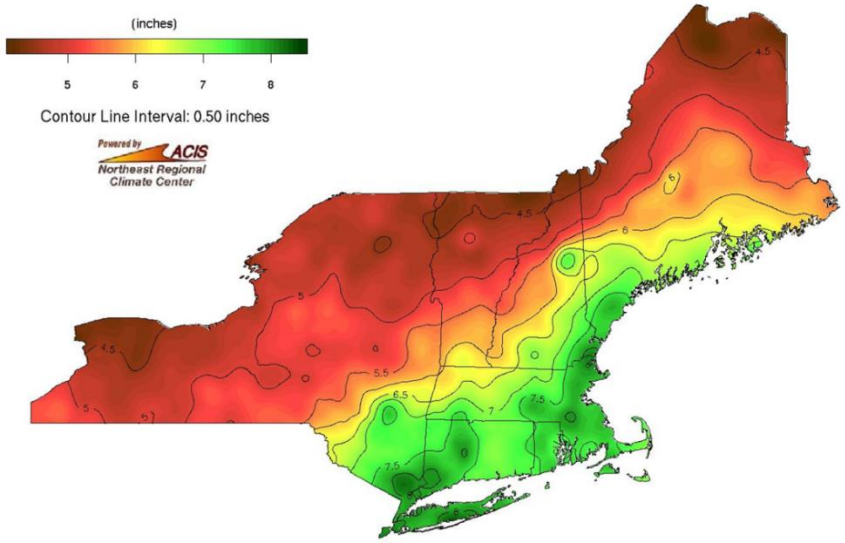
Northeast Regional Climate Center



24-HOUR DURATION RAINFALL (TOTAL DEPTH IN INCHES) INTERPOLATED FOR THE TOWN OF NEWMARKET, NH

Recurrence Interval [Annual Probability]	NRCC Extreme Precipitation Analysis
1-year Event [100%]	2.64
2-year Event [50%]	3.17
5-year Event [20%]	4.01
10-year Event [10%]	4.81
25-year Event [4%]	6.10
50-year Event [2%]	7.31
100-year Event [1%]	8.77

What We Did

LUBBERLAND CREEK RESTORATION
BAY ROAD CULVERT ASSESSMENT
NEWMARKET, NH

Prepared for
The NATURE CONSERVANCY

October 2015

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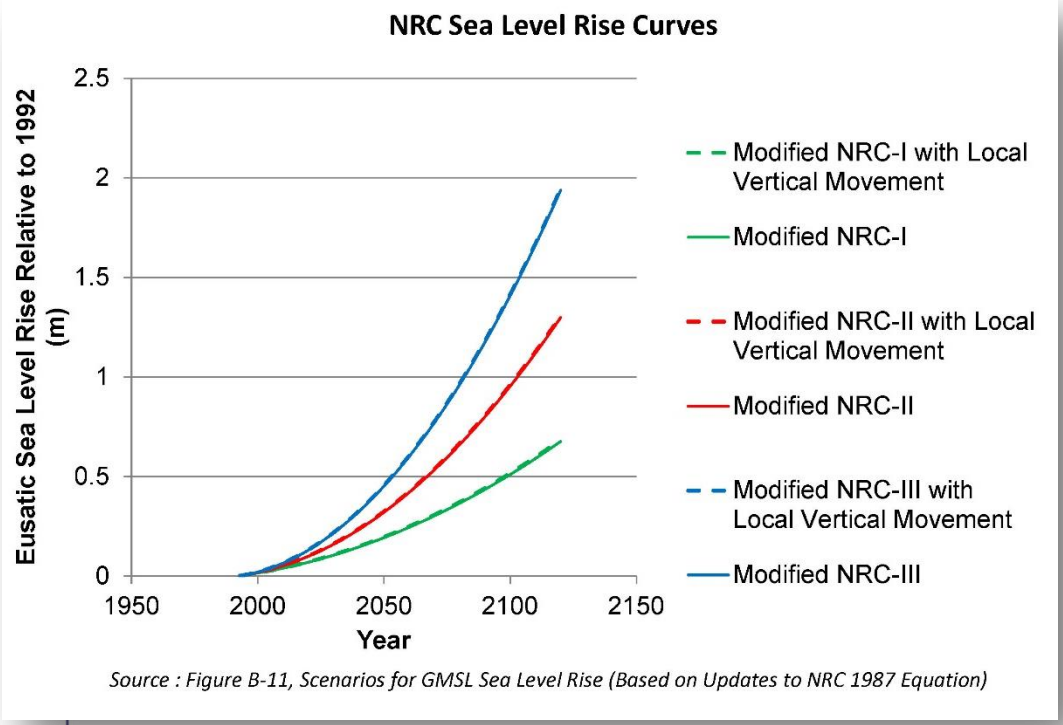
Engineering a Better Environment



Source : Figure B-11, Scenarios for GMSL Sea Level Rise (Based on Updates to NRC 1987 Equation)

Year	NRC-II Sea Level Rise (Ft)
2065	1.33
2115	3.74

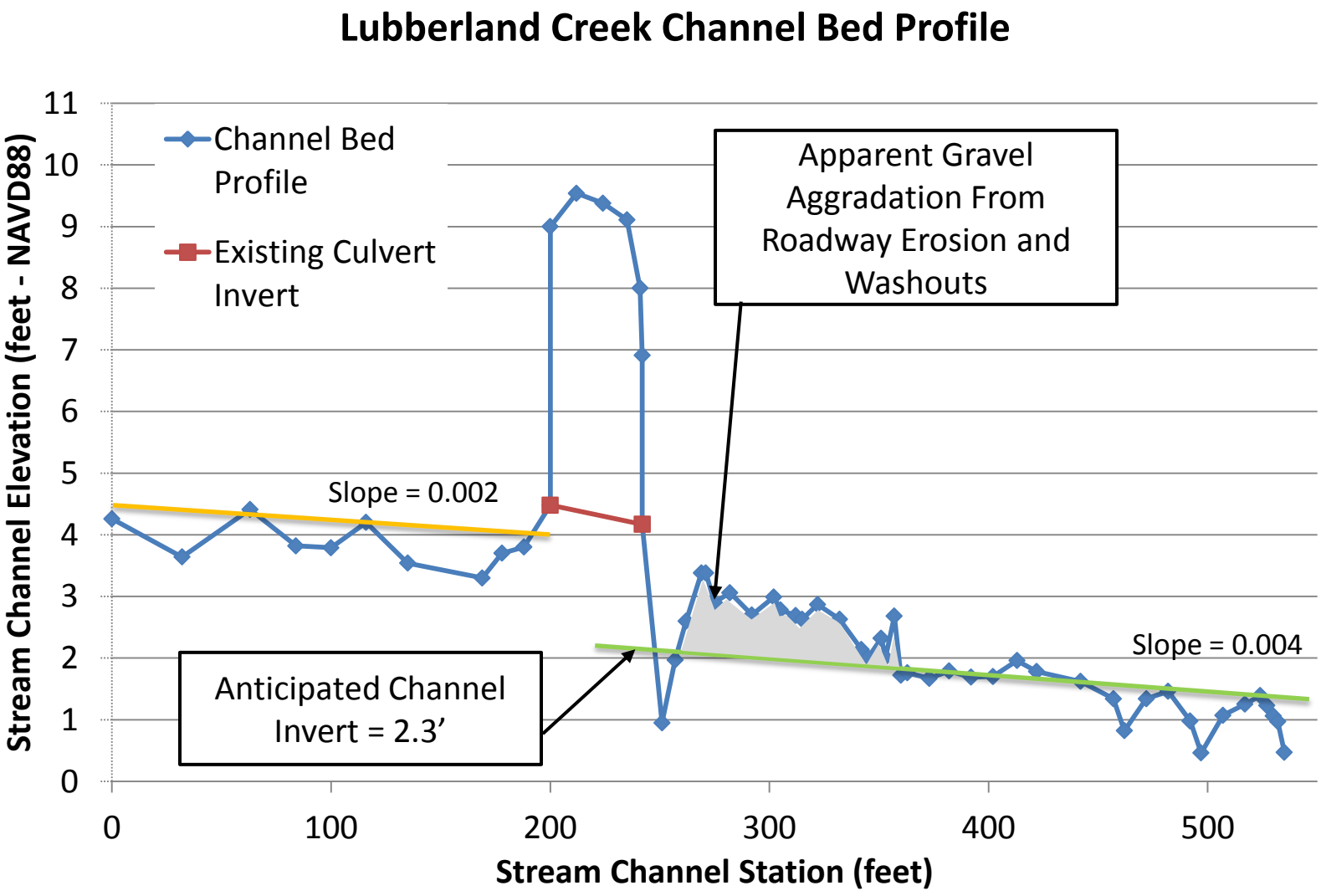
*** NRC: National Research Council**

What We Learned

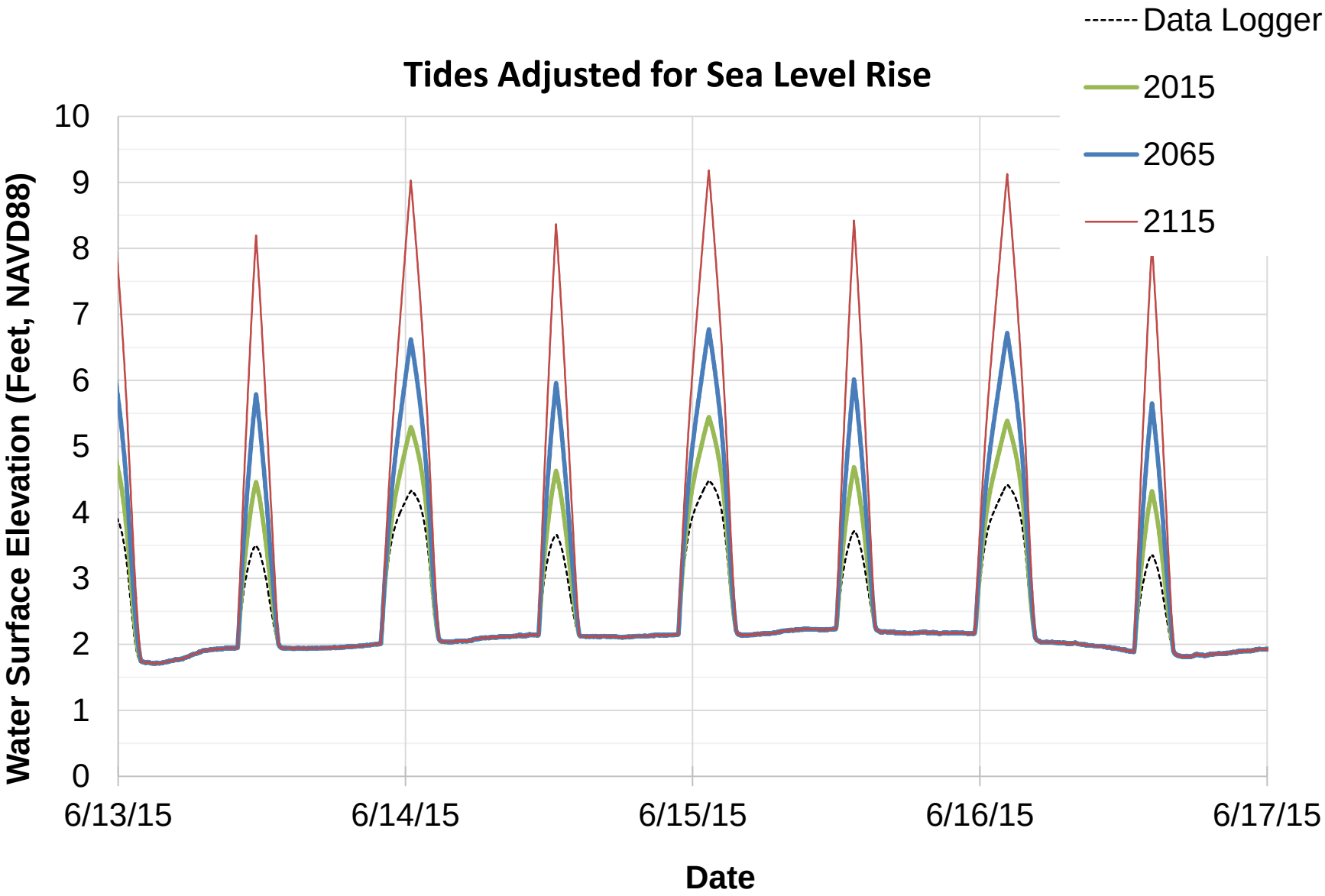
REPORTED EVENTS SINCE 2006 WHEN ROADWAY OVERTOPPED

Date	Event Recurrence Interval
May 14, 2006	10 year Event
April 16, 2007	25 year Event
March 14, 2010	10 year Event
March 30, 2010	5 year Event

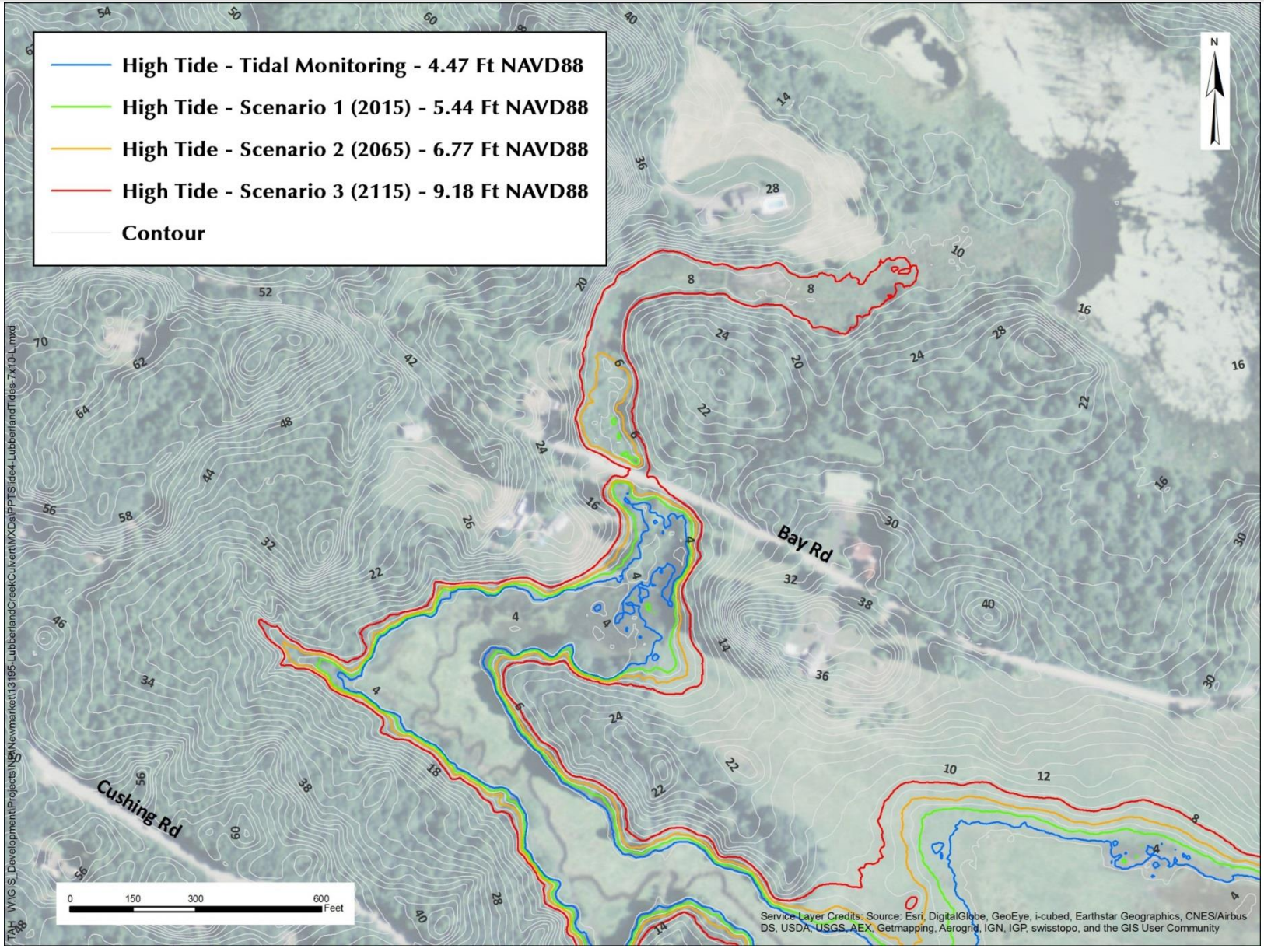
What We Learned



What We Learned



What We Learned

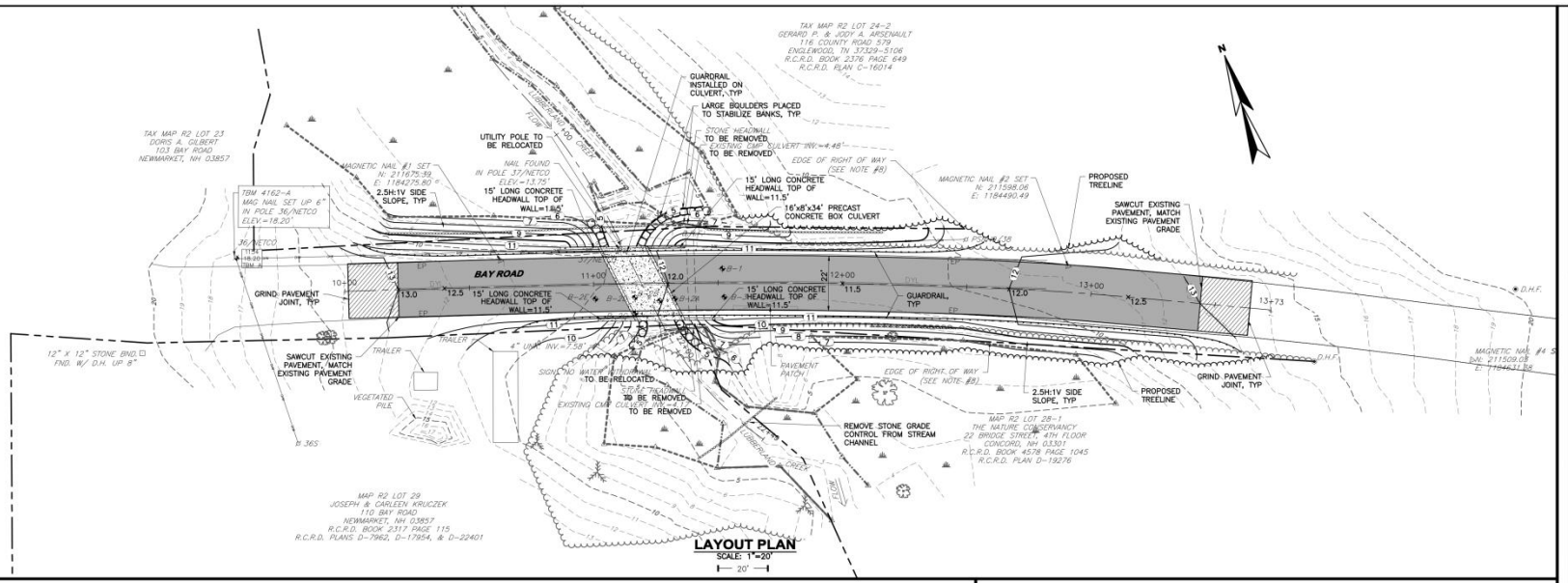


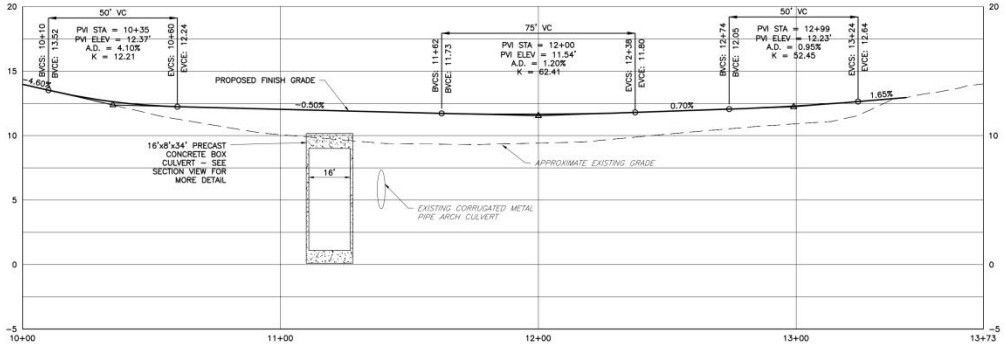
What We Learned

100-yr Event Hydraulic Performance

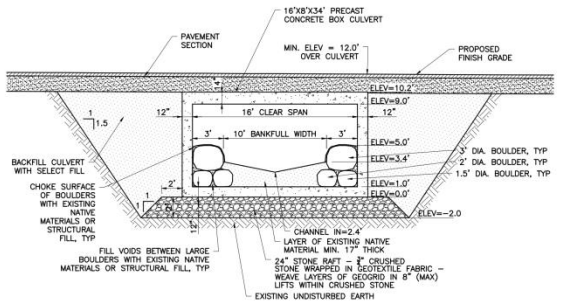
Culvert/ Bridge Geometry:	Existing Structure			10' Span			16' Span			20' Span			20' Span		
				Bottom of Deck : 8.0'			Bottom of Deck : 9.0'			Bottom of Deck : 8.0'			Bottom of Deck : 9.0'		
Year:	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115
W.S.E. of Tide	5.4	6.8	9.2	5.4	6.8	9.2	5.4	6.8	9.2	5.4	6.8	9.2	5.4	6.8	9.2
Peak W.S.E D/S of Culvert	5.9	6.8	9.2	6.3	9.3	9.3	6.7	6.8	9.3	6.7	6.8	9.3	6.7	6.8	9.3
Peak W.S.E U/S of Culvert	13.2	13.2	13.4	10.3	10.3	10.9	7.7	7.7	9.4	7.5	7.5	9.7	7.5	7.5	9.3
Elevation Difference (Ft)	7.3	6.4	4.3	4.0	1.0	1.6	1.0	0.9	0.2	0.9	0.7	0.4	0.9	0.7	0.1

Preferred Alternative





BAY ROAD PROFILE
SCALES:
VERT: 1"=2'
HORIZ:1"=20'



CULVERT SECTION
SCALES:
VERT: 1"=5'
HORIZ:1"=5'

PRELIMINARY DESIGN - FOR CONCEPTUAL PURPOSES ONLY

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Offices Throughout New England
888.621.8156 | www.wright-pierce.com

THE NATURE CONSERVANCY
LUBBERLAND CREEK RESTORATION
NEWMARKET, NH

CONCEPTUAL CROSSING REPLACEMENT PLAN AND PROFILE

DRAWING
C-3A

DESIGNED BY: LRB
CAD: MRL
CHECKED BY: LRB
DATE: 10-22-15
APPR: MJ
DATE: 10-22-15
PROJECT NO: 13195A

LAST SAVED BY: LYNDSAY BUTLER 10/22/2015 9:58 AM
G:\DWGS\NH\NEWMARKET\13195-LUBBERLANDCREEKRESTORATION\13195A-PD\CAD\13195AC03A.DWG | C-3A 13195aC03A | 1:4.58 | ---- | 10/22/2015 9:57:37 AM | LYNDSAY.BUTLER

Questions?