

K42 Asset Condition Project

Franklin County Line Upgrade

St. Albans Select Board

June 6, 2022



Mission, Vision & Values

Our mission

VELCO's mission is to serve as a trusted partner.

Our vision

VELCO's vision is to create a sustainable Vermont through our people, assets, relationships and operating model.

Our values

VELCO values people, safety, sustainability, creativity and great work.

To live our values we...

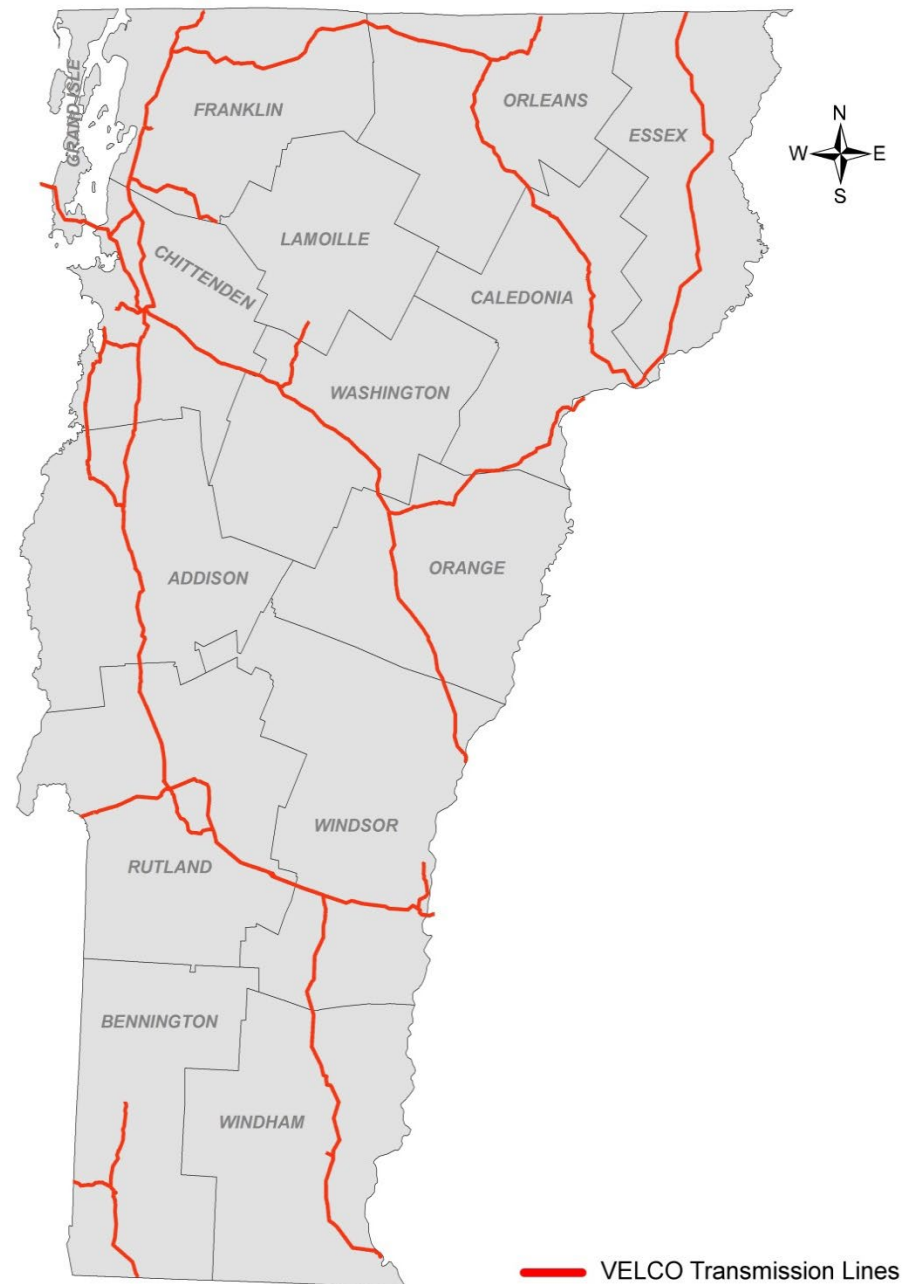
- Treat everyone with respect.
- Respond with urgency and care.
- Unconditionally support and empower one another.
- Share information.
- Think outside the box.



VELCO Background

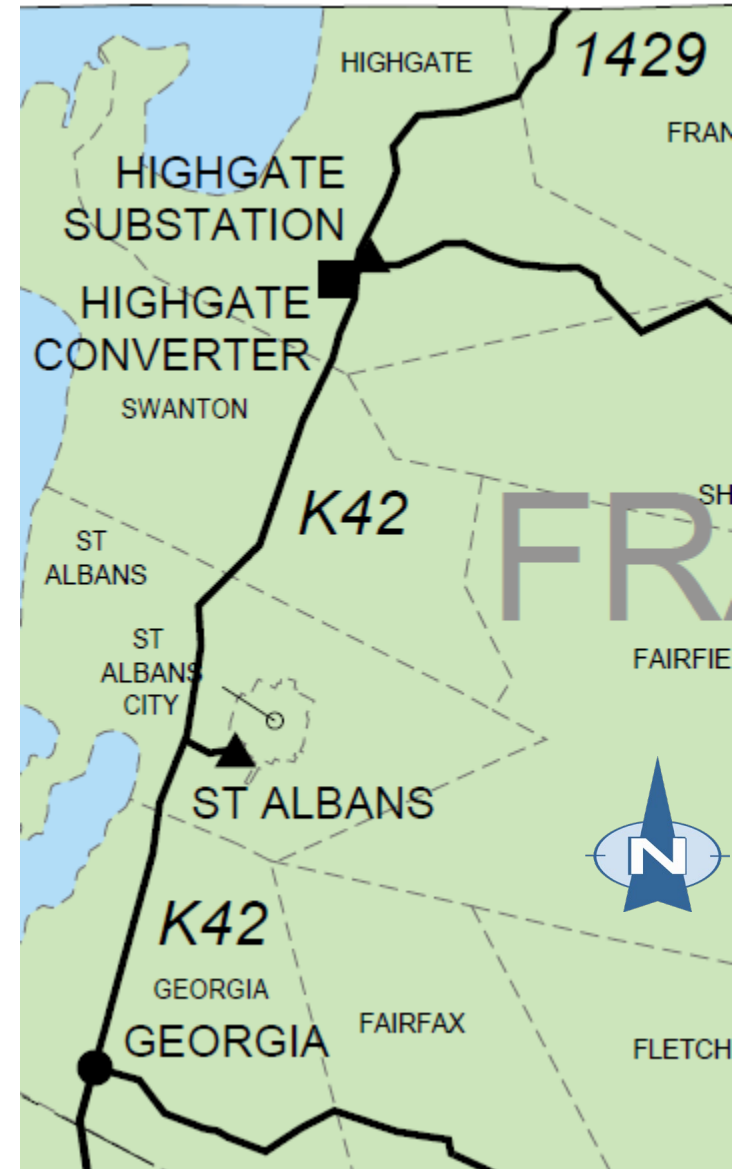
- Formed in 1956 as nation's first statewide, "transmission-only" company
- Owned by 17 local electric utilities and a **public benefits corporation**
- **For-profit company with cooperative revenue structure**

- Assets managed assets include \$1.2 billion electric transmission grid consisting of:
 - **738** miles of transmission lines
 - **1500** miles of fiber optic communication network
 - Statewide Radio System
 - 13,000 acres of rights-of-way
 - 55 substations, switching stations, and terminal facilities



K42 Line Overview

- Constructed in 1958; majority of 212 structures are original build
- 115 kV wood H-frame line from Highgate to Highgate Converter Tap to St Albans Tap to Georgia (16.6 miles)
- Main transmission path for HVDC Converter and wind generation toward load center (Burlington)
- Significant wetlands, crop farming, and long access routes drive need for substantial matting



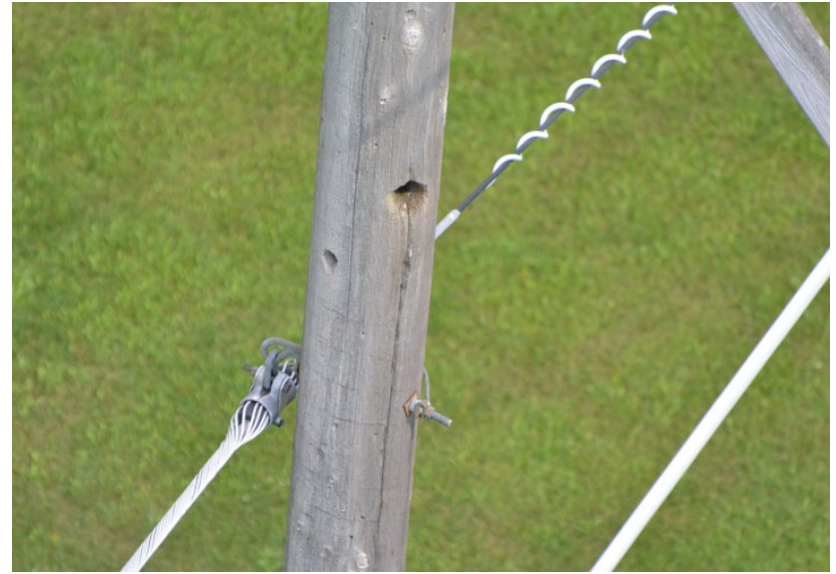
Identified K42 Deficiencies

- 146 (~70%) out of 212 structures to be replaced in the near term
 - Pole and cross arm damage:
 - Woodpecker holes
 - Cracks, splitting, rotting wood
 - Leaning poles
 - Reaching end of asset life
- Additional future structure replacements as needed
 - Reevaluation every 8 years

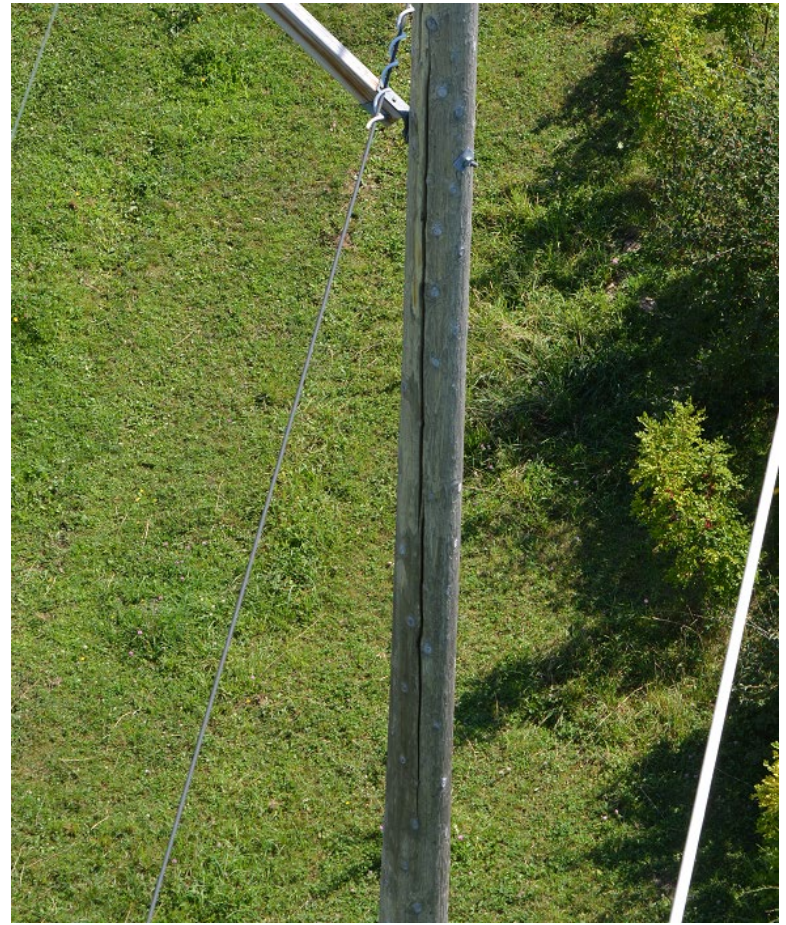
Examples of rotted pole tops



Examples of woodpecker damage



Examples of poles splitting



Examples of target practice damage

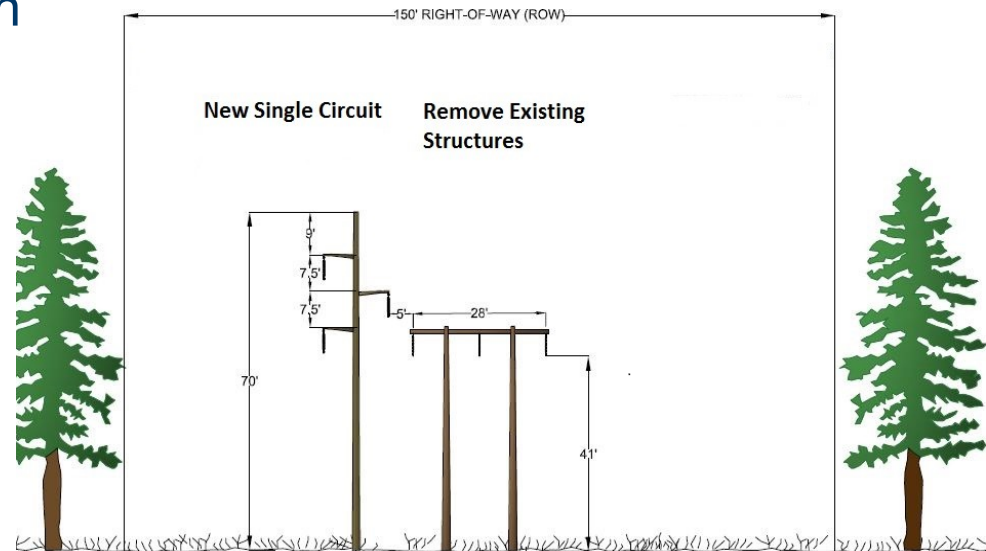


K42 line very difficult to take out of service

- System topology and load/gen balance are problematic
 - Outages result in radial supply almost 100 miles long
 - Loss of Northern Loop load post-contingency (15% of VT peak, nearly all of Vermont Electric Coop's service territory)
 - Portions of structure work disconnect St. Albans Tap
 - Exposure to low voltage post-contingency
 - Several resources switched off during outages
 - Highgate converter – 97% capacity factor
 - Wind plants – High generation except in the summer
 - K42 outages potentially can restrict planned outages in Vermont, Southern NH, and Central MA

Proposed solution: Rebuild K42 as single-pole line

- More efficient construction – minimizes mobilizations
- Maintains the existing line in service during construction
 - Avoids approximately 30 daily outages and their consequences
- Steel structures lower ongoing maintenance costs and future replacements
- Meets current VELCO line design standard
- Creates space in key ROW for a future line if needed by region
- **What conductor size?**
 - 1351 ACSS
 - 2515 ACSR
 - Double 1272 ACSR
 - (lower reactance & higher charging current)



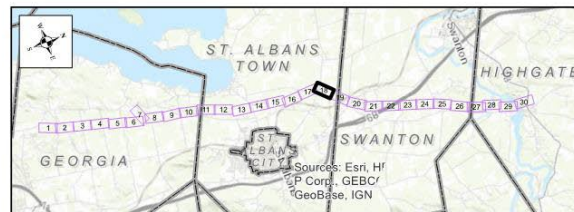
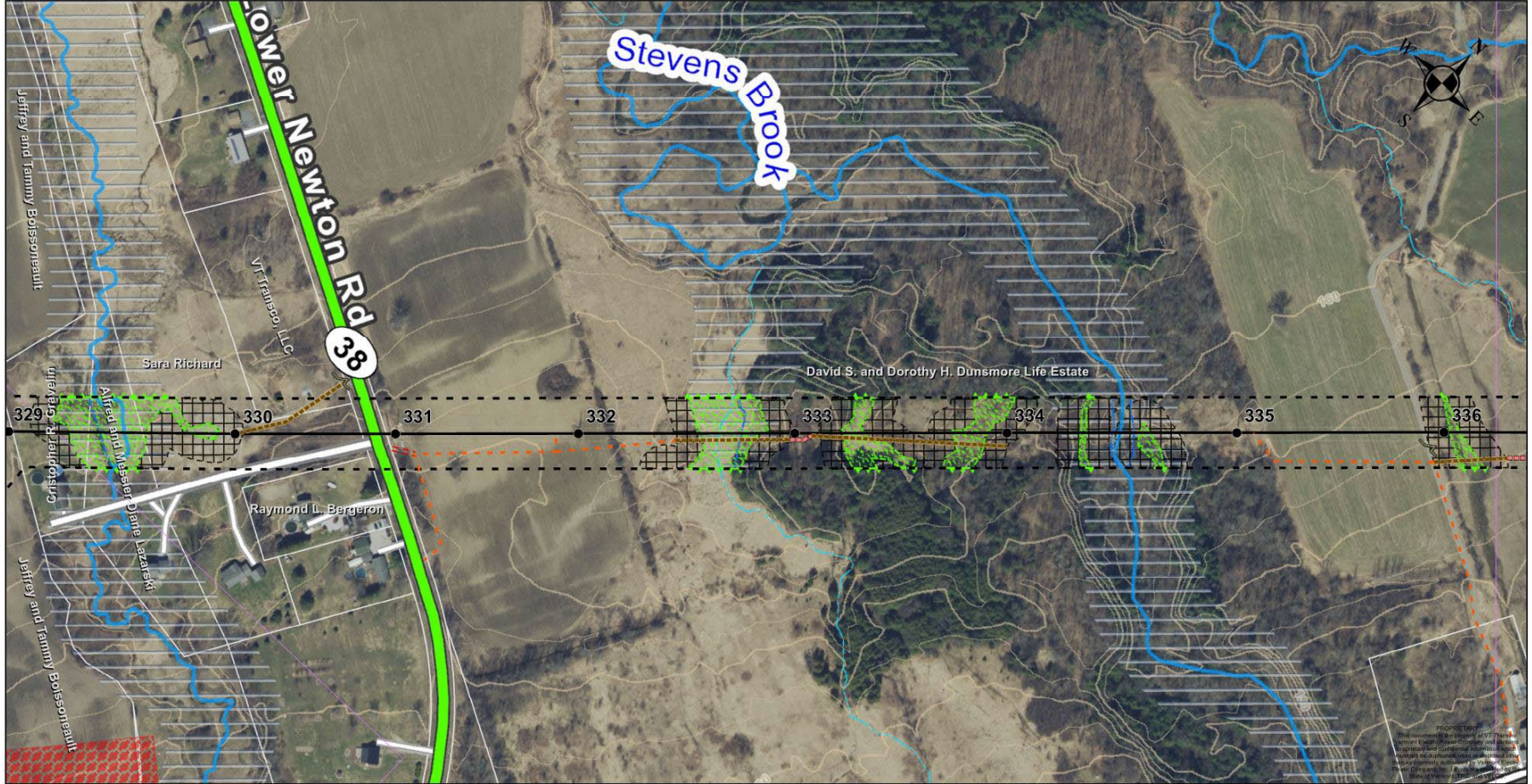
Project Value/Cost Summary

- Addresses asset condition need with minimal disruptions
- New single-pole line
 - More efficient construction
 - Avoids outages and associated generation lost revenue and reliability impacts
 - No interference with other planned outages
 - Lowers maintenance cost and structure replacement frequency
 - Optimizes utilization of the ROW
- Bundle conductors
 - Reduce PTF losses by 50% and LMP impacts
 - Improves system strength
 - Improves reactive margin
 - Addresses current export constraints
 - Facilitates renewable energy growth by about 20 MW
 - Avoids Vermont lost opportunity cost for SHEI improvement

Project milestones

- Received ISO-NE support on costs (January 2022)
- Discussions with VDUs & DPS (March-April 2022)
 - Studying cost/benefit analysis for single pole and double conductor investments
- Commenced draft line design (April 2022)
 - Increased fiber optic capacity
 - Field walk down in July/August
- Beginning environmental and aesthetic assessments (May 2022)
- Public outreach/ stakeholder engagement (April 2022 – 2023)
- VSPC update (April 2022)
 - NTA screening to follow
- Construction cost quotes (August 2022)
- Permitting process (2023)
- Construction and removal of old line (2024-2025)

Natural & Cultural Resource Surveys



Franklin County Line Upgrade Project
K-42 115 kV Line
Natural & Cultural Resource Map

vermont electric power company
VELCO

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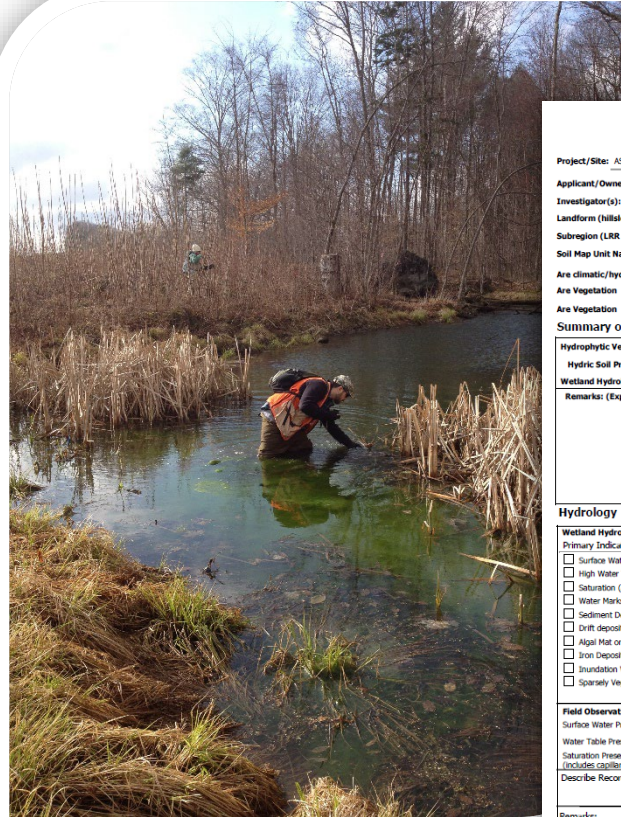


Natural & Cultural Resource Surveys



Access & Landowners

Data Collection → Reports → Permitting



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: ASC-CD - K31 Segment City/County: Cavendish State: VT Sampling Date: 17-Jul-11
 Applicant/Owner: VELCO/VT Transco State: VT Sampling Point: CA-W11-3 UPL
 Investigator(s): AF JW Section, Township, Range: S. T. R.
 Landform (hillslope, terrace, etc.): Undulating Local relief (concave, convex, none): convex Slope: 15.0 % / 8.5
 Subregion (LRR or MLRA): LRR R Lat.: 43° 25' 23.616" N Long.: 72° 37' 46.274" W Datum: NAD1983
 Soil Map Unit Name: Penn, Skerry, and Colonel soils, 8 to 15 percent slopes, very stony NWI classification:
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)
Summary of Findings - Attach site map showing sampling point locations, transects, important features, et
 Hydrophytic Vegetation Present? Yes No
 Hydric Soil Present? Yes No
 Wetland Hydrology Present? Yes No
 Is the Sampled Area within a Wetland? Yes No
 Remarks: (Explain alternative procedures here or in a separate report.)

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Mud Surface (C7)
<input type="checkbox"/> Anundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sparsely vegetated Concave Surface (B8)	

Secondary Indicators (minimum of 2 required)

<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Dry Season Water Table (C2)
<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Geomorphic Position (D2)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): _____
 Saturation Present? Yes No Depth (inches): _____
 (Includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections):
 Remarks:
 US Army Corps of Engineers



