

# Athol Solar Zoning Bylaw Assessment

*Tufts University Department of Urban and Environmental Policy and Planning  
Field Projects 2019*



**Tufts**  
UNIVERSITY

GRADUATE SCHOOL  
OF ARTS AND SCIENCES

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# Solar Development in Athol



## Increasing solar developments in the community

- Decreasing solar energy costs
- Growing demand for clean and renewable energy
- State initiatives



## Community Concerns





# Ground-mounted Solar Photovoltaic Arrays





## Research Questions



**What are innovative zoning bylaw criteria being utilized by other Massachusetts communities and how might Athol utilize these?**



**How can Athol identify and prioritize ideal sites for solar array development based on the various considerations expressed by the community?**



## Methods



Bylaw  
Review



Stakeholders

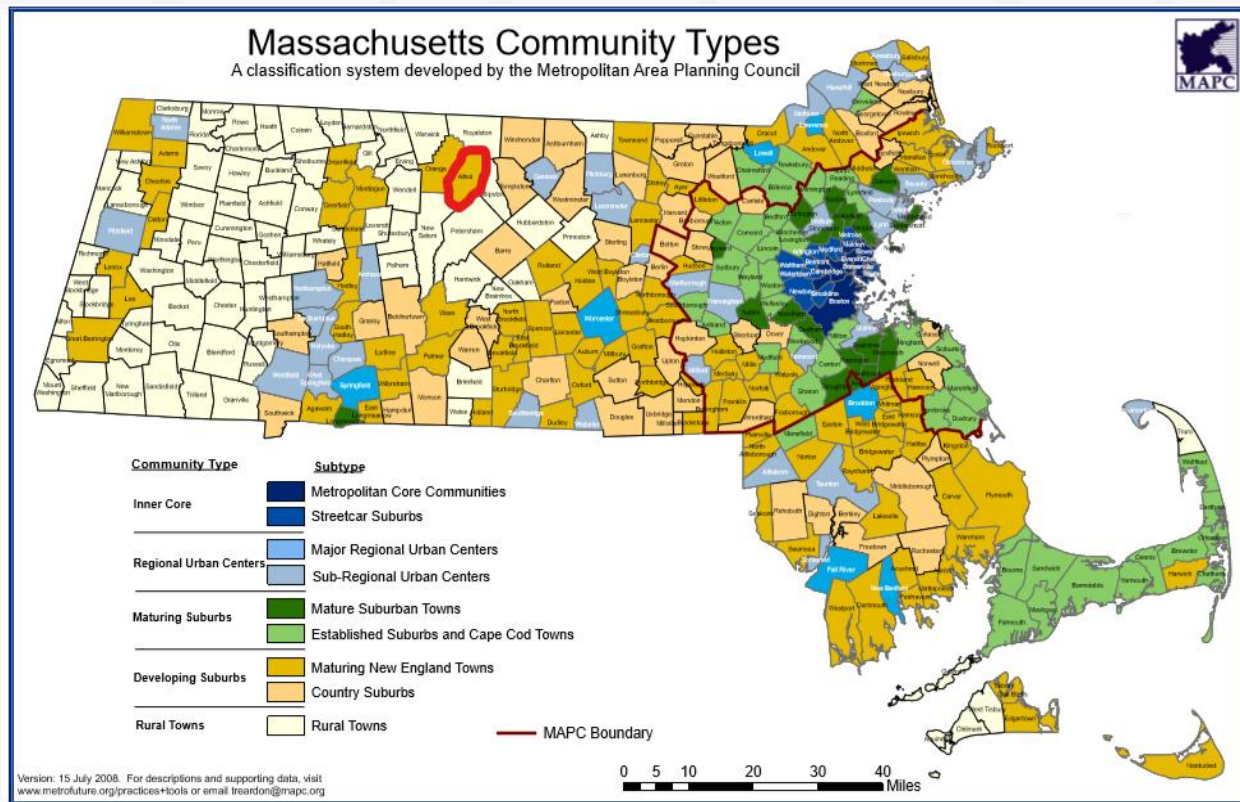


GIS Maps



# Method:

## Review of Solar Bylaws



**Purpose**



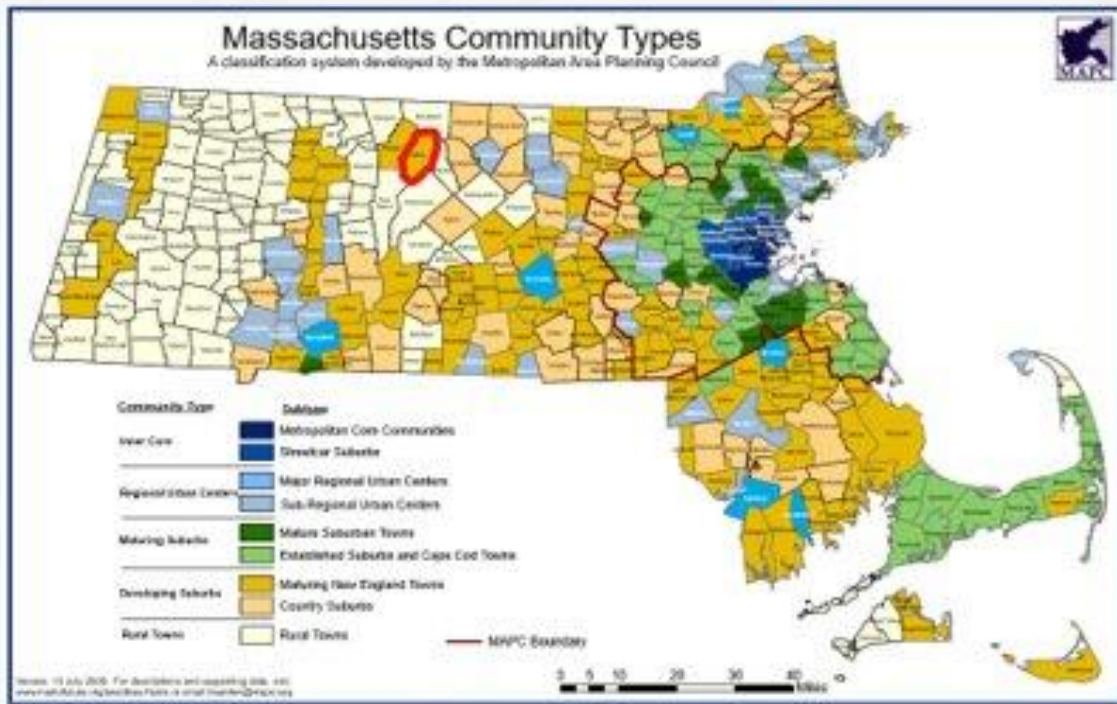
**Goal**



**Scope**



# Results: Zoning Bylaw



**Counties: Worcester, Franklin, Hampden, Hampshire, Berkshire, and other counties (Middlesex, Bristol, and Cape Code)**

**Review Process**

**Framework of Results**



# Existing Elements in Athol's Bylaw

1.1 Purpose and Intent

1.2 Applicability

1.3 General Requirements

1.3.1 Compliance with Laws, Bylaws,  
and Regulations

1.3.2 Building Permit and Building  
Inspection

1.3.3 Fees

1.3.4 Waivers

1.3.5 Site Control

**1.3.6 Site Plan Review Application and  
Requirements**

1.4 Operations and Maintenance Plan

1.5 Utility Notification

1.6 Dimension and Density Requirements

1.6.1 Setbacks

1.6.2 Appurtenant Structures

1.6.3 Size

**1.7 Design Standards**

1.7.1 Lighting

1.7.2 Signage

1.7.3 Utility Connections

1.8 Safety and Environmental Standards

1.8.1 Emergency Services

**1.8.2 Land Clearing, Soil Erosion,  
and Habitat Impacts**

1.9 Monitoring and Maintenance

1.9.1 Installation Conditions

1.9.2 Modification Conditions

1.10 Decommissioning and Abandonment

1.11 Financial Surety

1.12 Severability



# Communities' Included in the Analysis

- Worcester County- Barre
- Franklin County- Orange
- Hampden County- Ludlow
- Hampshire County- Shelburne
- Berkshire County- Cheshire
- Other Counties- Shirley





# Concrete Examples of Bylaw Changes

## Site Plan Review Application and Requirements

- Barre- "**Views of the site from all off-site abutting properties** (and where the site is abutting a street, from the street) indicating what will be seen, prior to construction, immediately after construction is completed with no plantings in place, after construction with all plantings in place and at two, five and 10 years after construction with all plantings still in place (indicating normal anticipated growth)."
- Cheshire- "Existing and proposed access roads, driveways, public ways, private ways, and **recreational trails** on the proposed site."



# Concrete Examples of Bylaw Changes

## Land Clearing, Soil Erosion, and Habitat Impacts

- Orange- "The **Stormwater Management Plan** submitted with the permit application shall contain sufficient information for the Stormwater Authority to evaluate the environmental impact and effectiveness of the measures proposed for reducing adverse impacts from stormwater runoff."
- Shirley- "**Landscaping screening** shall consist of planting, including evergreens, the plantings to be of such height and depth as is needed and as determined by the Planning Board during site plan review to adequately screen from view from the installation, accessories, appurtenant structures, and light sources."



# Concrete Examples of Bylaw Changes

## Design Standards

- Shelburne- "**Access roads** shall be constructed to minimize grading, stormwater/run-off control, removal of stone walls or trees and to minimize impacts to environmental, wetlands, or historic resources."
- Ludlow- "A **landscaped buffer strip** is intended to provide, within five years of installation, a visual barrier between the large-scale, ground-mounted, photovoltaic system and neighboring properties. Except for vehicular and pedestrian passways and permitted signs, these areas shall be used only for an interplanting of deciduous or evergreen trees, shrubs and other vegetative ground cover that can appropriately create a visual barrier."





# Model Solar Bylaw

## 3.24 Ground-Mounted Solar Photovoltaic Installations

### 3.24.1 Purpose and Intent

The purpose and intent of this bylaw is to provide standards for the placement, design, construction, operation, monitoring, modification and removal of ground-mounted solar photovoltaic installations which address public safety, minimize impacts on scenic, natural and historic resources, and, in the case of large-scale commercial installations, to provide adequate financial assurance for the eventual decommissioning of such installations.<sup>1</sup>

The provisions set forth in this section shall apply to the construction, operation, maintenance and/or repair, and environmental effects of ground-mounted solar photovoltaic installations. (Athol)

This bylaw aims to balance the rights of landowners to use their land with the corresponding right of abutting and neighboring landowners to live without undue disturbance from noise, traffic, lighting, signage, smoke, fumes, dust, odor, glare, or stormwater runoff.<sup>2</sup>

To maintain the character of the Town of Athol as a small New England village, this bylaw aims to retain the natural beauty, aesthetic appeal, historic value and scenic attraction of the Town for both residents and tourists.<sup>3</sup>

### 3.24.2 Applicability

The Planning Board shall permit no building or use that is injurious, noxious, offensive, or detrimental to the surrounding neighborhood.<sup>4</sup>

<sup>1</sup> Towns that share similar purpose and intent section: Adams, Athol, Ayer, Barre, Boylston, Concord, Falmouth, Great Barrington, Lunenburg, Monterey, New Marlborough, Sandisfield, Sheffield, Shirley, Stockbridge, and Windsor

<sup>2</sup> Referenced Town of Pelham

<sup>3</sup> Referenced Town of Warwick

<sup>4</sup> Referenced Town of Boylston

### 3.24.5.1 Compliance with Laws, Bylaws, and Regulations

The construction and operation of all ground-mounted solar photovoltaic installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of a ground-mounted solar photovoltaic installation shall be constructed in accordance with the State Building Code. (Athol)

**Pre-Application Conference:** The applicant is required to meet with the planning staff to conduct a pre-application session to discuss the project, process, waivers, and submittal requirements and proposed management practices for siting, construction, screening, reducing the visual contrast, operation and maintenance of the installation.<sup>5</sup> The applicant shall pay the cost of providing notice of the public meeting to consider the proposed development agreement.

### 3.24.5.2 Building Permit and Building Inspection

No ground-mounted solar photovoltaic installation shall be constructed, installed or modified as provided in this section without first obtaining a building permit. (Athol)

### 3.24.5.3 Fees

The application for a building permit for a ground-mounted solar photovoltaic installation must be accompanied by the fee required for a building permit. (Athol)

### 3.24.5.4 Site Plan Review Process and Requirements

<sup>5</sup> Referenced Town of Shelburne



# Method: Stakeholder Interview



## Stakeholder Groups

- Athol Planning Board
- Municipal Contacts
- Solar Developers
- Community Land Trusts
- Abutters, Property Owners, and Community Members



## Interview Format

- Open-Ended, Semi-Structured
- Questions grouped by theme
- Interviews will be transcribed
- Analyze data for common response patterns





## Tensions

Greenfield  
vs.  
Brownfield

Reasonable  
vs.  
Unreasonable





# Agreement

**Environmental**

**Economic**

**Social**

**Visual**



# Method: Geographic Information Systems (GIS) Mapping



**Purpose and Goal:**  
Solar array site considerations  
& Determine most suitable  
solar sites



**Data sources:** Town of Athol,  
USGS, NOAA, MassGIS, IPaC,  
and Stakeholder Interviews



**Tools:**  
ArcGIS, QGIS, and Carto



**Method:** GIS mapping with multi-  
criteria decision-making (MCDM)  
technique



# **Results: GIS Mapping and Findings**

**Slope, Land Use and Zoning, Roads,  
and Transmission Line**

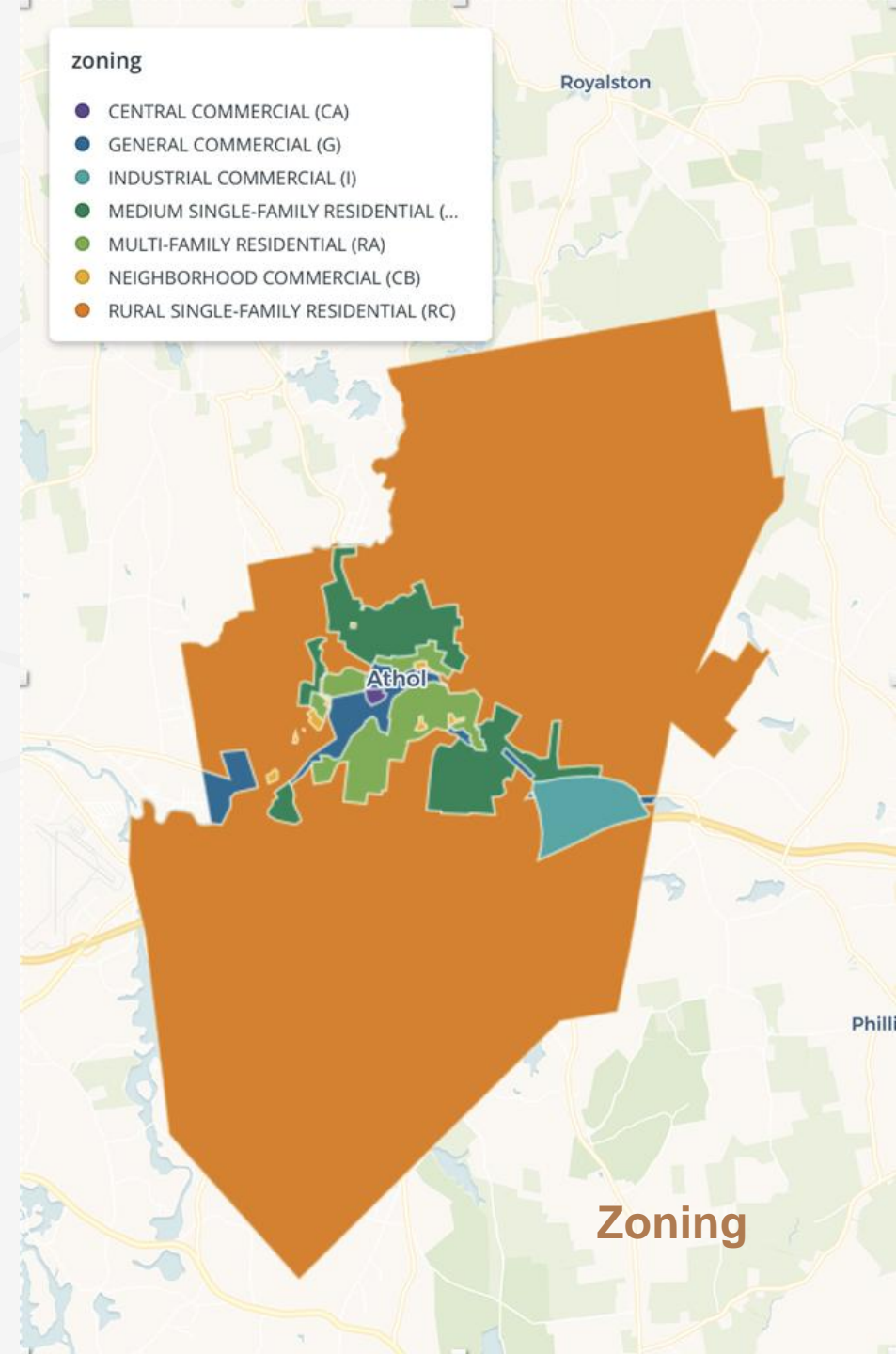
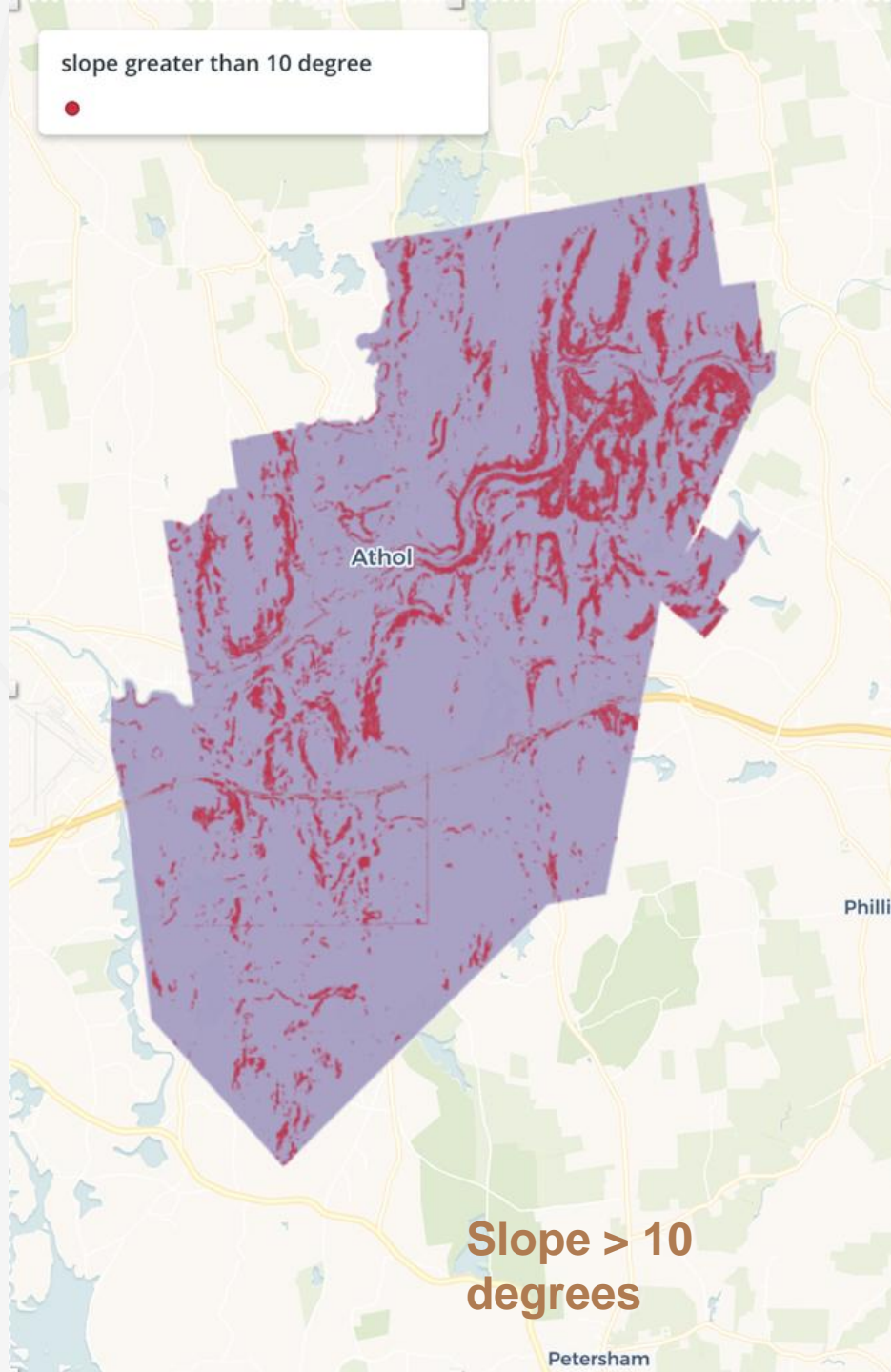
**Wetland, Local and State  
Protected Area, and Other  
Environmental Concerns**

**Temperature and  
Threatened Species**

**Elevation Map and  
Viewshed Analysis**

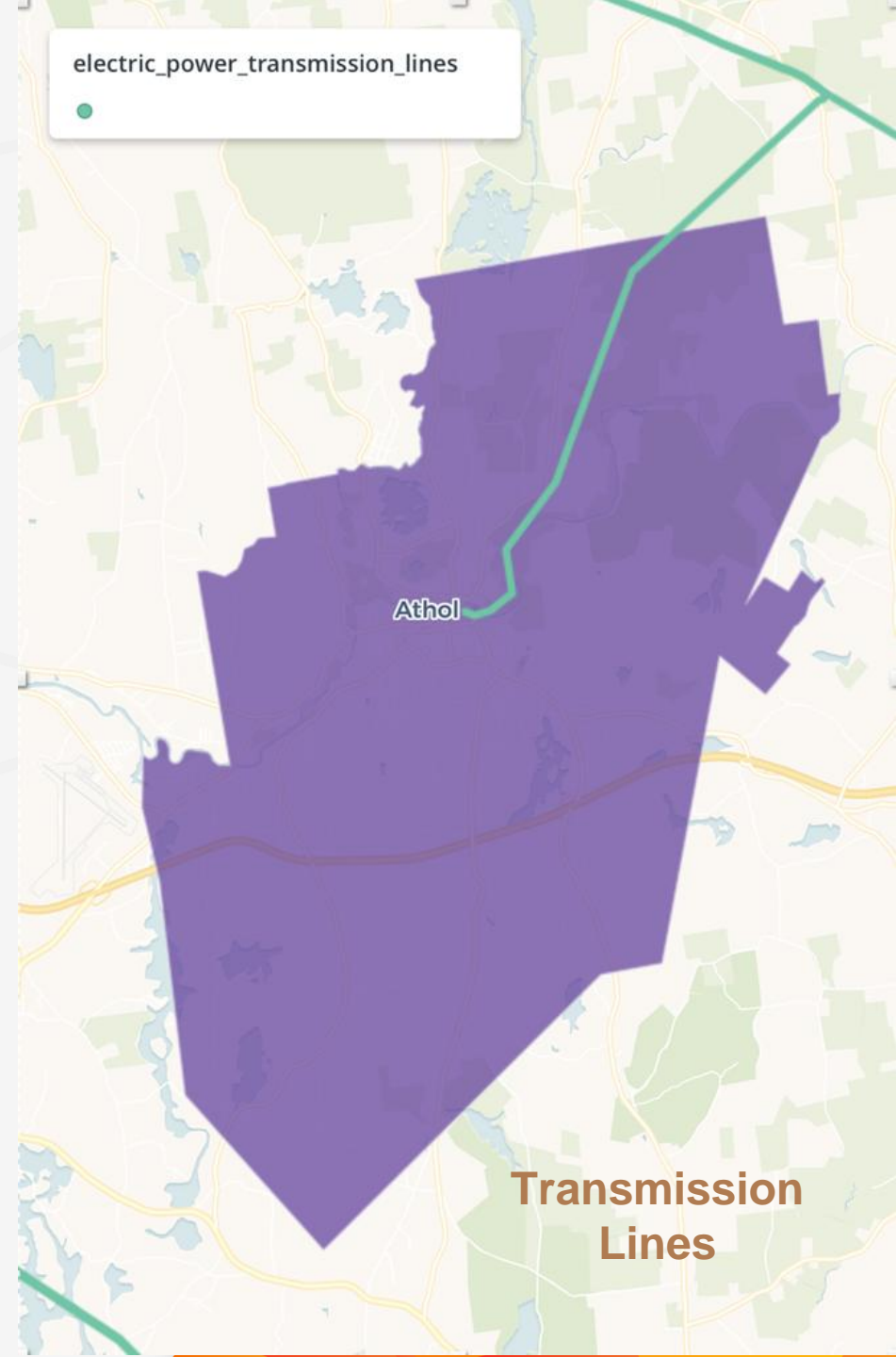
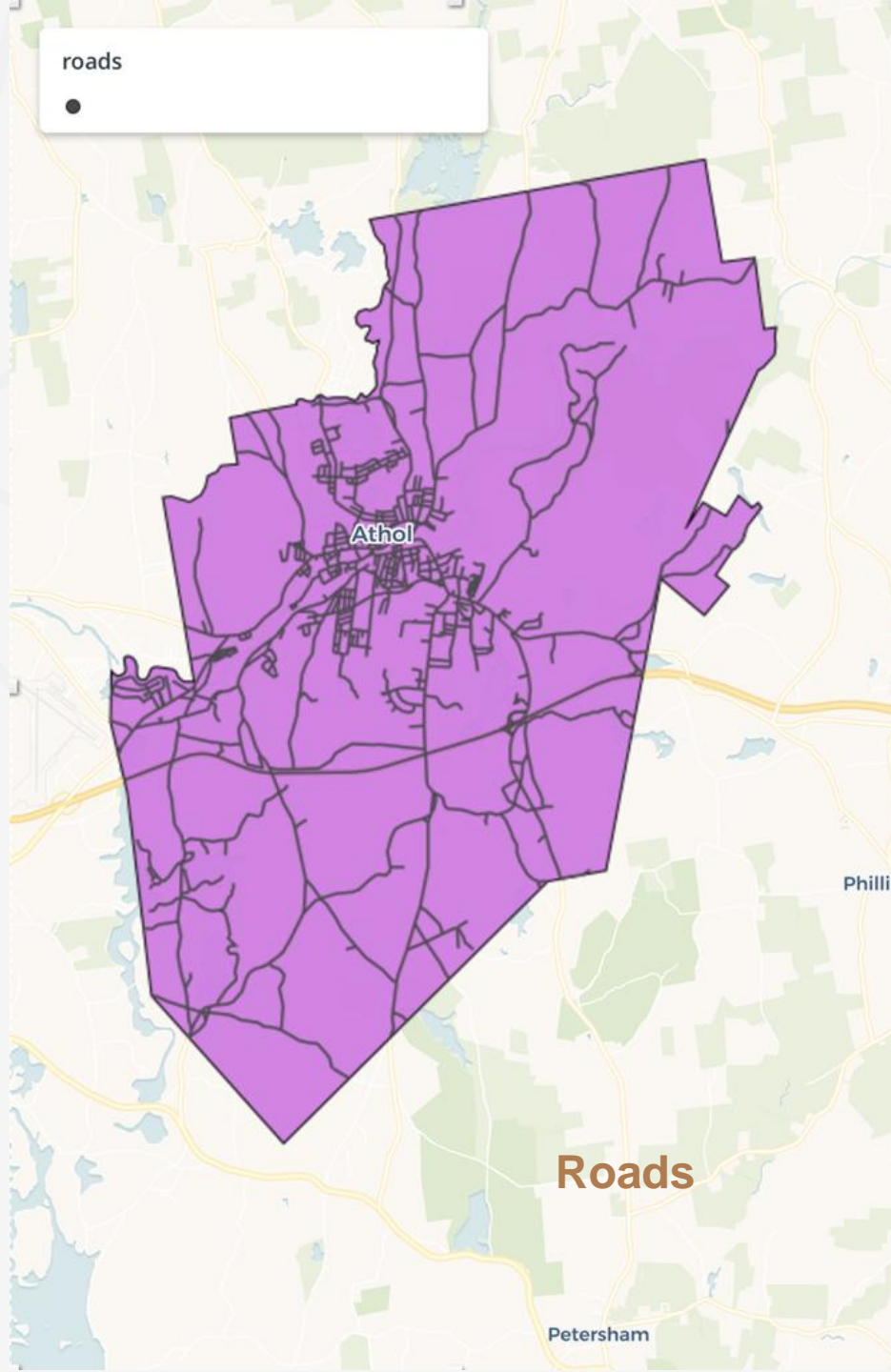


# Maps



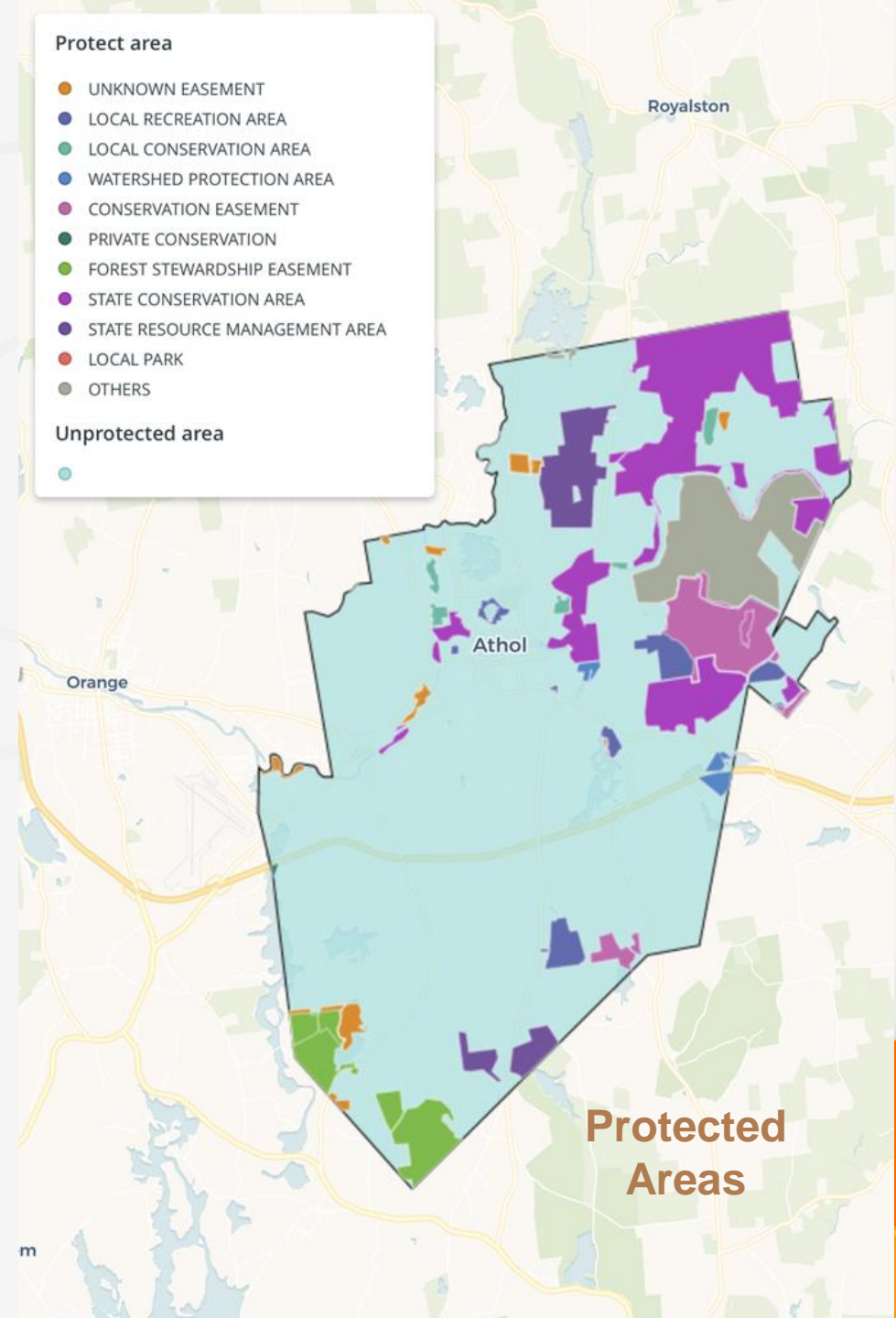
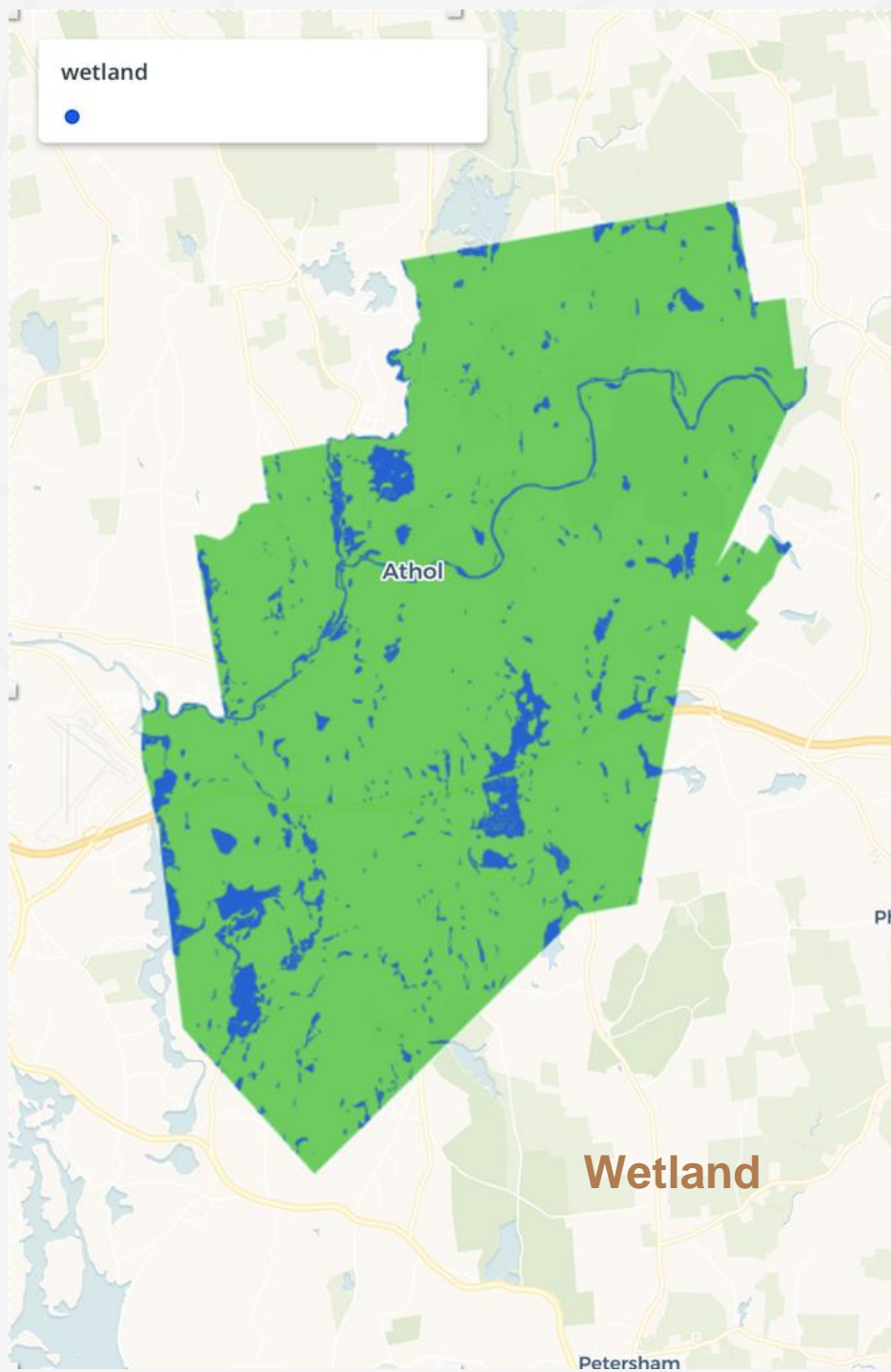


# Maps





# Maps





# Maps



## Priority Natural Communities



Forest Core



Landscape Blocks



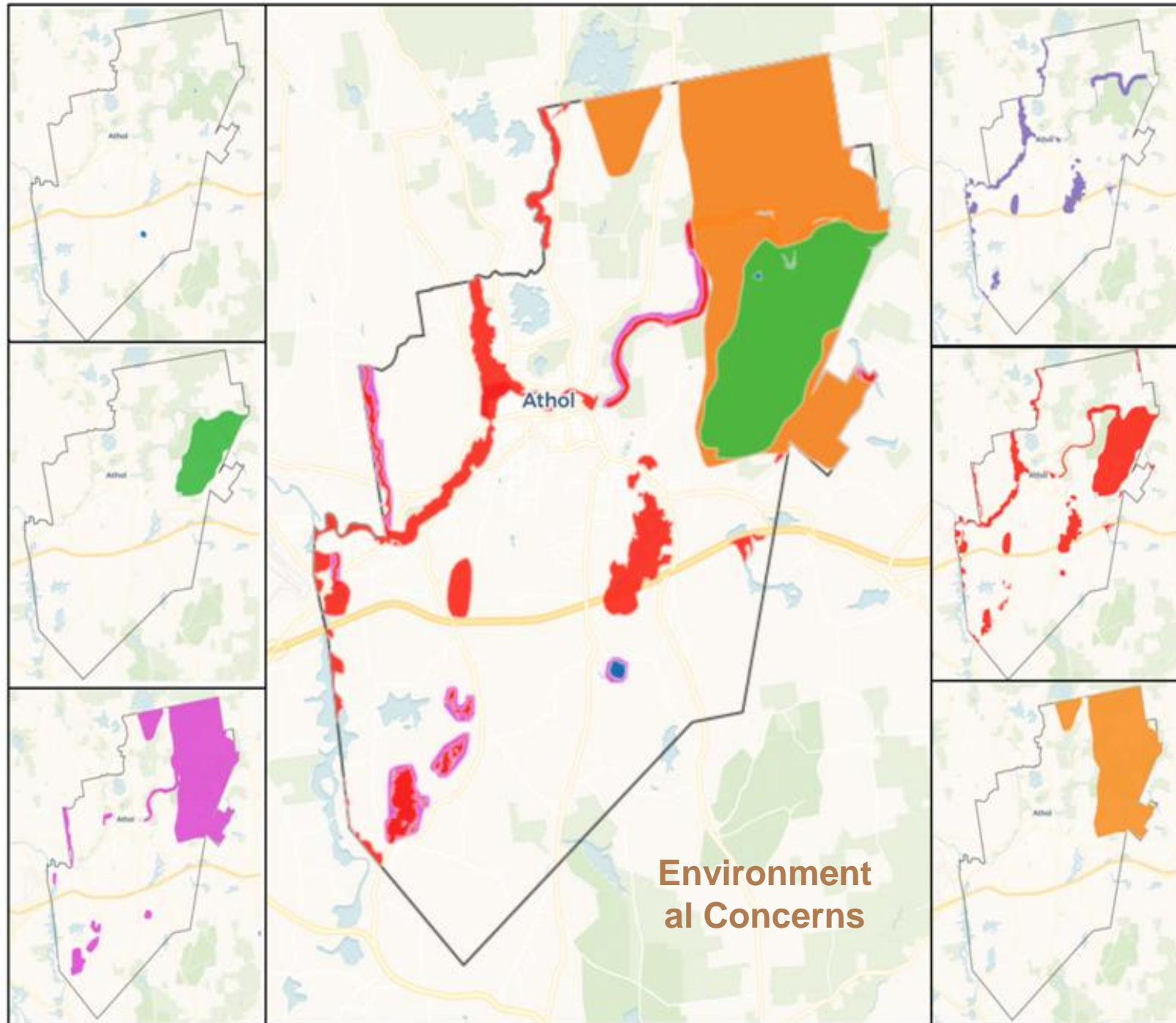
Core Habitat



Critical Natural Landscape



Species of Conservation Concern





# Temperature and Threatened Species

Appropriate  
Climate



Northern Long-Eared Bat



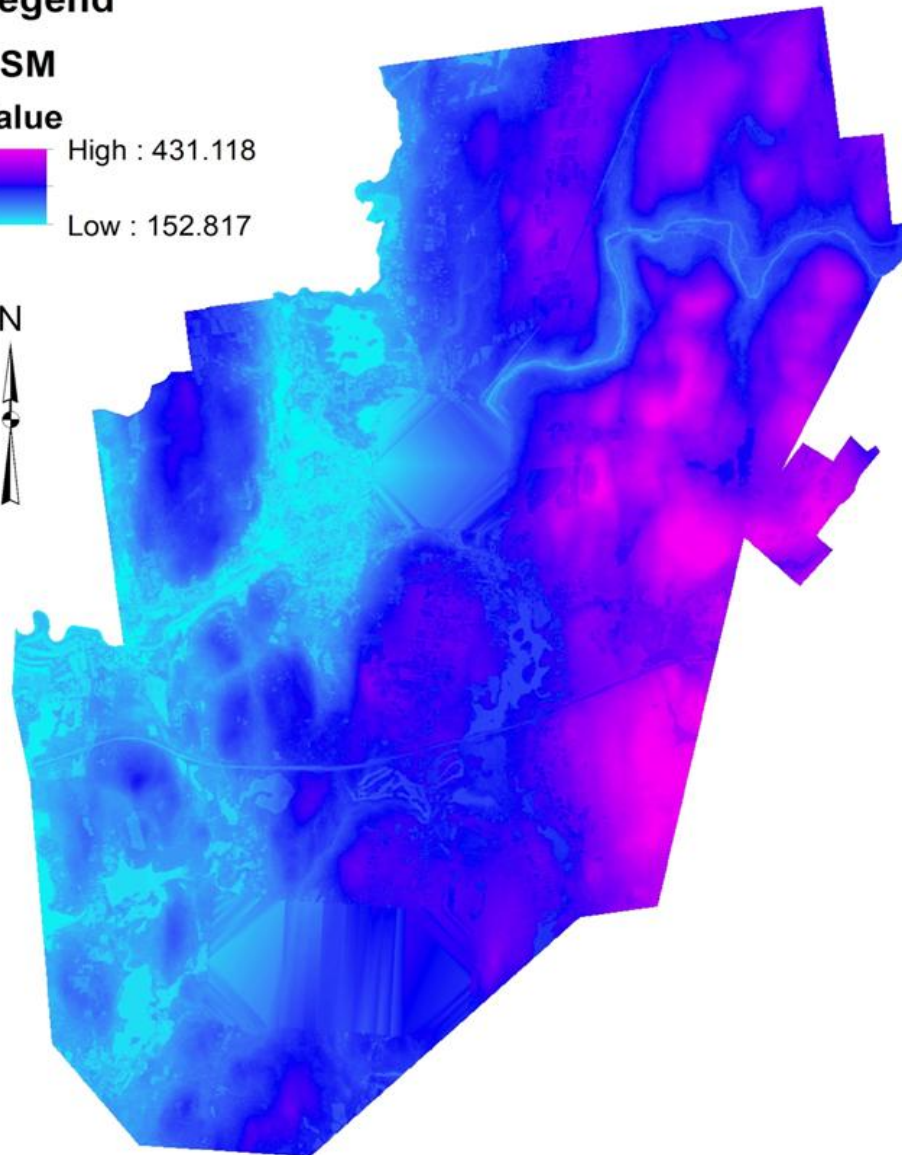
## Legend

### DSM

#### Value



N



## Potential Sites and Visible Areas

### Legend

- potential\_site1
- potential\_site2
- potential\_site3

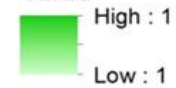
### Visible\_Area\_1

#### Value



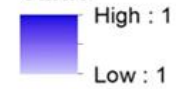
### Visible\_Area\_2

#### Value

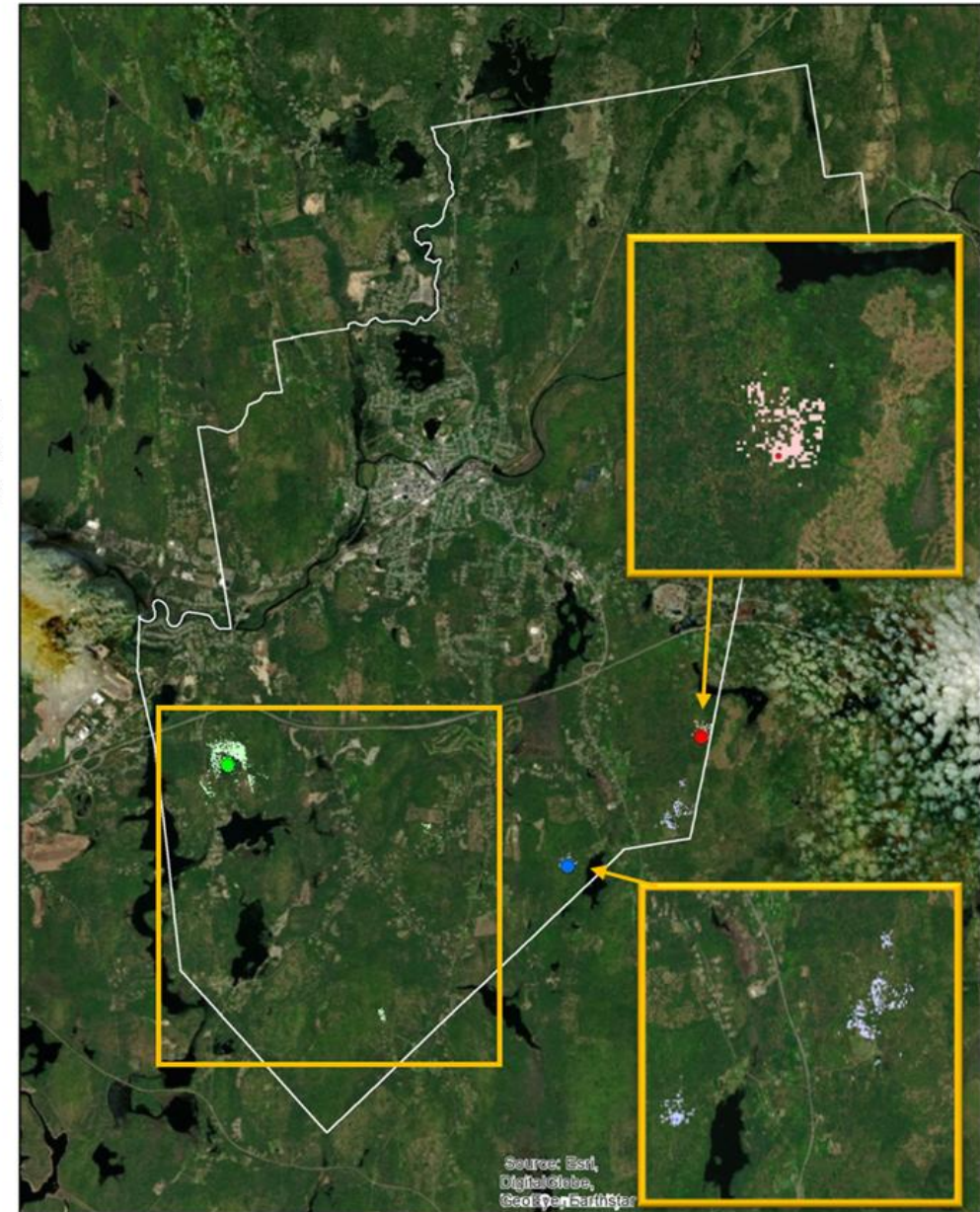


### Visible\_Area\_3

#### Value



N





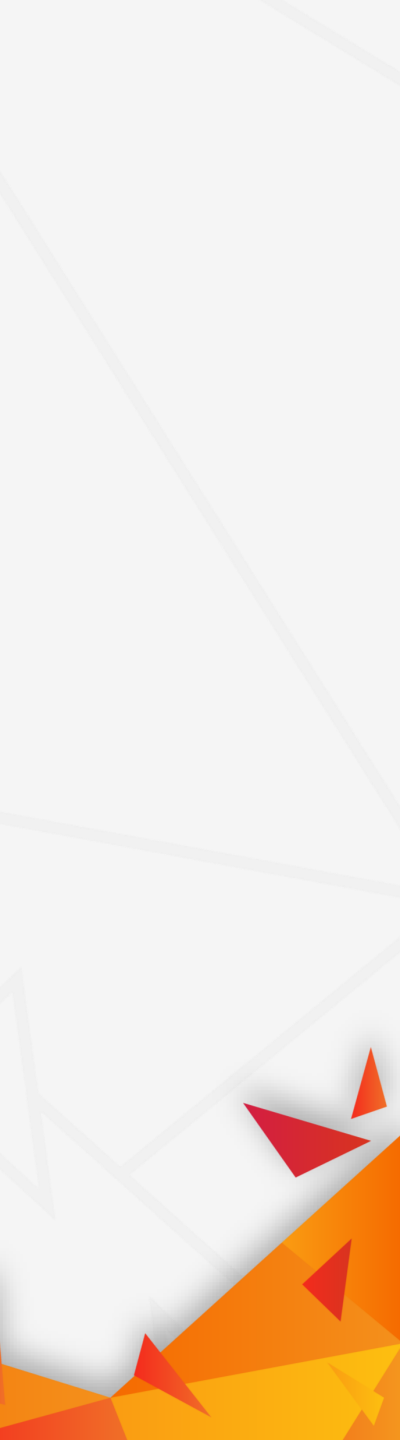
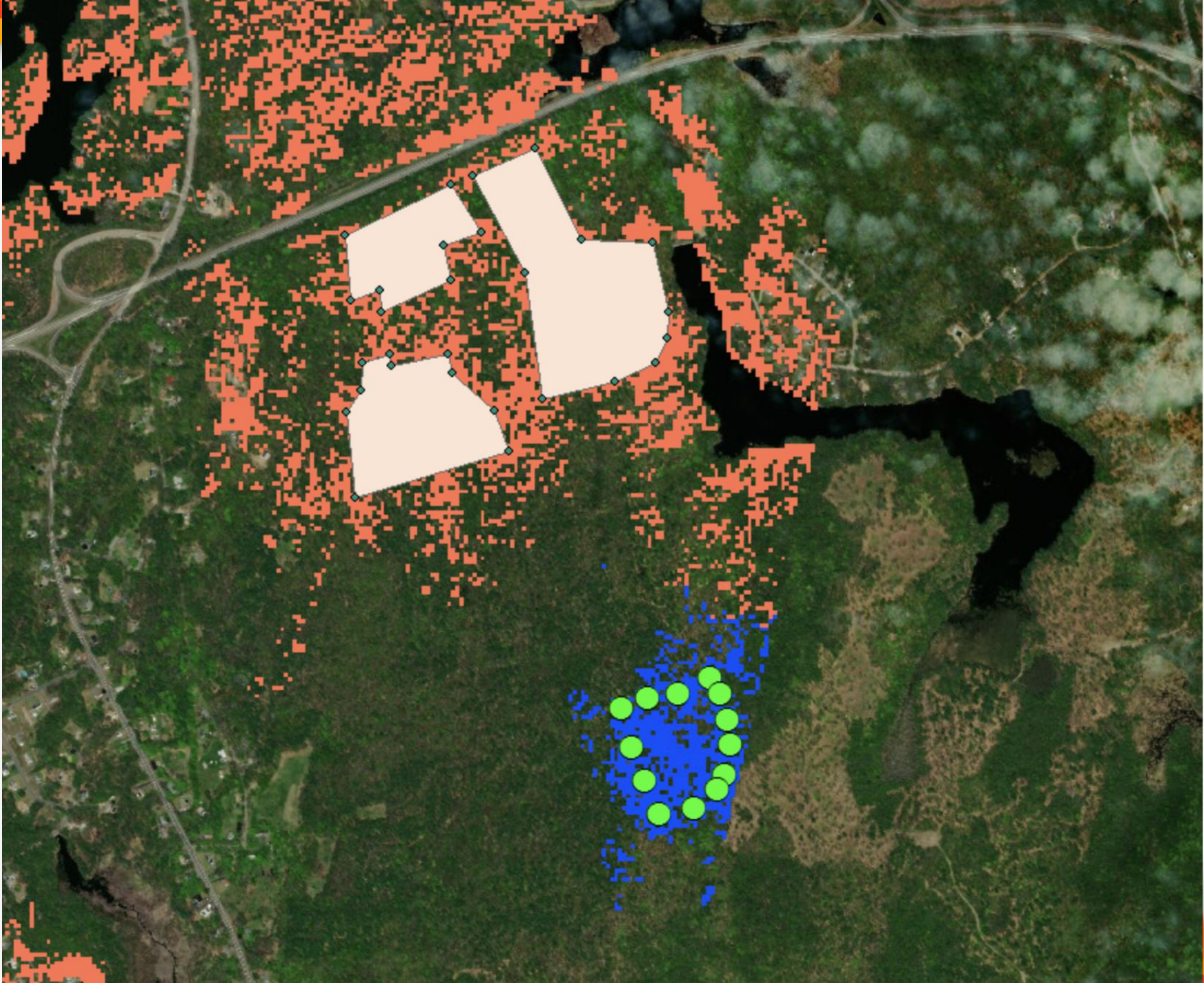
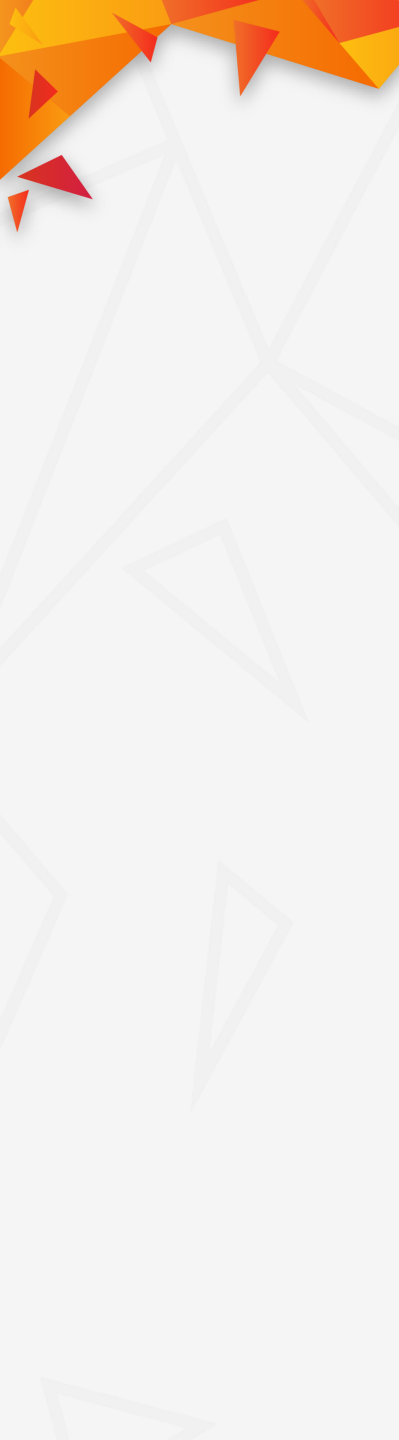


**Proposed secret lake site**



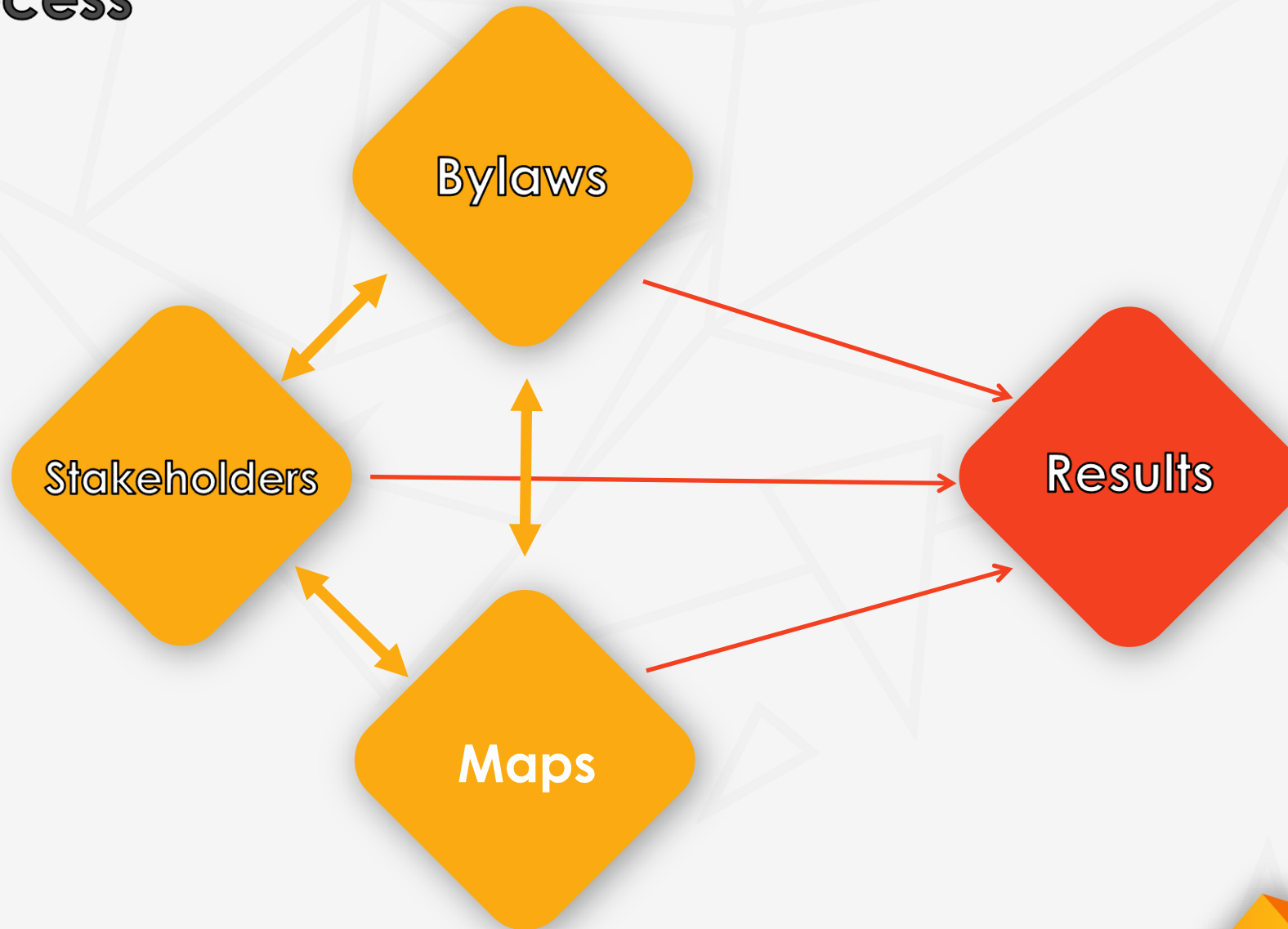
**Potential site select by team**







# Process





# Innovative Zoning Bylaw Criteria

## Medium Priority

**The requirement of a  
pre-application  
conference between  
the town's planning  
staff and the  
applicant**

## High Priority

**Land Clearing  
Soil Erosion  
Habitat Impacts  
revisions  
Landscaping  
Screening revisions**

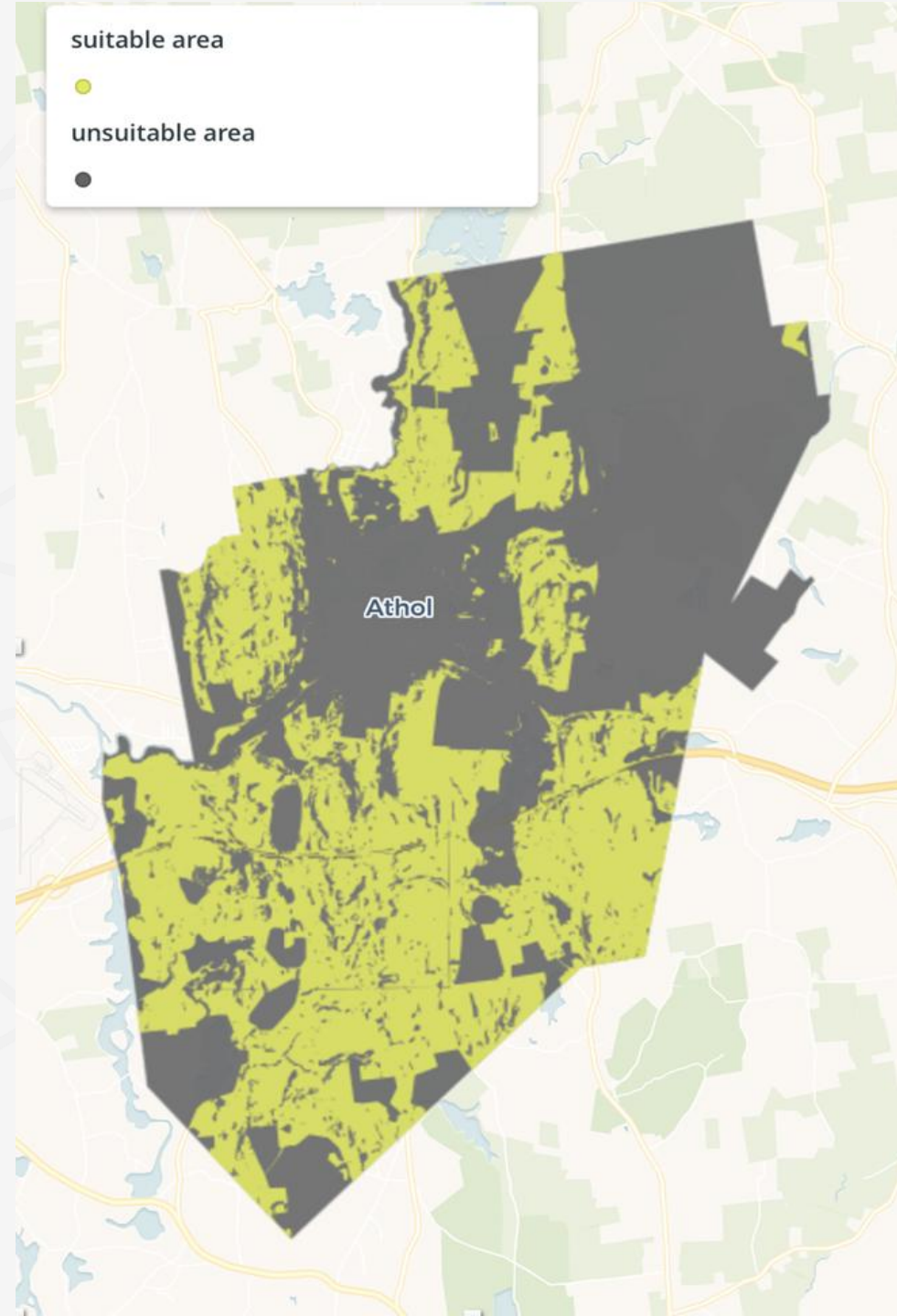
## Low Priority

**Documentation by  
an acoustical  
engineer of the  
noise levels  
projected to be  
caused by the  
installation**



# Prioritized Ideal Sites

**This map was generated by using data on slope, wetland, land use and zoning, local and state protected area, and other environmental concerns.**







# Conclusion

**We hope these comprehensive and sensitive solar zoning bylaws recommendations will:**

- 1) Allow the community to better meet its goals**
- 2) Be seriously considered and eventually integrated into the town's solar zoning bylaw**
- 3) Be beneficial to other municipalities as they go through the process of developing, strengthening, and evaluating their solar bylaws.**