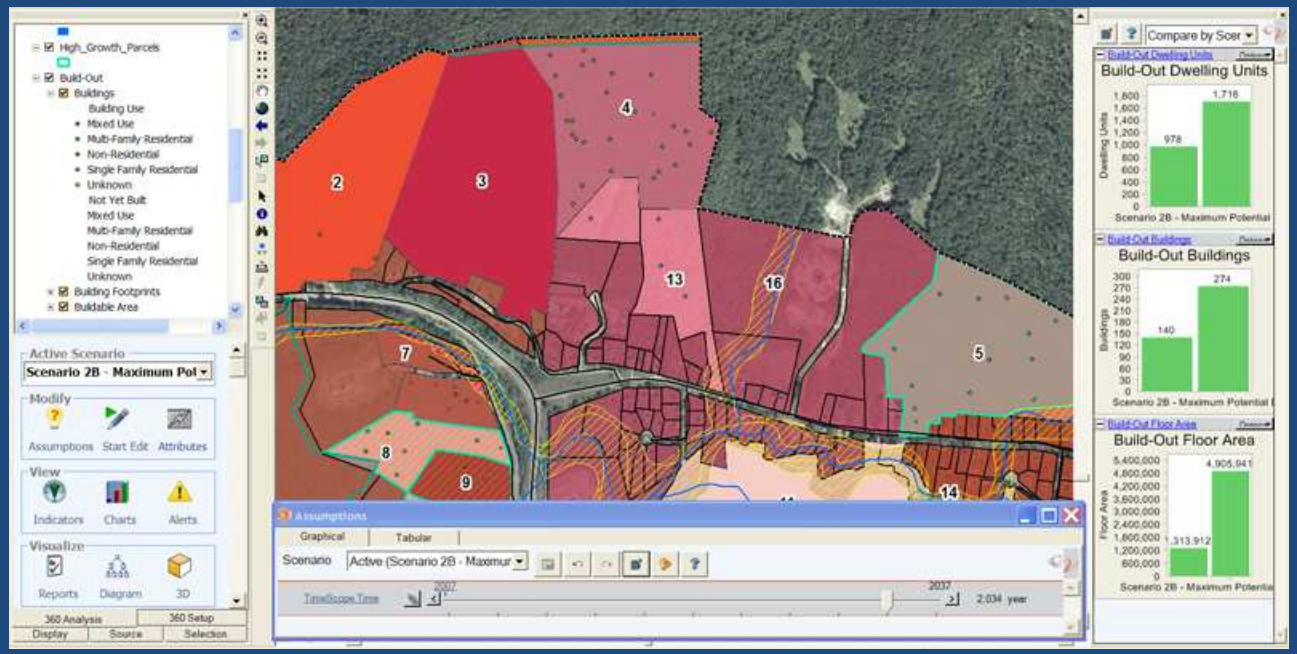
Introduction to CommunityViz



March 11, 2008

McLane Center at Silk Farm

Presented by the University of New Hampshire/NH GRANIT , the Jordan Institute, & NH Audubon with support from the NH GIS Conservation Collaborative

Today’s Agenda

10:00

- Introductions
- What is CommunityViz?

10:30

- Build-out analysis with CommunityViz
- Basic build-out results
- Data requirements for basic build-outs
- Advanced analysis outputs
- Sharing results
- Program demonstration

11:30

- Case studies
- Community responses

12:00 Lunch

12:30

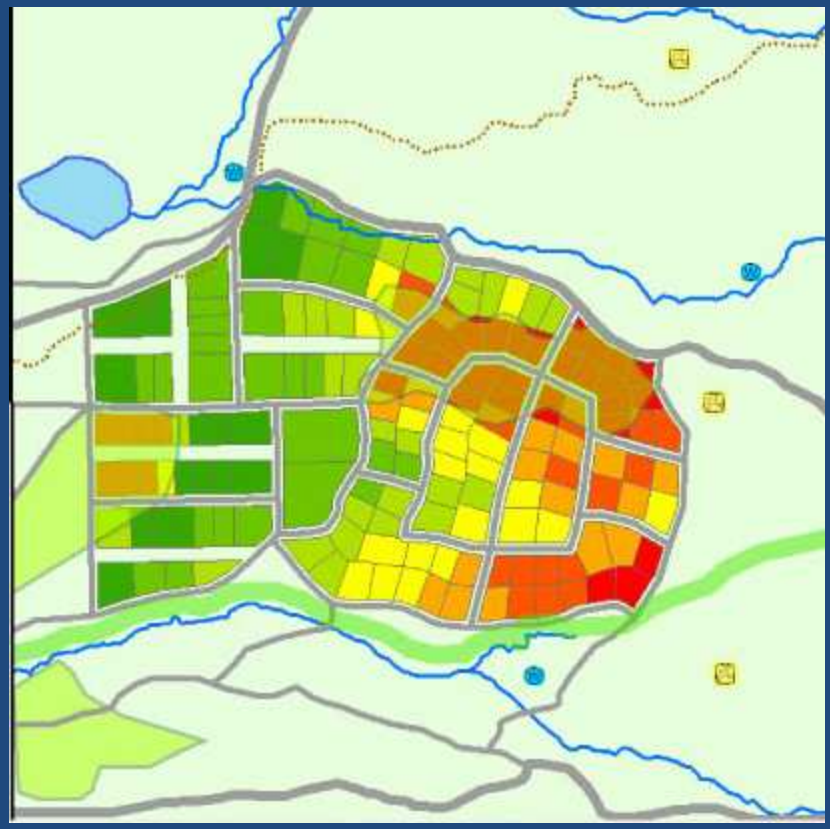
- Funding opportunities
- Web and other resources

What is CommunityViz?

"Advanced yet easy-to-use GIS software designed to help people visualize, analyze, and communicate about important land use decisions."
(communityviz.com)

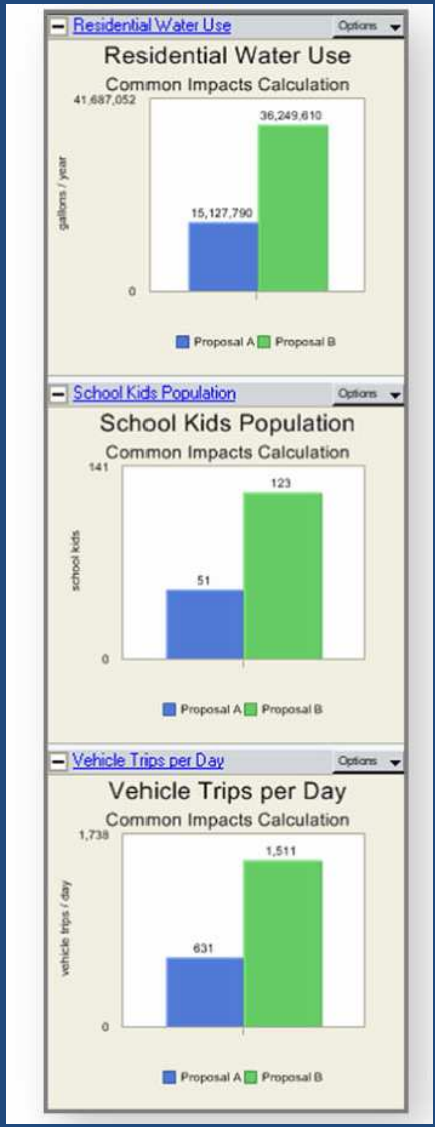
Questions CViz can help answer

How suitable is a particular location for a new development?



Questions CViz can help answer

How might a zoning change affect important indicators of town health, prosperity, and environmental impact?

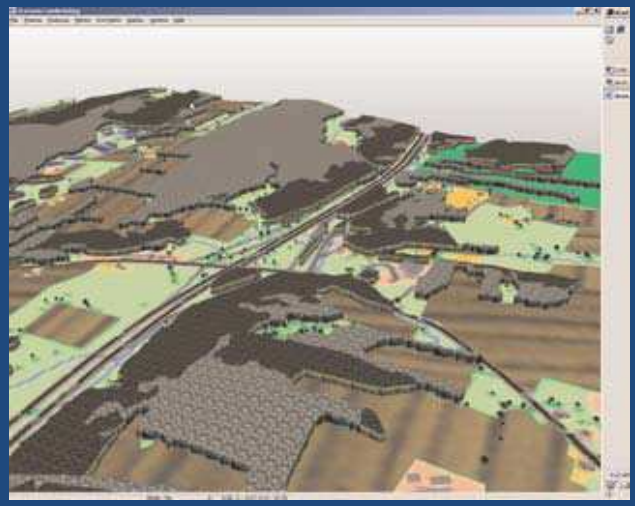


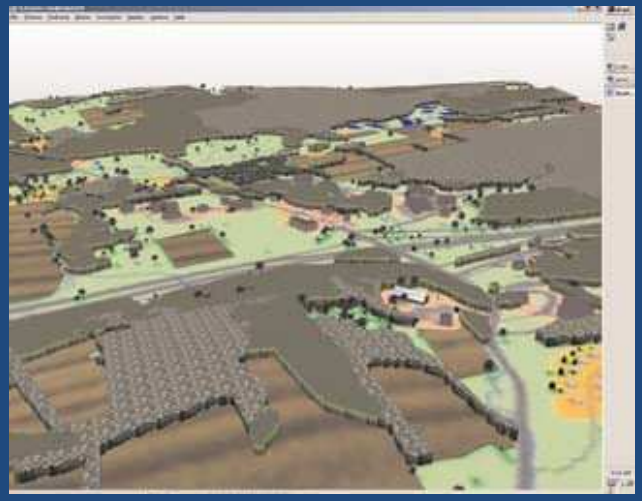
Questions CViz can help answer

At its current growth rate, how will a town's appearance change over time?

Questions CViz can help answer

Which future development scenario does a community prefer?

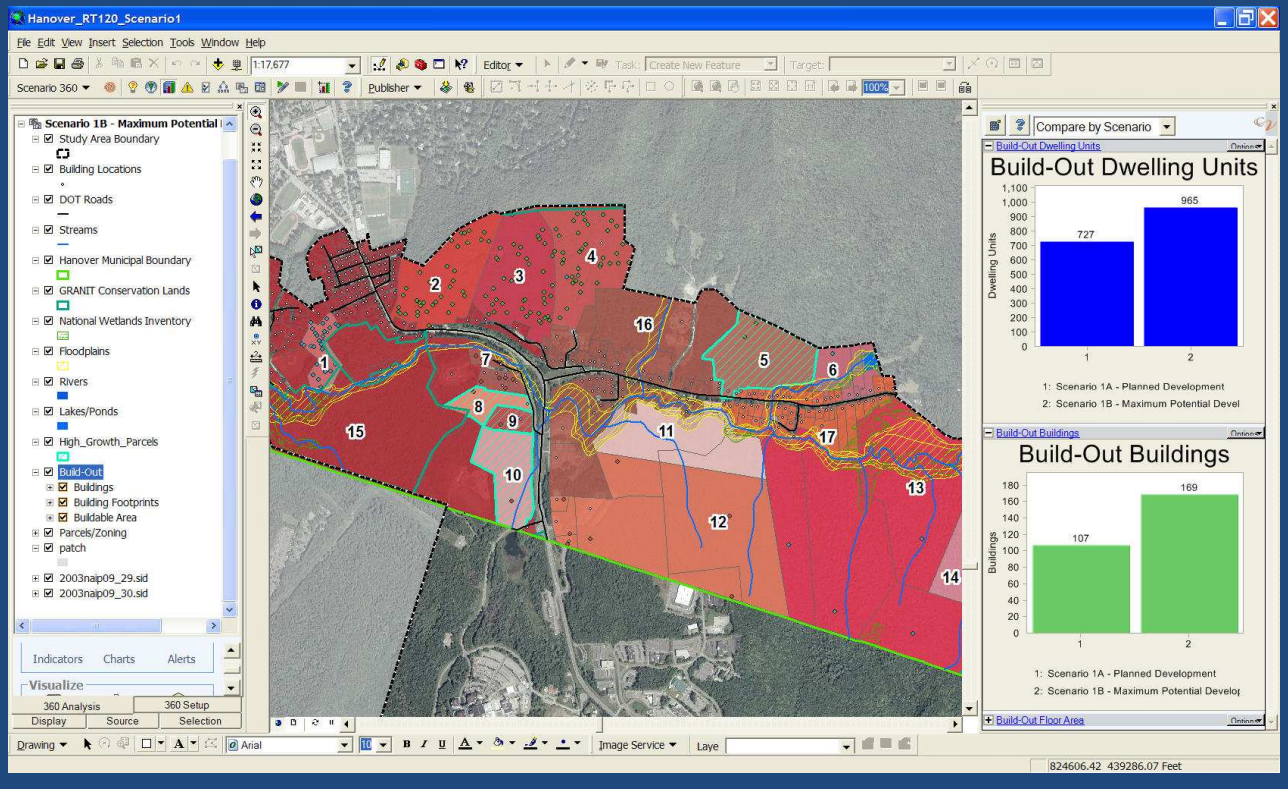




Build-Out Analysis

What is a build-out analysis?

- Places future hypothetical buildings on a map according to land-use designations.
- Can be used to create many different scenarios for evaluation.
- Estimates the numeric capacity as well as spatial distribution of buildings in a scenario.



Build-out process involves three separate, but integrated steps:

1. Numeric build-out
   - Provides an estimated building capacity (in numbers) for each parcel in the layer

2. Spatial build-out
   - Places building points on a two-dimensional map

3. Visual build-out
   - Associates spatial build-out building points with three-dimensional models

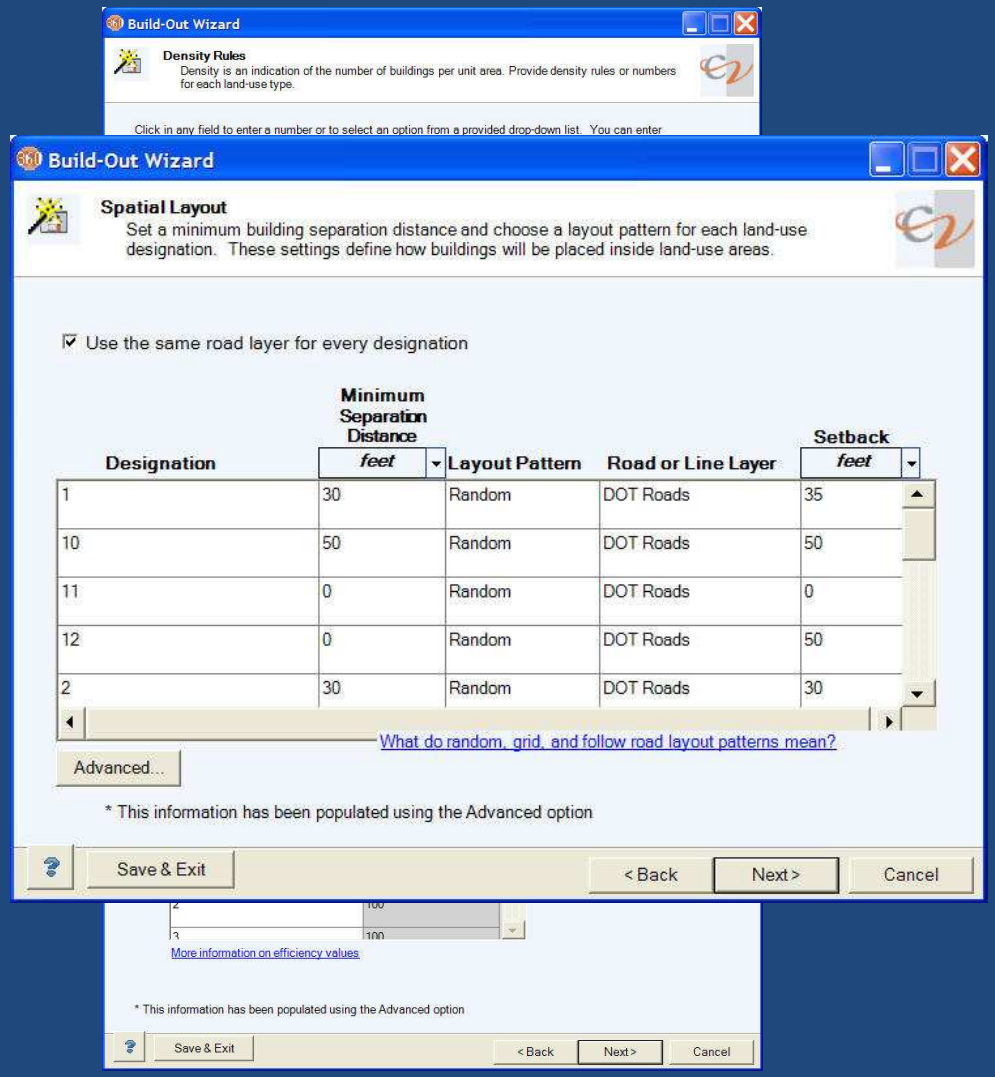
Inputs to build-out analysis…

1. Numeric:

- Density Rules and Efficiency Factors
- Building information
- Constraints to development
- Existing buildings

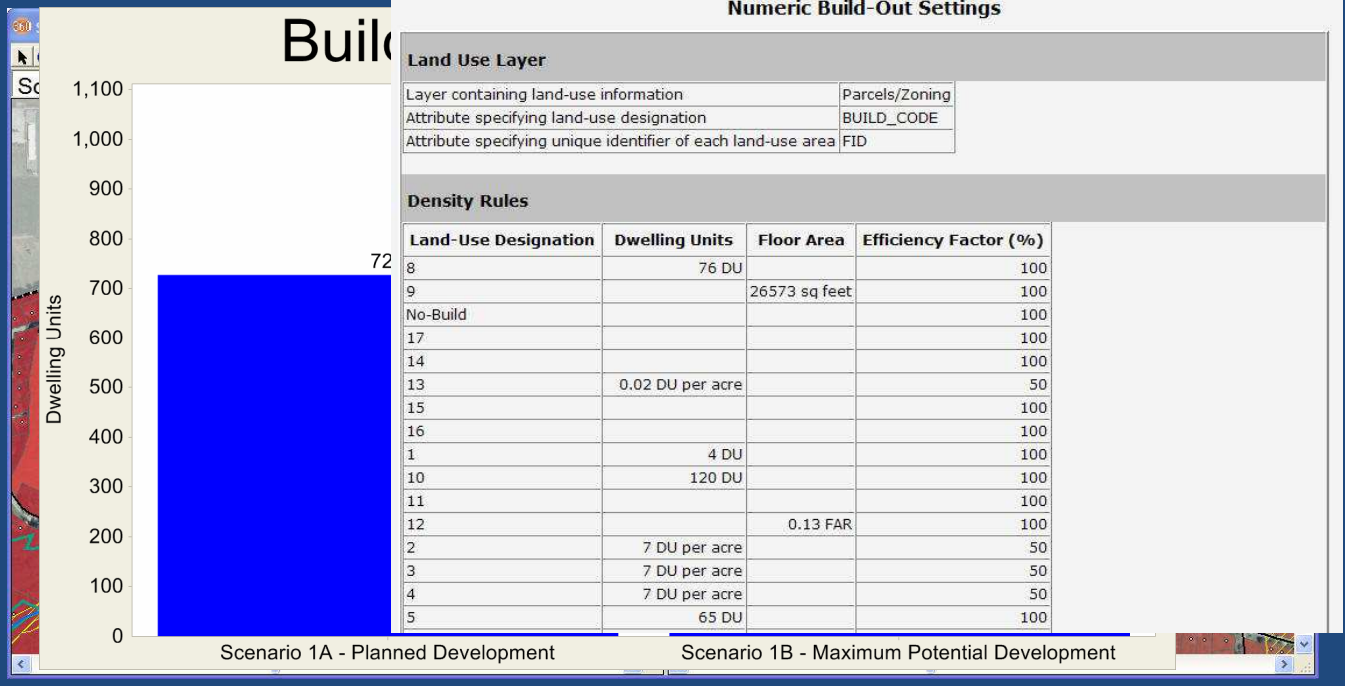
2. Spatial:

- Separation distances, setbacks, and layout patterns



Results can be displayed as…

- Maps
- Charts
- Reports



Build-Out Report - Scenario 1A - Planned Development
Analysis Name: Hanover_RT120_Scenario1
Wednesday, August 15, 2007, 8:38 AM

Report Contents

Numeric Build-Out Settings
Spatial Build-Out Settings
Results

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

☑ Numeric Build-Out has been run
☑ Spatial Build-Out has been run
☒ Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer

Layer containing land-use information	Parcels/Zoning
Attribute specifying land-use designation	BUILD_CODE
Attribute specifying unique identifier of each land-use area	FID

Density Rules

Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
8	76 DU		100
9		26573 sq feet	100
No-Build			100
17			100
14			100
13	0.02 DU per acre		50
15			100
16			100
1	4 DU		100
10	120 DU		100
11			100
12		0.13 FAR	100
2	7 DU per acre		50
3	7 DU per acre		50
4	7 DU per acre		50
5	65 DU		100

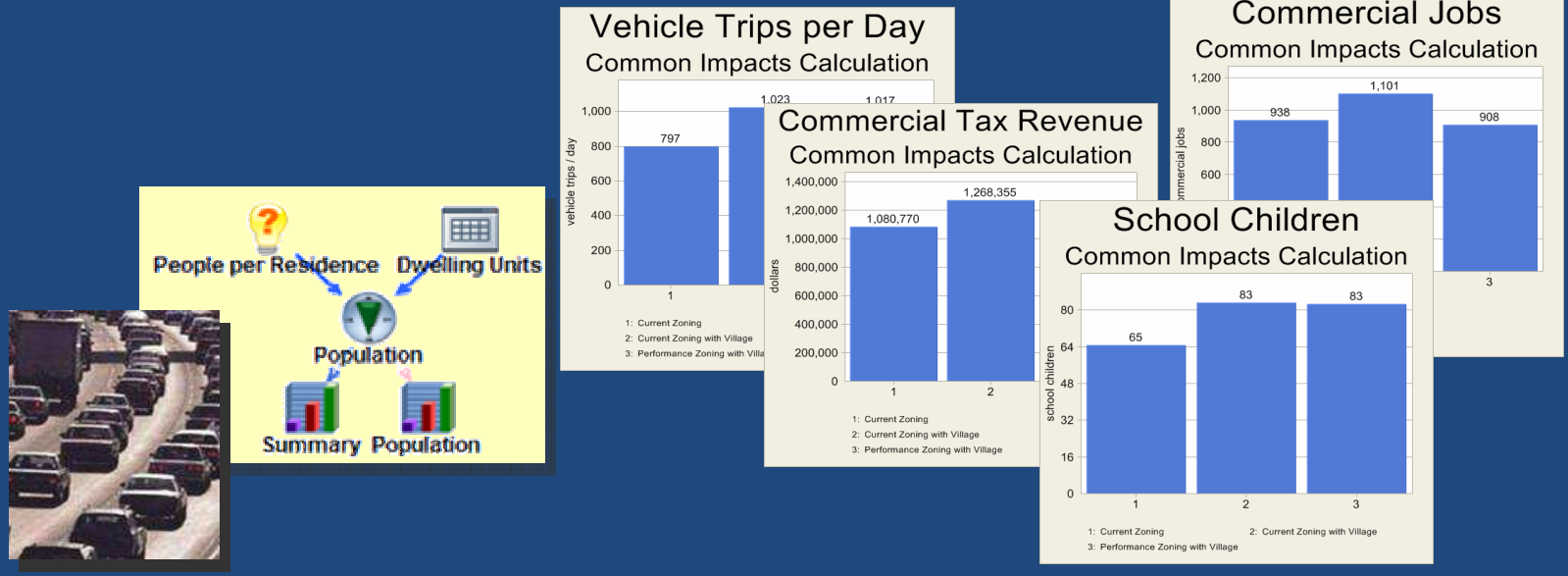
Requirements for build-out analysis…

- Tax parcel data with zoning information attached
- Building locations with descriptive information
- Road centerline data
- Zoning ordinance
- Constraints data
- Close working relationship between GIS Analyst and Planner

Advanced Analysis Outputs

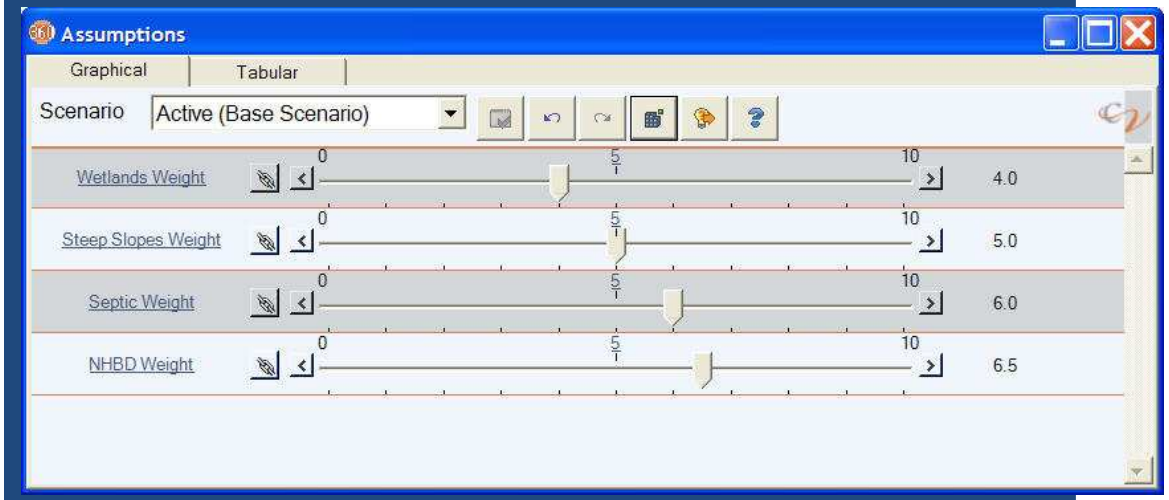
Common Impacts Analysis

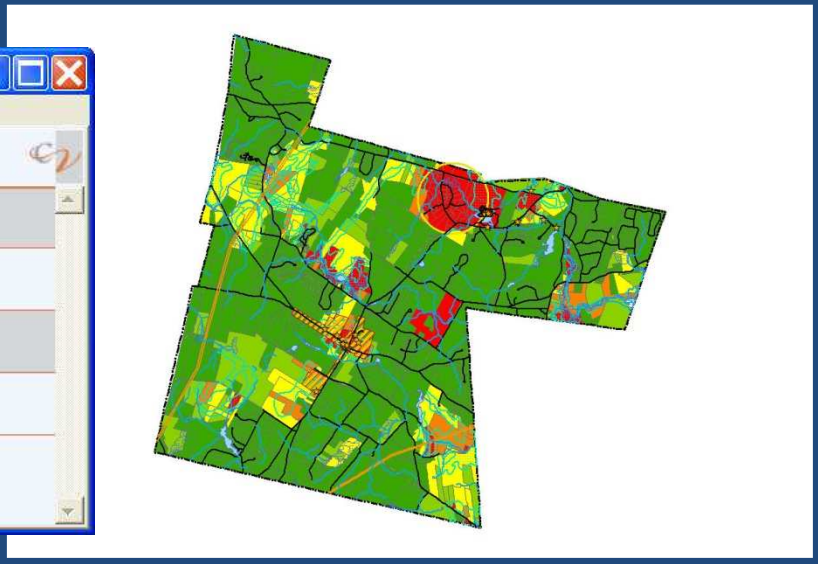
- Automatically create socioeconomic and environmental impact analyses based on projected growth.
- Analyze impacts on auto emissions, energy use, tax revenue, water use, school kids …



Suitability Analysis

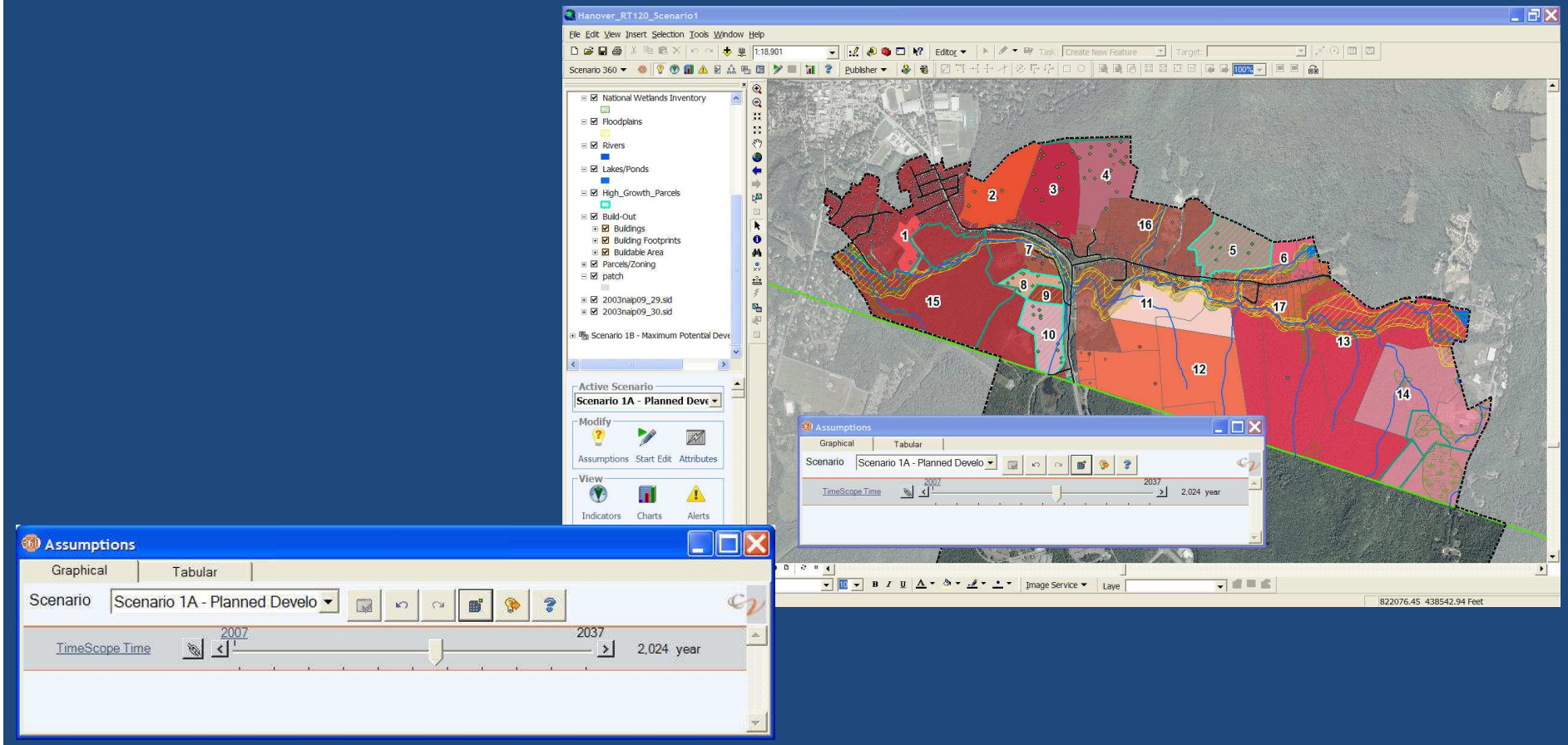
- Assess the desirability of locations, e.g. where houses are most likely to be built (could be based on land cost, accessibility or other constraints to development).





Time Scope Analysis

- Model development over a specified period of time using growth rate and building sequence.



Sharing Results

A couple of free programs …

- Google Earth (kmz)
- CommunityViz Analysis Viewer

Software Demonstrations

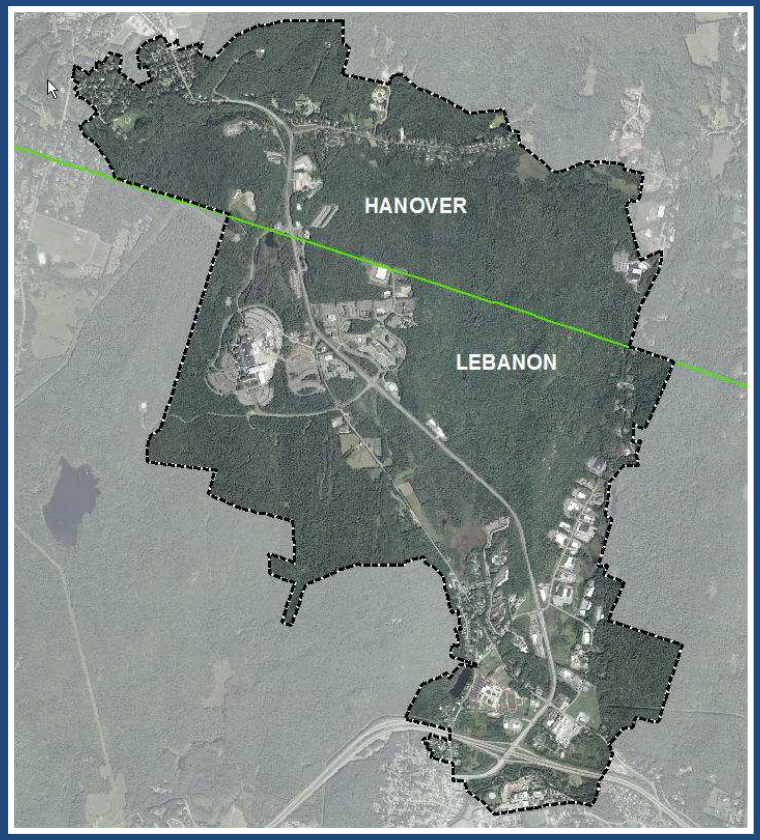
Sample projects …

- Build-out analysis results with Time Scope
  - *Route 120 Corridor Management Plan, Hanover and Lebanon, NH*
- Fundraising potential
  - *Dover Mounted Police Unit*

Route 120 Corridor Management Plan

The Story: Background

The Route 120 Corridor is a valuable intercity and regional resource, linking two important New Hampshire municipalities in the Upper Valley of the Connecticut River - the City of Lebanon and the Town of Hanover. This resource includes Route 120 and associated infrastructure, existing development, vacant land, and natural resources. It plays a major role in the economic health of both communities and, very importantly, is the access from two interstates to Dartmouth Hitchcock Medical Center (DHMC) and the Centerra Business Park.



Route 120 Corridor Management Plan

The Story: Traffic

- Traffic has more than doubled on Route 120 since DHMC moved there from downtown Hanover:
  - 1989: 10,132 vehicles per day
  - 2004: 21,225 vehicles per day

Dartmouth Hitchcock Medical Center

- Increasing commuting distances due to lack of housing

- Peak hour congestion = back-ups onto I89

Route 120 Corridor Management Plan

The Story: Development Pressure

- In the past, improvements have been based on reaction to development, rather than planning ahead before development occurs.

- If market forces alone continue to shape future growth, the Route 120 area would continue to grow as a single use corridor likely necessitating expensive infrastructure improvements to mitigate travel demand.

Route 120 Corridor Management Plan

The Solution: Take a more proactive management approach

Phase I:

- Facilitate cooperation between Route 120 Corridor communities
- Encourage public participation in the planning process
- Gather data and enumerate existing conditions
- Develop build-out scenarios estimating potential growth

Phase II (awaiting funding):

- Identify options and alternatives for the use of the corridor
- Recommend initiatives that each community can pursue for the betterment of the corridor, including strategies for developing access management programs, corridor-specific land use policies, fiscal plans, capital improvement programs, and planning for any required long-term investments within the corridor

Route 120 demo …

Dover Mounted Police Unit

The Story:

The Dover Mounted Police Unit (DMP) was initiated as part of the department's proactive approach to crime prevention, while re-allocating limited resources to provide more effective service. The DMP is a practical approach to specific law enforcement problems, providing increased visibility and approachability.

The DMP currently receives no tax funding. Therefore, they look to the community for sponsorship and volunteer support. As the DMP spends most of their time patrolling the downtown district, they have gained the moral and financial support of many of the downtown business owners. Other sources of sponsorship are somewhat unpredictable. The DMP could benefit from a more stable source of sponsorship from the greater Dover community.

The Dover Mounted Police comprises two full-time officers, one part-time officer, three Percheron draft horses, and a fleet of citizen volunteers.

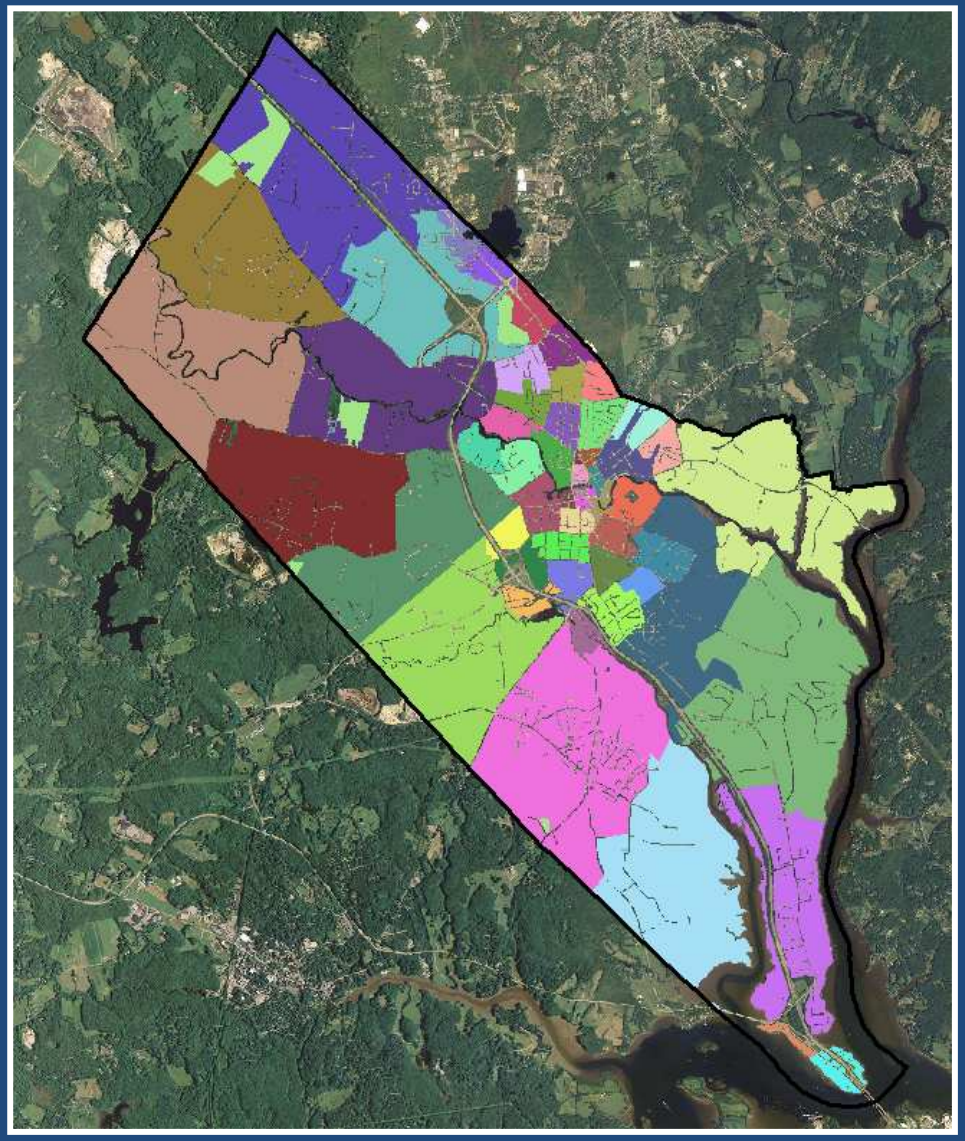
The Paddock Project

The DMP has found that the citizens of Dover are very responsive to events where they can personally meet the unit, and have pictures taken of their children with the horses.

The Paddock Project would leverage this enthusiasm by offering DMP memberships to Dover families, and rewarding these contributions with special DMP visits to their neighborhoods.

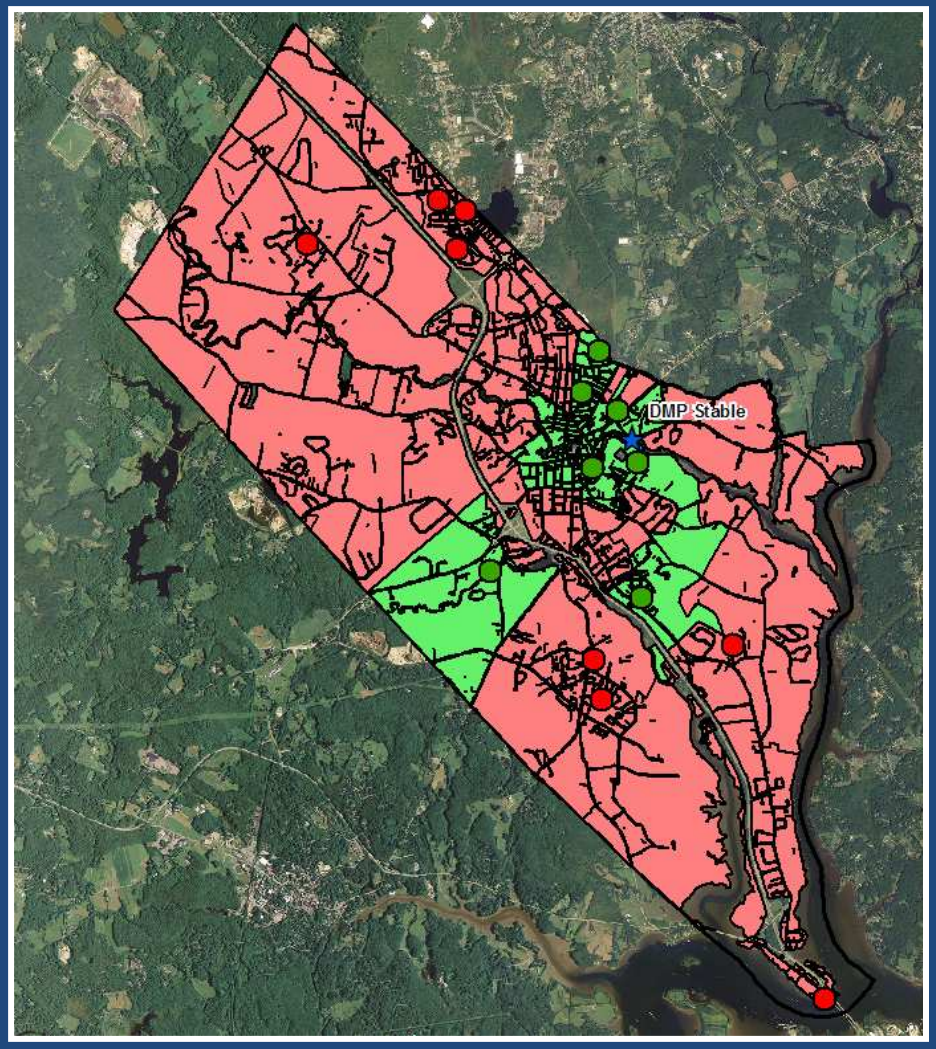
The Paddock Project Concept

Divide the City of Dover into “Neighborhoods”...



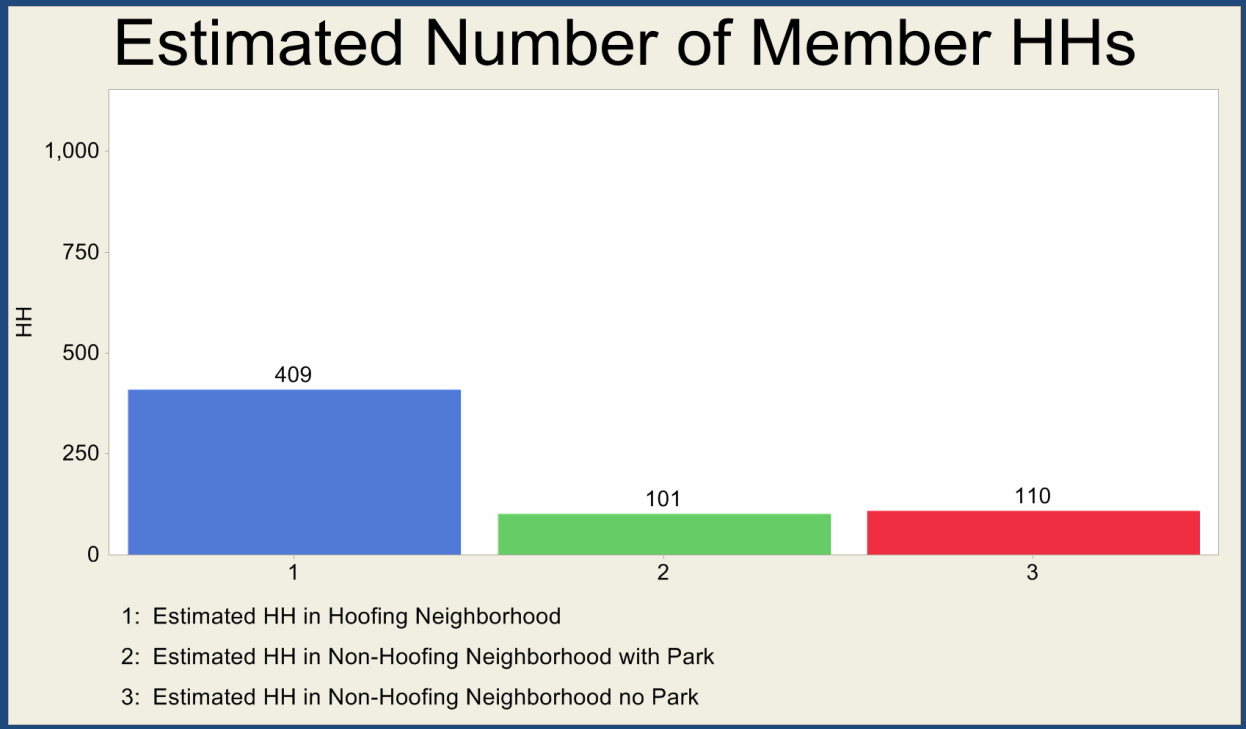
The Paddock Project Concept

Identify those “Neighborhoods” that contain a park that the horses can visit, and determine the distance from the DMP Stable to the park. Is the park close enough to the stable that it is “hoofable”? Or would the DMP need to trailer the horses to the park?



The Paddock Project Concept

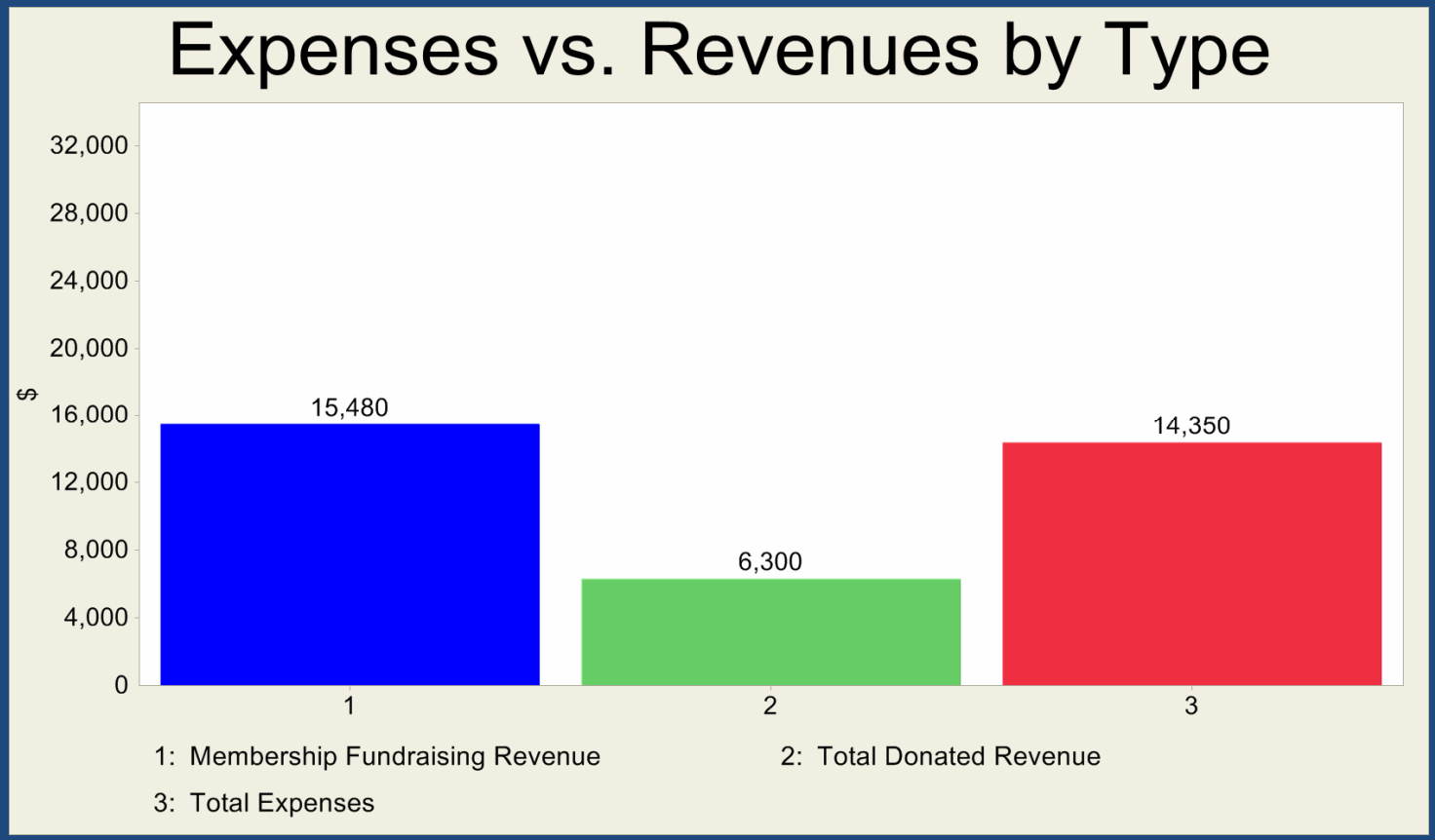
Estimate the number of households in each “Neighborhood”, the percentage of households in each “Neighborhood” that purchase memberships, and the average contribution per household. Those “Neighborhoods” that raise a target amount of funding will receive special visits from the DMP at their park.



It is assumed that those “Neighborhoods” that are not within “hoofing” distance, or that do not have a park, will generate fewer memberships. Those “Neighborhoods” that do not have parks would be invited to a visit elsewhere in town.

The Paddock Project Concept

Assess the annual membership fundraising revenue, revenues from other sponsorships/donations, and DMP expenses. Determine the overall fundraising potential for the DMP.



Dover Mounted Police demo …

Case Studies

Chester, Hooksett & Salisbury

Goals:

How wildlife habitat protection can be incorporated into town planning

How the alternative scenario concept can inform local decision making

Funding was provided by NH Fish & Game Department and the Jessie B. Cox Charitable Trust

Case Studies Overview

- 4 scenarios
- Used CTAP methodology and template

- Constraints
- Data
- Methods
- Maps
- Indicator charts
- Lessons learned in each community

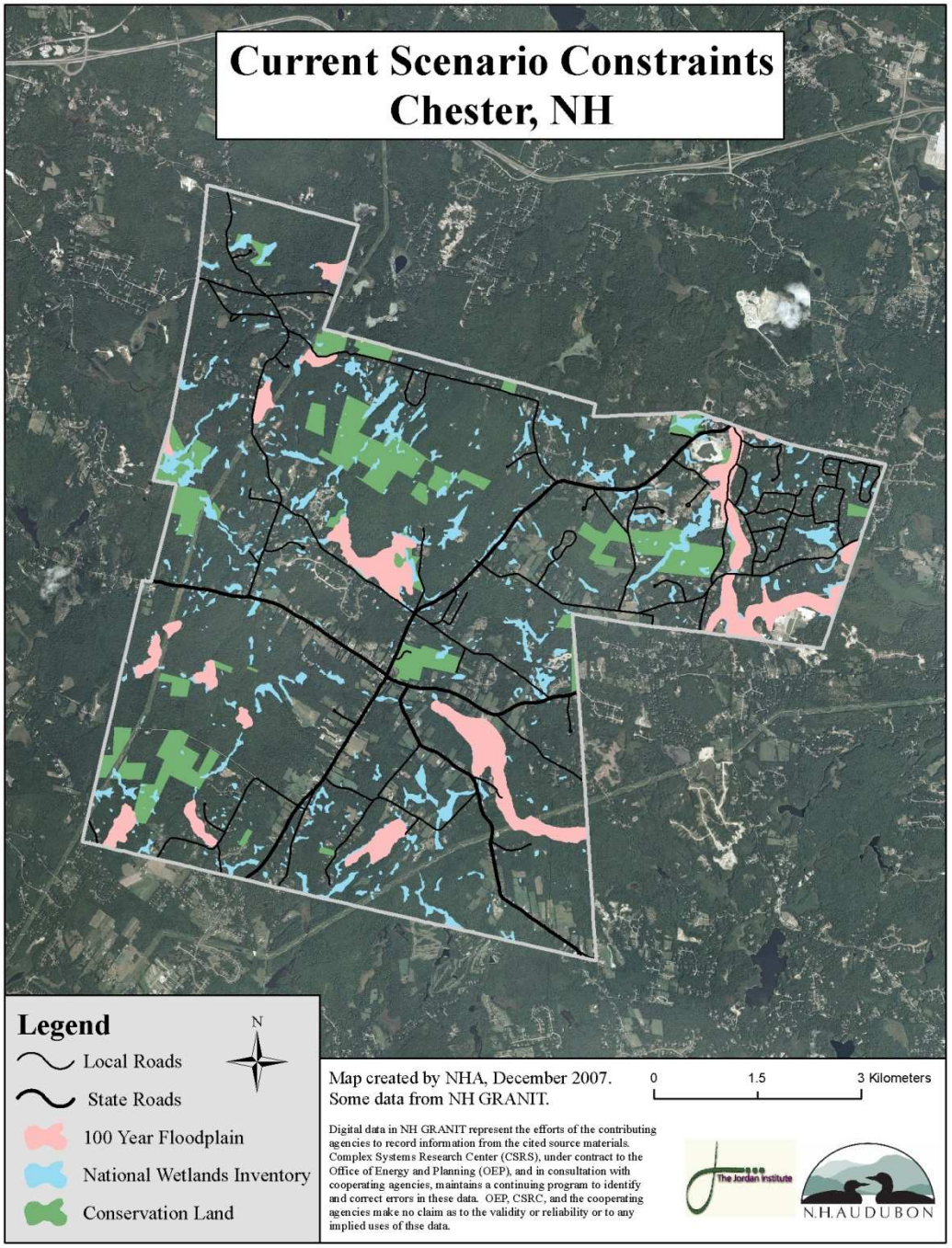
Current Scenario

Current regulations (setbacks, lot size)

NWI wetlands

Conservation Land

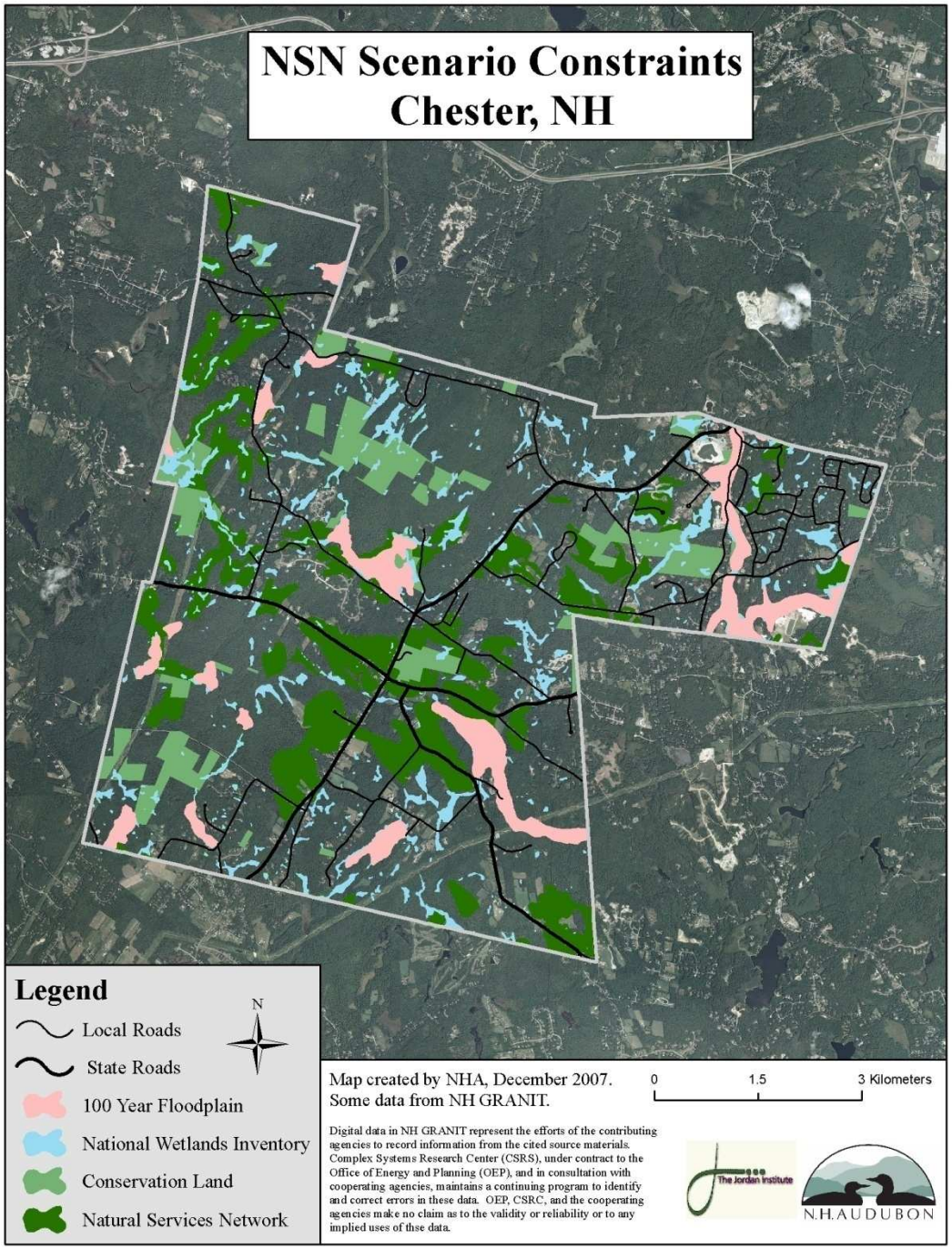
100-Year Floodplain



NSN Scenario

Allowable densities were adjusted to allow for a growth neutral scenario

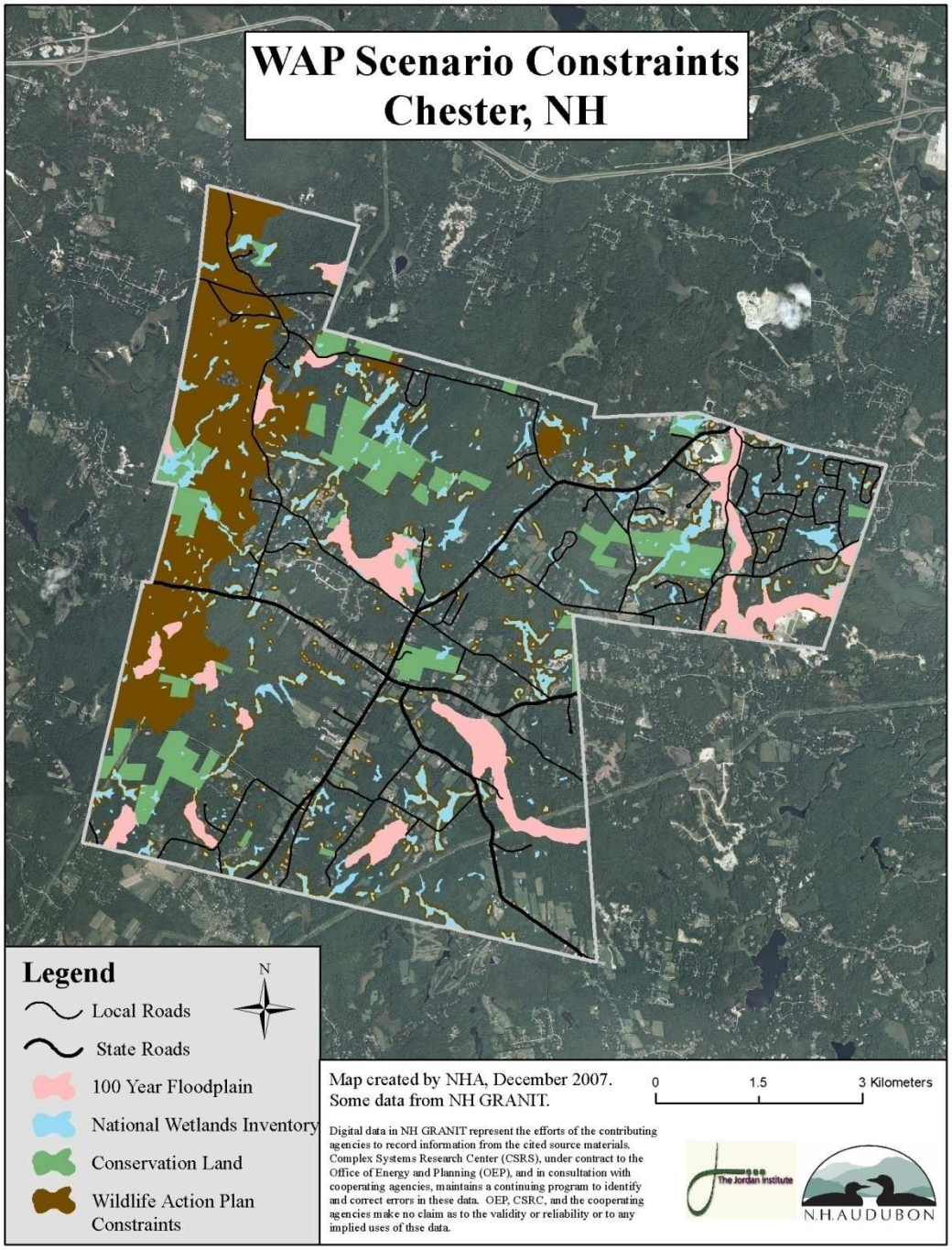
NSN added as a constraint



WAP Scenario

Different for each town

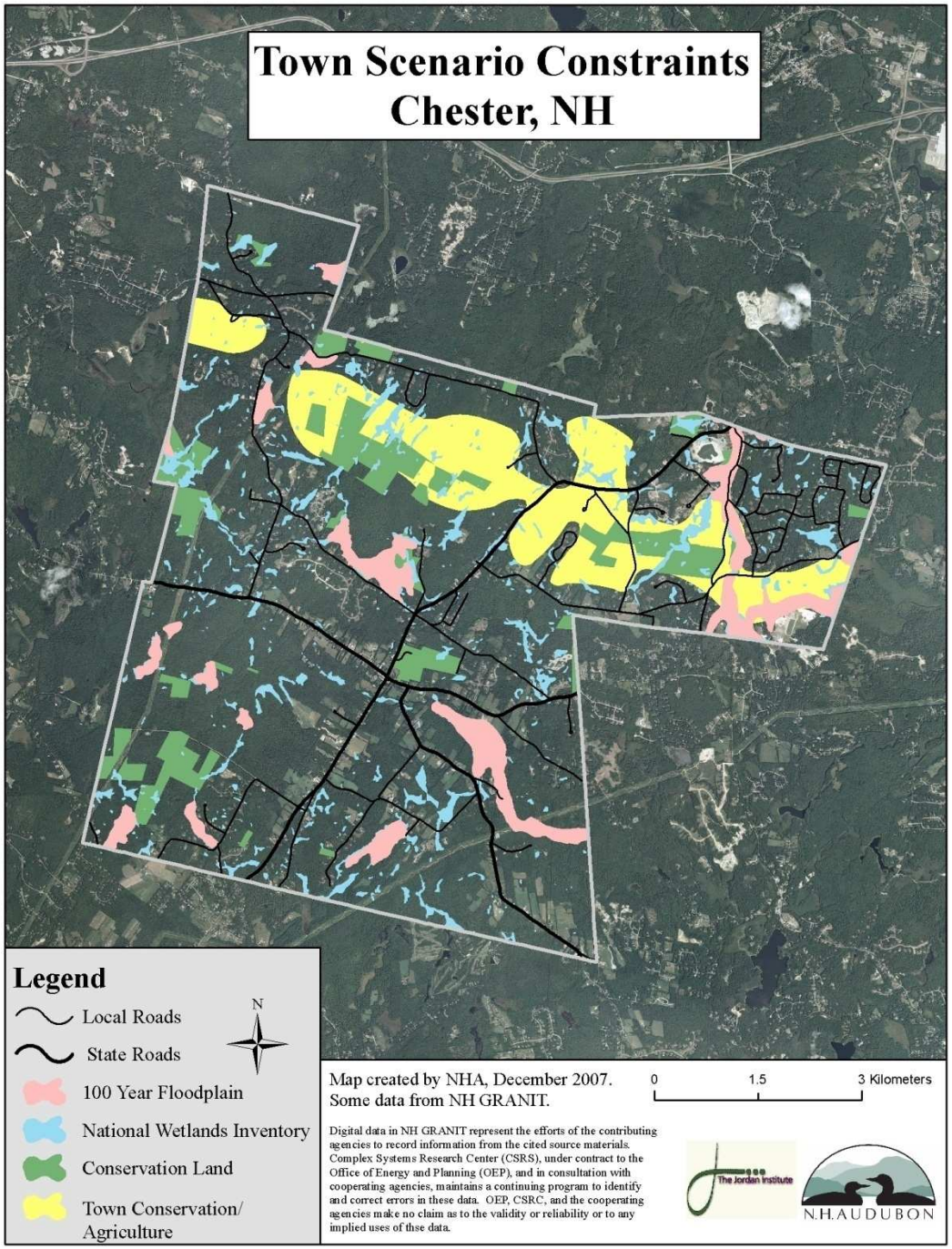
Certain WAP habitats or areas constrained in addition to base constraints

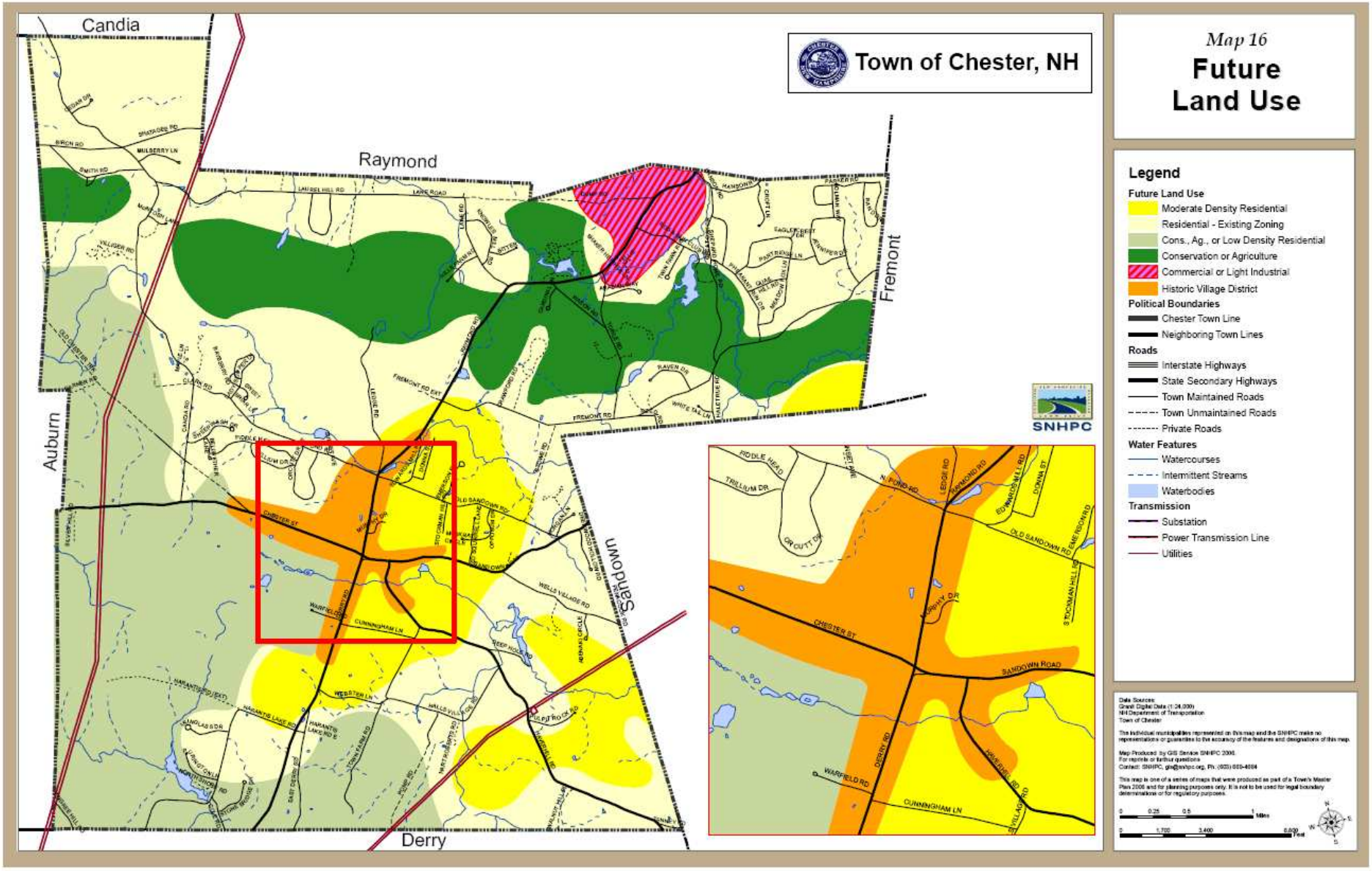


Town Scenario

Based loosely on features of the Master Plan

New constraints added





Map 16

Future Land Use

Data Sources:
Grant: Digital Data (1:24,000)
NH Department of Transportation
Town of Chester

The individual municipalities represented on this map and the SNHPC make no representations or guarantees to the accuracy of the features and designations of this map.

Map Produced by GIS Service SNHPC 2008.
For reprints or further questions
Contact: SNHPC, gis@snhpc.org, Ph: (603) 669-4664

This map is one of a series of maps that were produced as part of a Town's Master Plan 2008 and for planning purposes only. It is not to be used for legal boundary determinations or for regulatory purposes.

0 0.25 0.5 1 Miles
0 1,700 3,400 6,600 Feet

Data Used in Analyses

Layer	Source	Constraint
100-Year Floodplain	FEMA	Yes
Amenities	DES, modified by NHA	No
Buildable Land (Chester, Hooksett)	Created by NHA using RPC data	No
Buildable Land (Salisbury)	Created by NHA	No
Community Centers	Created by NHA using DES data	No
Conservation Land	SPNHF	No
Current Buildings	Created by NHA	Yes
Land Use	Regional Planning Commission	No
Natural Services Network	Varies, see NH GRANIT	Yes
National Wetlands Inventory	USFWS	Yes
Roads	NH DOT	No
Sewer and Water Service	Regional Planning Commission	No
Tax Parcels	Regional Planning Commission	No
Wildlife Action Plan	NHFG	Yes
Zoning	Regional Planning Commission	No

Buildable Land

For CTAP towns:

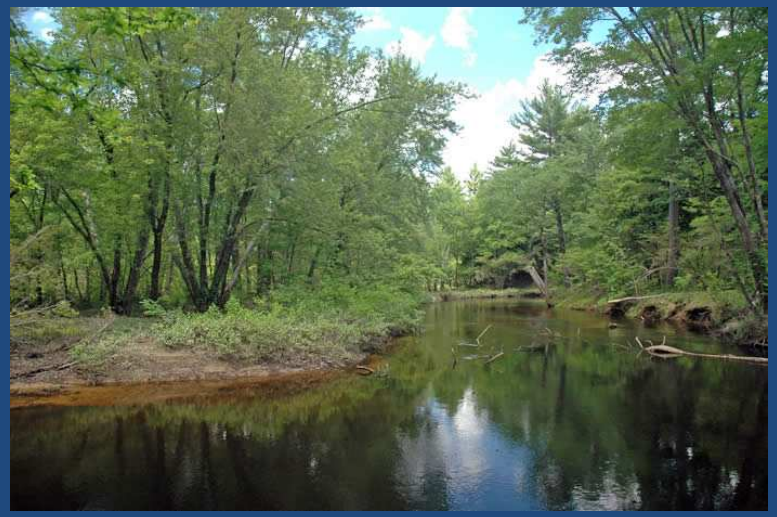
- Vacant
- Agricultural
- Brush or transitional between open and forested
- Forested land

- Barren land (except for strip mine/quarry or gravel pit)

Buildable Land

For Salisbury, no build on:

- Hydric soils A and B
- Conservation easement properties
- Blackwater floodplain
- Slopes greater than 30%



- Roads
- Water
- Gravel pits
- Cemeteries
- Recreational areas

Current Buildings

- Digitized based on most recent aerial image (2005/2006)
- Primary buildings only
- Single-Family Residential, Multi-Family Residential, or Non-Residential
- # Dwelling units or gross floor area
- Based on town assessment data

Build-out Methods

Current regulations were examined for:

- Allowable uses by right
- Minimum lot size or density, including changes to the above due to service availability
- Floor area ratio
- Other regulatory overlays
- Setbacks: front, side and back
- Lot set-aside requirements
- Any other regulation that would significantly affect new development

Assessing Build-out Impacts

- Common Impacts Wizard:

Automatically generates several commonly used impact indicators associated with growth and development over time

- Custom Template:

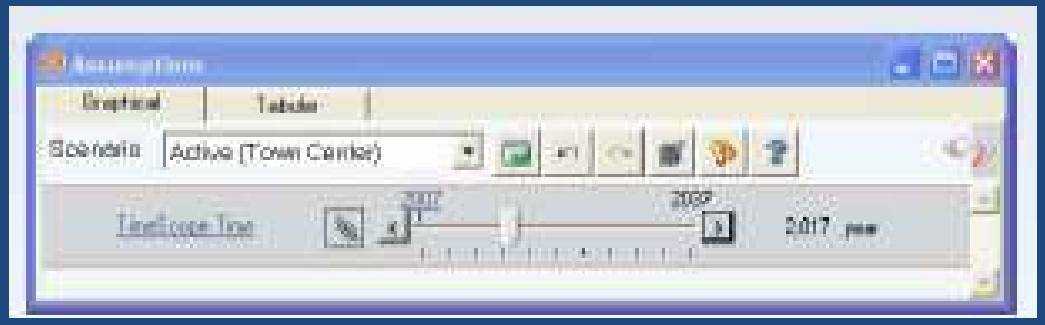
Approximately 40 indicators in these categories:

Build-out totals
Transportation
Municipal Demands
Demographics and Employment
Water and Energy Use
Land Use Characteristics

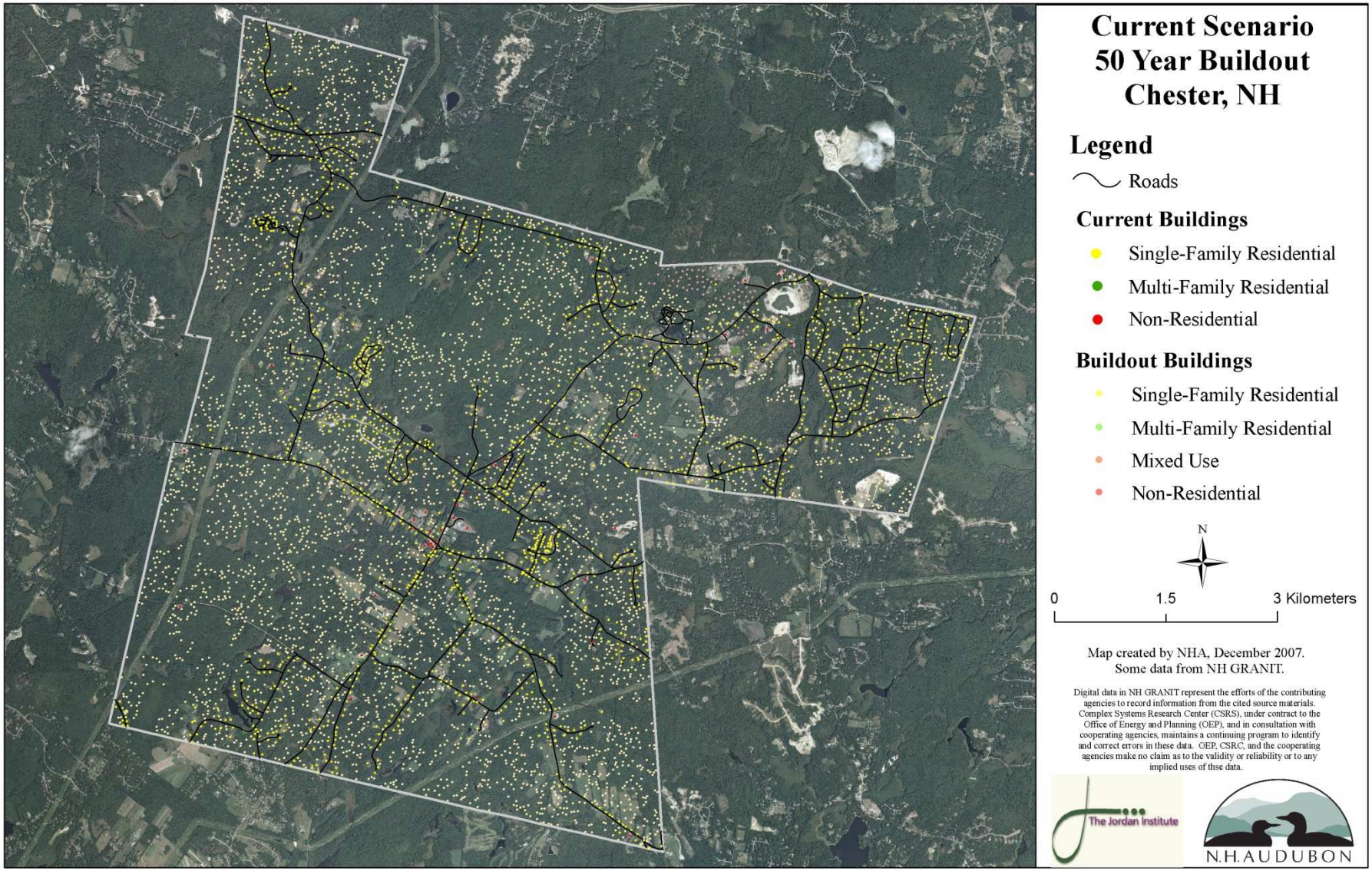
TimeScope Wizard

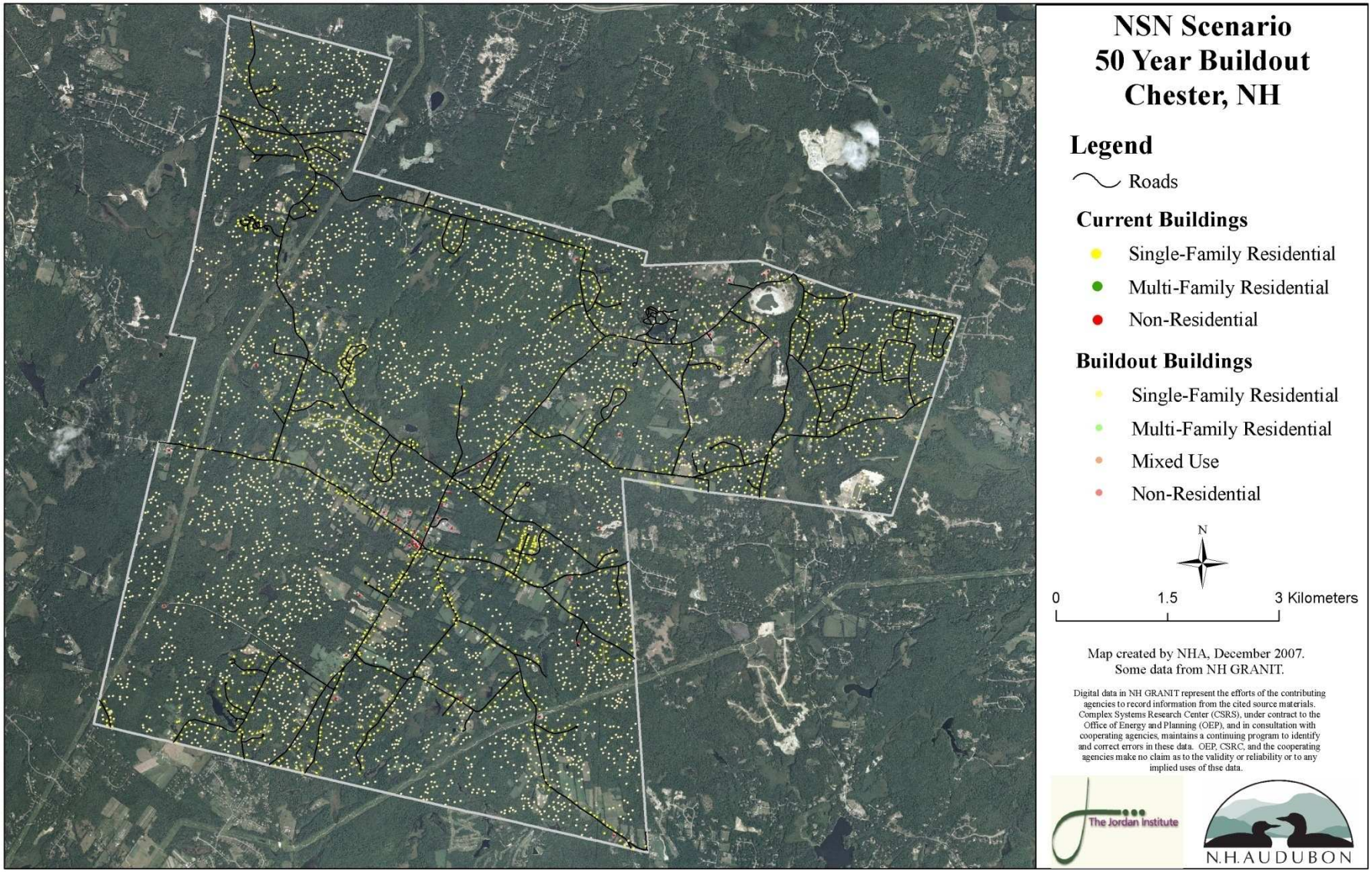
- Watch the build-out occur over time
- Set rules:
  - Rate over time
  - Proximity to another feature

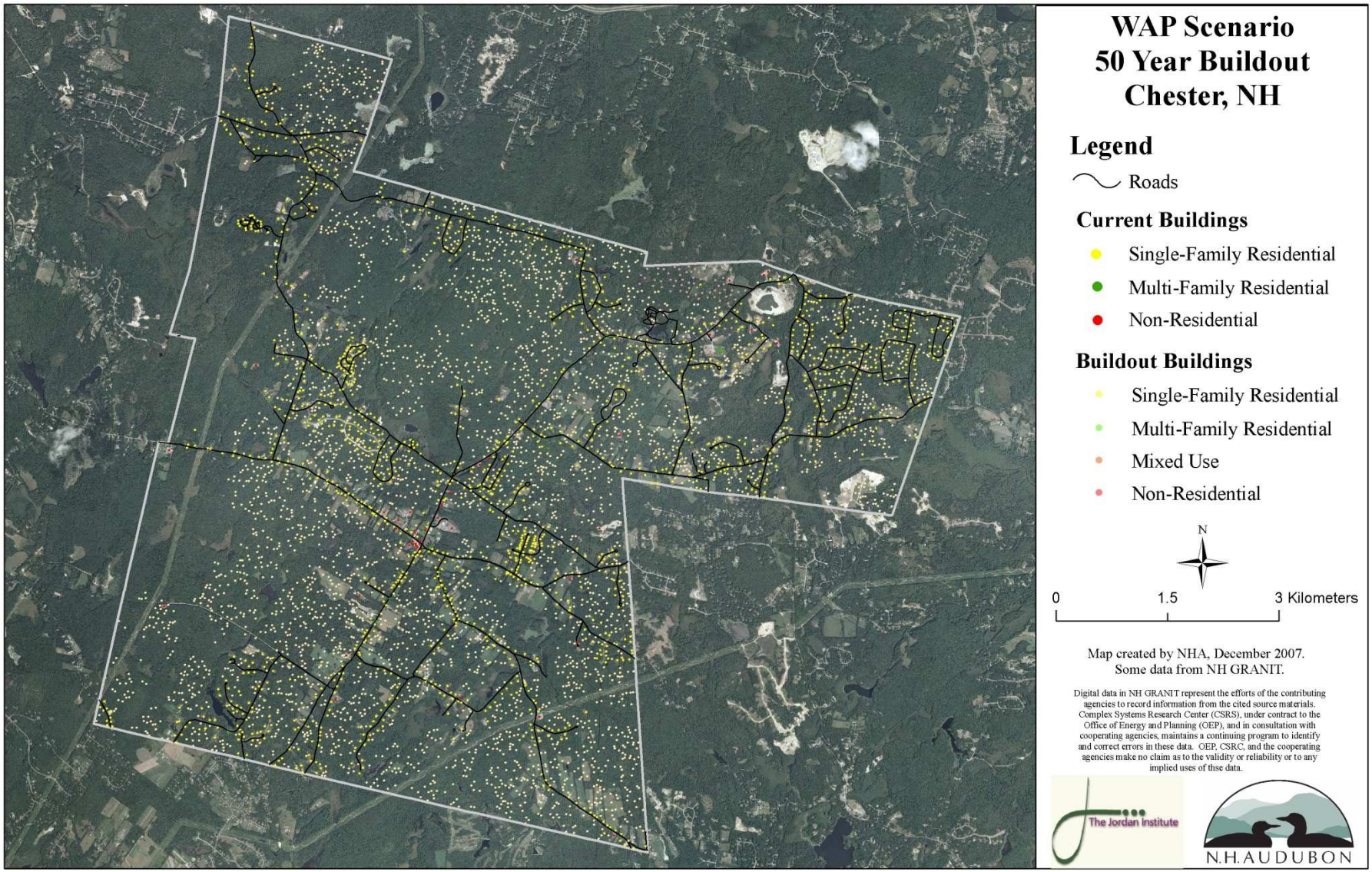
- Used projected population rate or growth ordinance number
- Built-out in proximity to >Class VI roads first

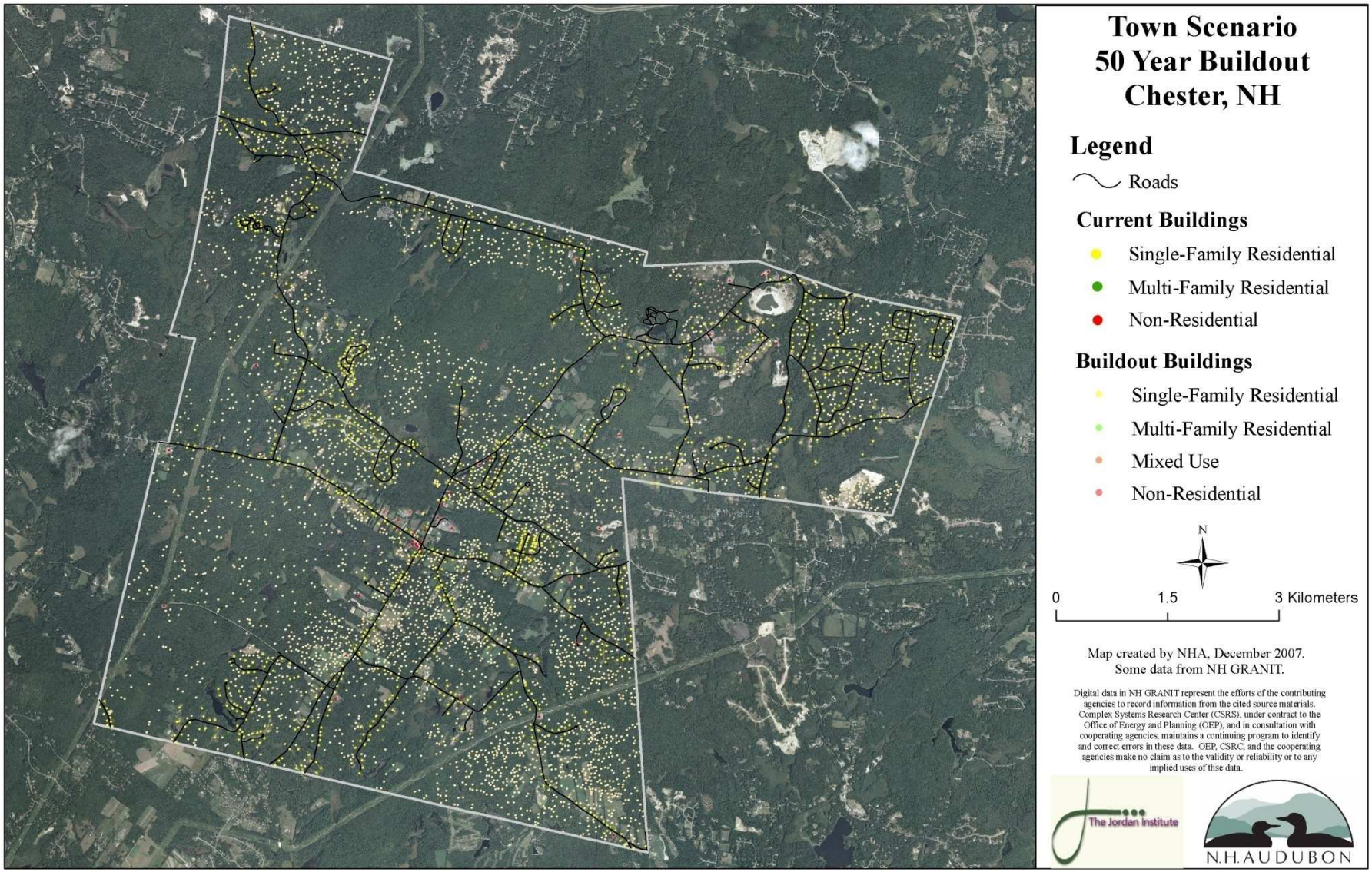


Build-out Results

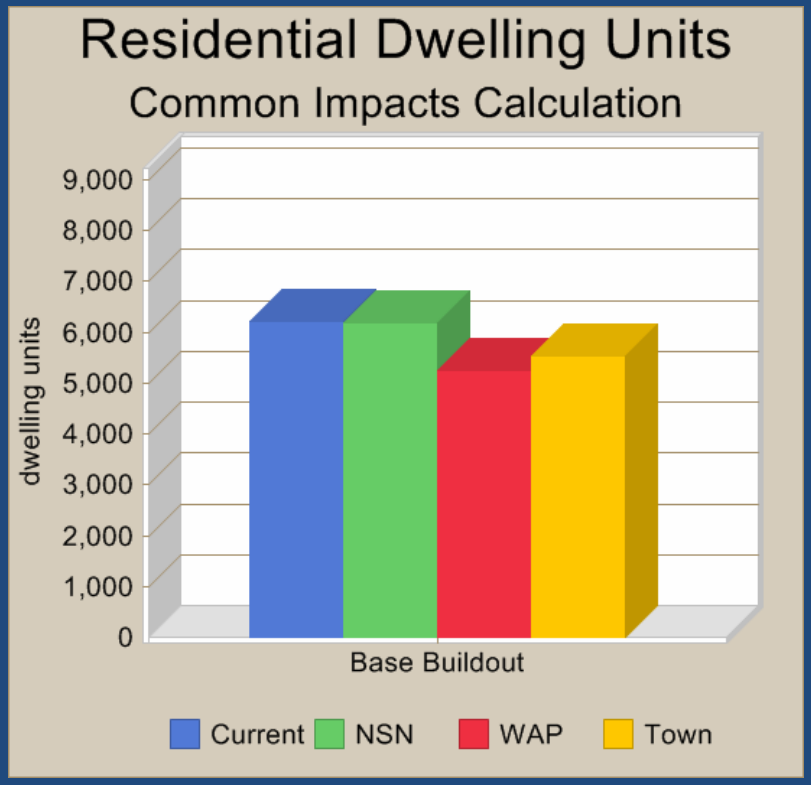


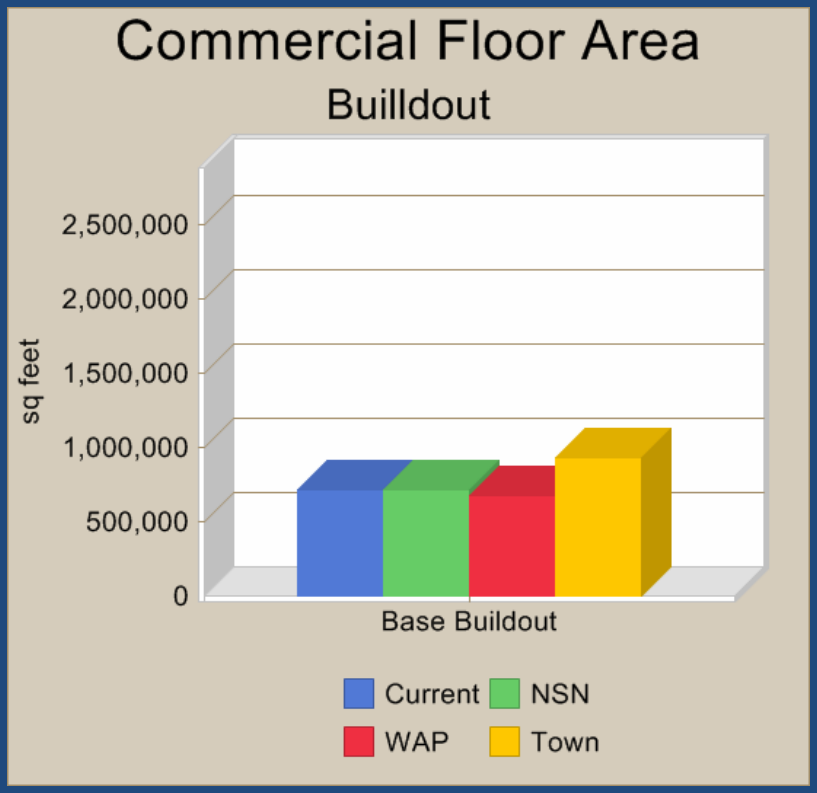

NSN Scenario
50 Year Buildout
Chester, NH
Legend
Roads
Current Buildings
Single-Family Residential
Multi-Family Residential
Non-Residential
Buildout Buildings
Single-Family Residential
Multi-Family Residential
Mixed Use
Non-Residential
N
0
1.5
3 Kilometers
Map created by NHA, December 2007.
Some data from NH GRANIT.
Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRS), under contract to the Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of thse data.
The Jordan Institute
N.H. AUDUBON

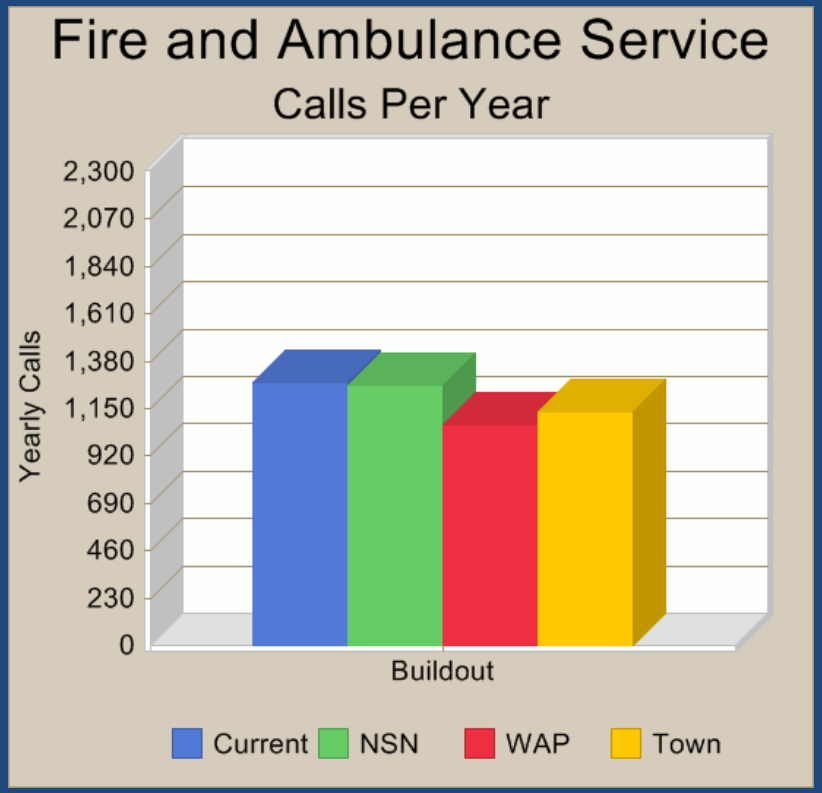

WAP Scenario
50 Year Buildout
Chester, NH
Legend
Roads
Current Buildings
Single-Family Residential
Multi-Family Residential
Non-Residential
Buildout Buildings
Single-Family Residential
Multi-Family Residential
Mixed Use
Non-Residential
N
0
1.5
3 Kilometers
Map created by NHA, December 2007.
Some data from NH GRANIT.
Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRS), under contract to the Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of thse data.
The Jordan Institute
N.H. AUDUBON

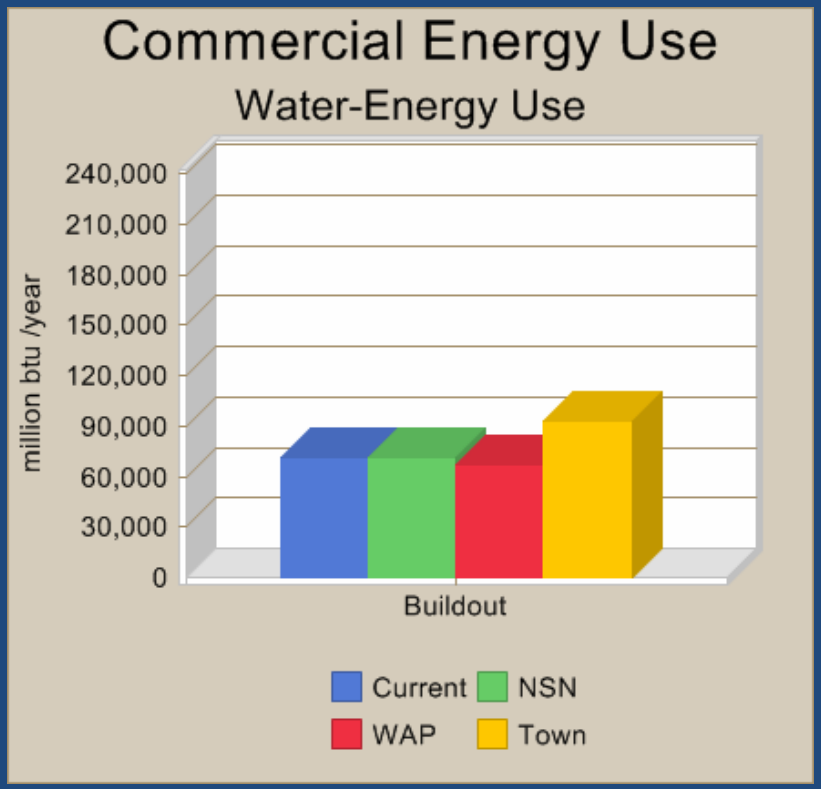

Town Scenario
50 Year Buildout
Chester, NH
Legend
Roads
Current Buildings
Single-Family Residential
Multi-Family Residential
Non-Residential
Buildout Buildings
Single-Family Residential
Multi-Family Residential
Mixed Use
Non-Residential
N
0
1.5
3 Kilometers
Map created by NHA, December 2007.
Some data from NH GRANIT.
Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRS), under contract to the Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of thse data.
The Jordan Institute
N.H. AUDUBON

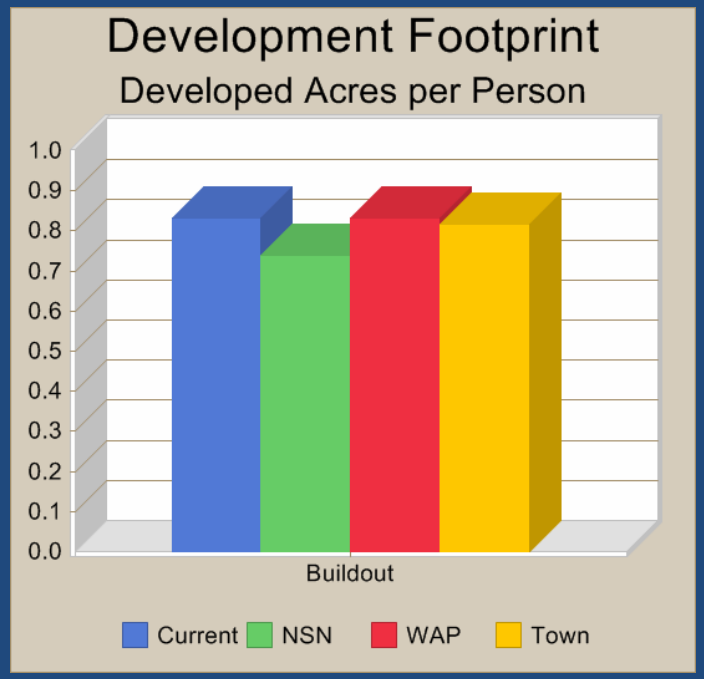
Chester Indicators

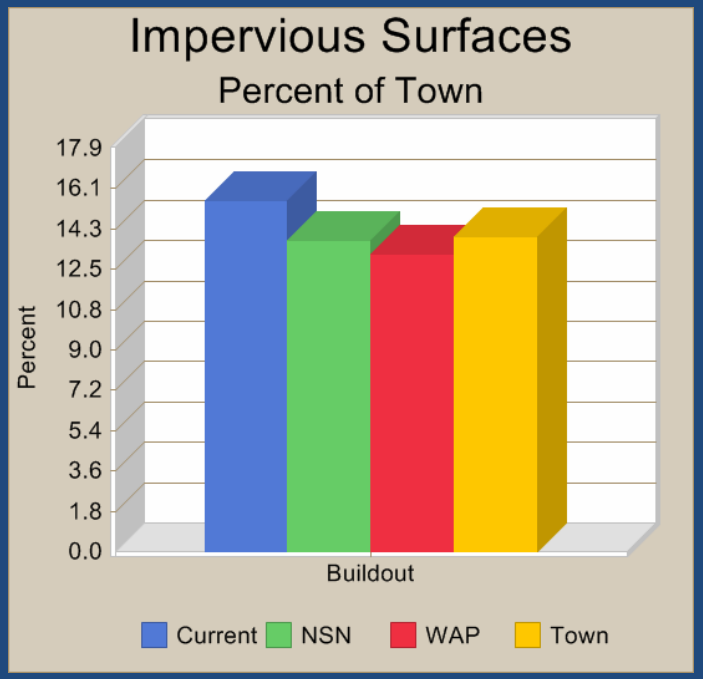


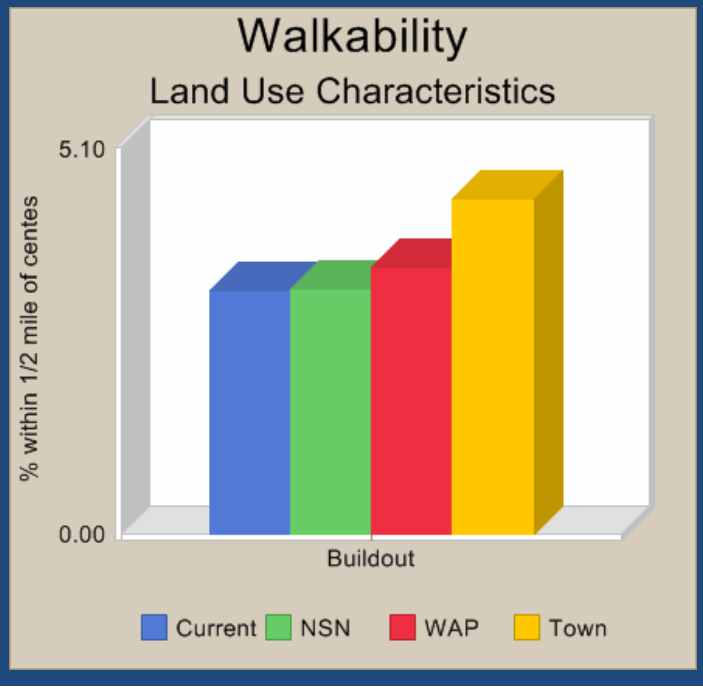



Fire and Ambulance Service
Calls Per Year
Yearly Calls
2,300
2,070
1,840
1,610
1,380
1,150
920
690
460
230
0
Buildout
Current
NSN
WAP
Town


Commercial Energy Use
Water-Energy Use
million btu /year
240,000
210,000
180,000
150,000
120,000
90,000
60,000
30,000
0
Buildout
Current
NSN
WAP
Town


Development Footprint
Developed Acres per Person
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Buildout
Current
NSN
WAP
Town


Impervious Surfaces
Percent of Town
Percent
17.9
16.1
14.3
12.5
10.8
9.0
7.2
5.4
3.6
1.8
0.0
Buildout
Current
NSN
WAP
Town


Walkability
Land Use Characteristics
% within 1/2 mile of centes
5.10
0.00
Buildout
Current
NSN
WAP
Town

Chester

The build-out analyses helped to visualize where WAP, NSN, and Town priorities differed

A future land use map helped to guide the Town/Master Plan Scenario

Hooksett

The complexity of Hooksett's zoning made it difficult to incorporate many changes

Presenting the build-out maps during public meeting created interesting discussion

Hooksett pursued further CommunityViz work with Complex Systems Research Center

Salisbury

Salisbury decided that educational materials that could be used in town were more important than pursuing a desired future scenario

Citizens' interest in the WAP and NSN made it easier to show how to incorporate these into town planning

Community Responses

- Trouble identifying with total build-out
- Different responses depending on how results were presented
- “Not on my land” mentality

- Appreciation for visual representation
- Indicator charts provided valuable information

Lessons Learned

It can be difficult to educate people about important natural resources and a new software tool at the same time

CommunityViz is an effective but challenging tool that requires patience, communication, and commitment

Paying for CommunityViz

- Program costs $750 w/ technical support, $279 self-service
- Teach yourself or hire someone else
- Include in Master Plan budget & contract
- Housing & Conservation Planning Program
- Moose Plate grants (NH State Conservation Committee)
- Resource-specific grants, e.g. CViz for watershed planning

NH CommunityViz Technical Resource Center

- Funded by the New Hampshire GIS Conservation Collaborative (NHGCC)
- Provide technical support to CommunityViz users throughout the state
  - CommunityViz selected as the build-out tool for the I93 expansion project
- Develop and host a website containing technical information and other resources
- Conduct pilot projects to build CommunityViz skill set
- Collaborate with The Jordan Institute (networking and promoting the use of the software)

http://www.granit.unh.edu

Click on CommunityViz TRC under Quick Links

Questions?

Thank You!

Maura Adams, the Jordan Institute
(mkadams@thejordaninstitute.org)

Jennifer Lingeman, UNH Complex Systems Research Center
(jennifer.lingeman@unh.edu)

Vanessa Jones, NH Audubon
(VJones@NHAudubon.org)