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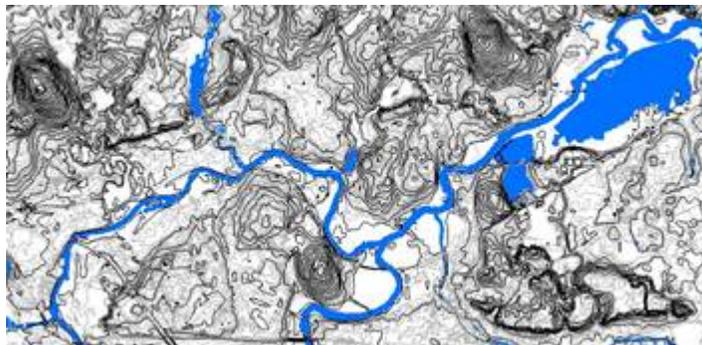
## 1. Concord GIS Goes 3D



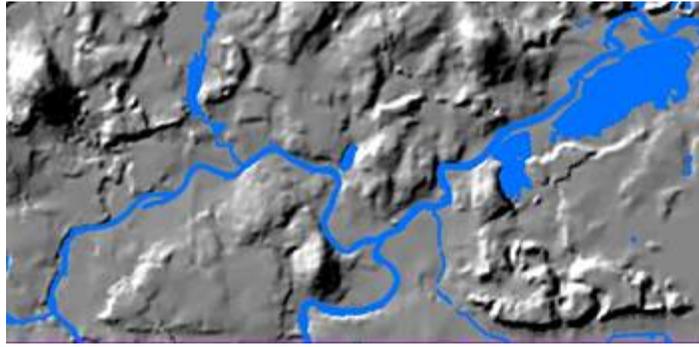
The pitch pine mapping project discussed in the previous Newsletter could benefit from some 3D map displays. Accordingly, I have been taking online training in ESRI's 3D capabilities.

There are a number of options for visualizing altitude or height in two dimensions:

Contours



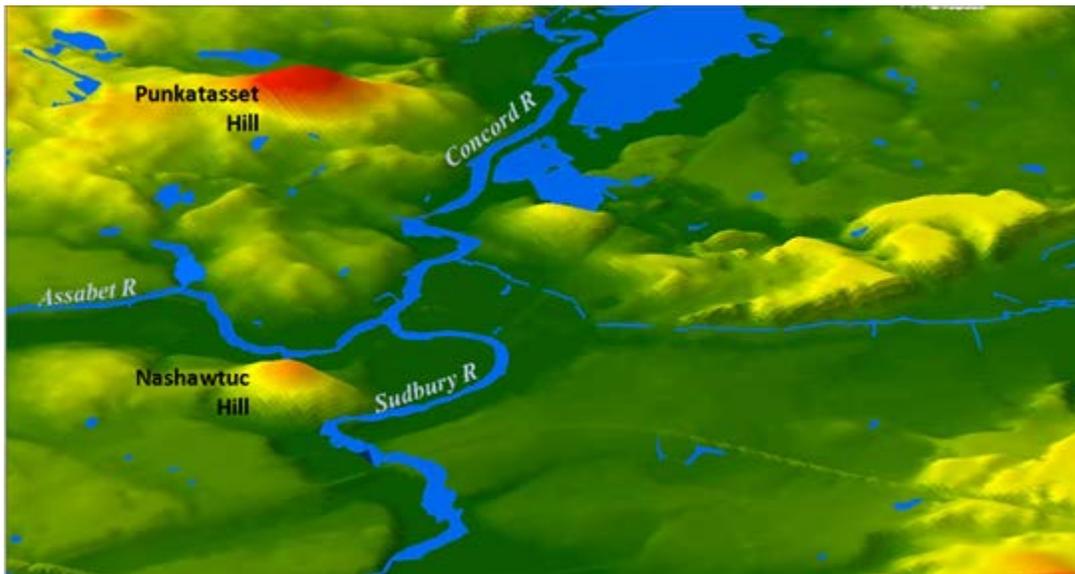
Hillshade  
(Shaded  
Relief)



Triangulated  
Irregular  
Network (TIN)  
with Hillshade



3D rendering of the last option above provides the ability to 'fly' through the terrain at any oblique angle desired, and from any compass orientation. Additional 2D data layers can be draped over the 3D terrain, as with the Pond and River features below.



'Flying' closer to Punkatasset Hill from a perspective more to the northeast dramatizes its classic glacial drumlin shape:



I hope to apply these 3D capabilities to additional projects in the future!

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## 2. Survey123 → GIS Integration for Manhole Inspections

Sewer Manholes are one of the many asset types Concord Public Works is responsible for monitoring and maintaining. Manhole inspections are conducted throughout the warmer months.

Pre-Inspection of Manhole and Depth of Sediment Check

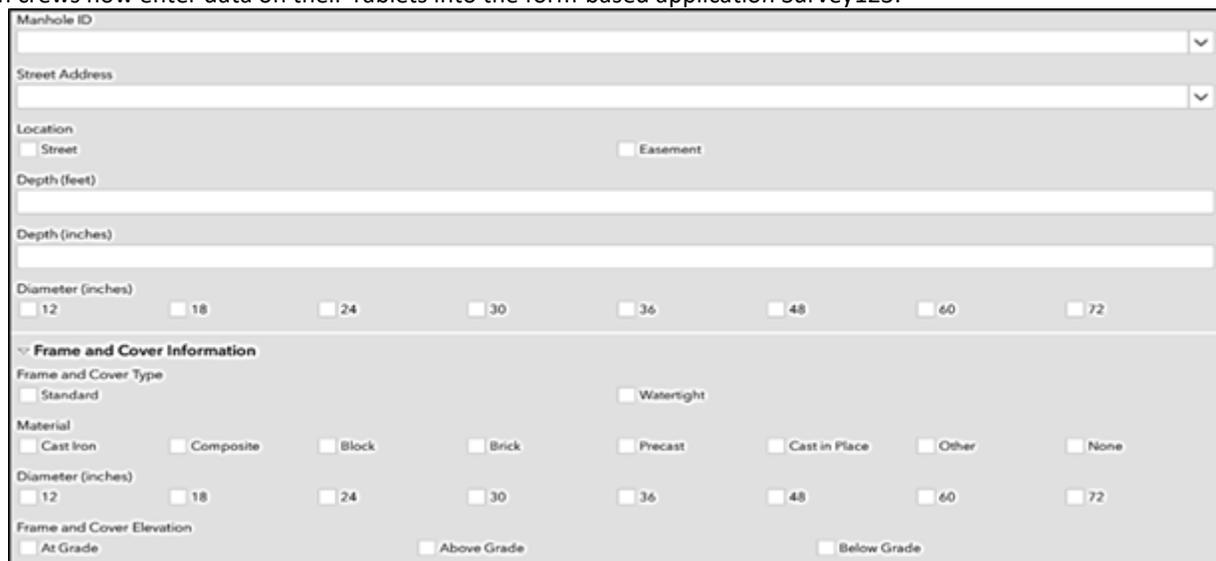


Manhole inspection data must be captured for state reporting, and archived in our GIS system. To transition from cumbersome paper data sheets to electronic data recording in the field, CPW acquired multiple Tablet devices.

When designing the Tablet-based data input form for the field inspection crews, CPW kept several key criteria in mind:

- quick and easy to use
- offline enabled so cell service is not required
- all information needed for reporting is captured without having unnecessary fields

Inspection crews now enter data on their Tablets into the form-based application Survey123:

The image is a screenshot of a mobile data entry form for manhole inspections. The form is organized into several sections with a light gray background. At the top, there is a dropdown menu for 'Manhole ID'. Below that is a text input field for 'Street Address' and another dropdown menu for 'Location'. The 'Location' section includes two radio button options: 'Street' and 'Easement'. There are two text input fields for 'Depth (feet)' and 'Depth (inches)'. A 'Diameter (inches)' section features a row of seven radio button options: 12, 18, 24, 30, 36, 48, 60, and 72. A section titled 'Frame and Cover Information' is expanded, showing 'Frame and Cover Type' with radio buttons for 'Standard' and 'Watertight'. Below this is 'Material' with radio buttons for 'Cast Iron', 'Composite', 'Block', 'Brick', 'Precast', 'Cast in Place', 'Other', and 'None'. Another 'Diameter (inches)' section has radio buttons for 12, 18, 24, 30, 36, 48, 60, and 72. The final section is 'Frame and Cover Elevation' with radio buttons for 'At Grade', 'Above Grade', and 'Below Grade'.

This inspection data is joined directly – and automatically – to our Enterprise GIS by a unique Asset ID for each manhole. Benefits include:

- Time saving both in the field and back at the office
- Considerably simplified reporting to MassDEP
- Ability to easily look back on all our inspections over the years

Public Works will continue leveraging technology to create more efficient and long-term solutions for asset management and preventative maintenance.

My Favorite Type of Manhole – Brick!



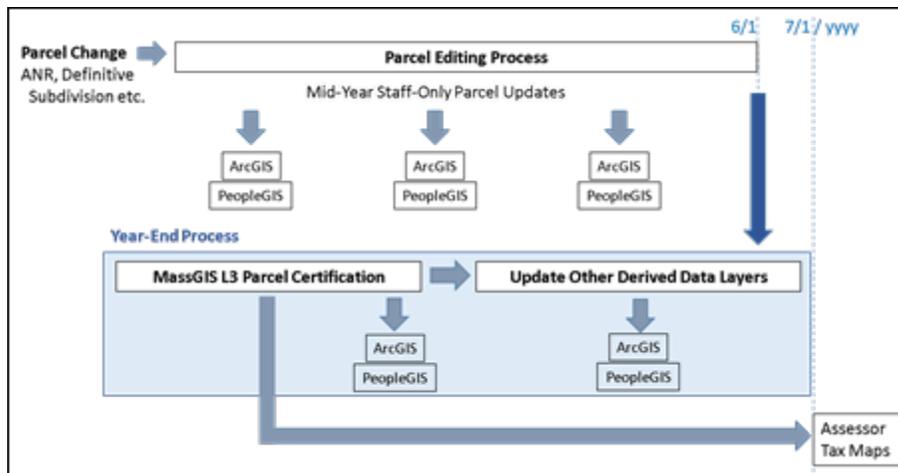
– Ben Griffiths, GIS Technician

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### 3. Concord's Parcel Management Process

Parcel polygons are arguably the most fundamental data layer in municipal GIS. Development of this layer is where many, if not most or all, town GIS systems get started, usually for on-line presentation of Assessor data. Though Concord GIS has happily gone far beyond just Parcels, the Assessing calendar continues to guide the Parcel management process.

Parcel geometries may change at any time, based on landowner actions such as parcel splits. However, these changes can only be reflected in public GIS layers as of the following July 1 – the start of the new Fiscal (i.e. Property Tax) Year.



#### Mid-Year Staff-Only Parcel Updates

So Concord Staff can stay current on recent parcel changes, **Staff-Only** Parcel layers are updated throughout the year. They are available for internal viewing on ArcGIS, and on the Concord Staff webmap:



## Year-End Process

June 1 is the Assessor's cut-off for accepting new parcel changes for the upcoming new Fiscal Year. The Year-End process kicks off then, as Concord GIS works with MassGIS to attain Level 3 parcel certification. [Tax maps](#) for the new Fiscal Year display these certified parcels; other derived layers (e.g. Town-Owned Parcels) are also refreshed. And on July 1, Parcel updating begins anew.

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## 4. Nearmap July Imagery

Our Nearmap aerial imagery subscription has provided a new survey, flown on July 19. Here are some views you may find interesting.

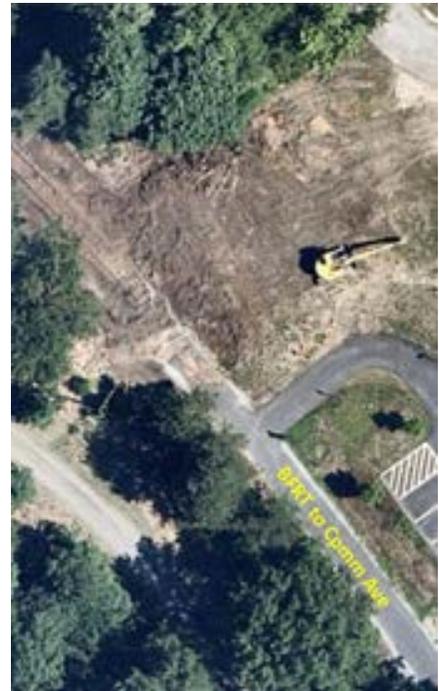
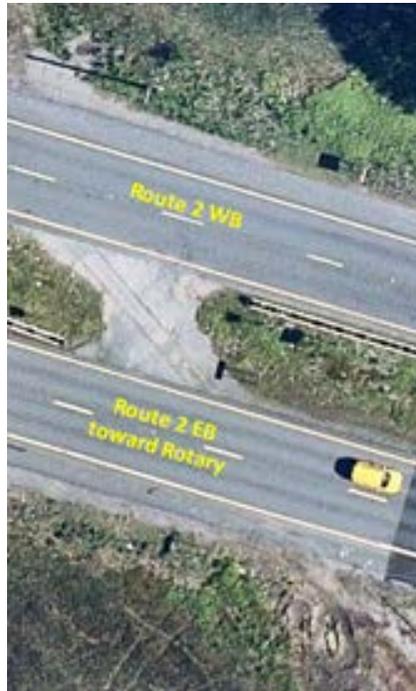
### Cambridge Turnpike

Most of the street had been reopened by July, but at Mill Brook the project was still digging for a solid footing.



### Bruce Freeman Rail Trail

All the overgrowth has been cleared away from the old tracks between Acton and Concord.



Route 2 Concord Rotary

MassDOT moved quickly to take advantage of lighter Covid traffic, completing safety improvements at the dreaded rotary.

April 2019 (oblique)



March 2020 (oblique)

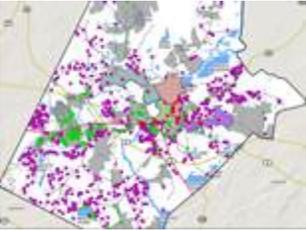
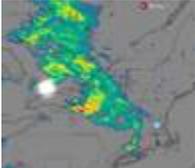


July 2020 (overhead)



## 5. Map/App Gallery

*CTRL-Click on a thumbnail to view a full-size map*

<p><b>CMLP Rebate</b></p>		<p>Sustainability intern Abigail Ahern asked for help visualizing CMLP rebates against Historic areas. I set up a <a href="#">webmap</a> for her, with past years' rebate data (over 800 individual addresses!) displayed against Historic Area and Historic District base layers.</p>
<p><b>Town Meeting (Rev 1)</b></p>		<p>Concord's Town Meeting needed to be held outdoors this year due to Covid-19. Chris Carmody requested a seating plan with Covid social distancing, laid out on the high school's turf fields. Can do! The final seating arrangement was on the other field, but this was excellent practice.</p>
<p><b>White Pond map/app</b></p>		<p>Resident Jane Prentiss requested a map of White Pond overlaid with a grid for water quality sampling and search-and-rescue purposes. The project expanded to include Walden Pond, pond bathymetry, and eventually a <a href="#">phone app</a>.</p>
<p><b>Battle Road Trail Connector Proposal</b></p>		<p>Natural Resources is working with MassAudubon on a proposal for a new trail connecting the Battle Road Trail in the Minute Man NHP to the Thoreau Birth Site on Virginia Road. Looking forward to checking it out, especially the boardwalk!</p>
<p>Also of Interest</p>		
<p><b>Lightning</b></p>		<p>Summer's spate of thunderstorms sparked a cartography question: Where is the lightning striking? Turns out there are multiple <b>real-time lightning-strike webmaps</b> out there – the technology is fascinating*.</p>
<p><b>Covid By Town (Massachusetts)</b></p>		<p>Massachusetts' Dept. of Public Health has put up a spiffy new <a href="#">ESRI webmap</a>, updated biweekly, with Covid rates by town. Click on a Town for a popup with specifics.</p>

- "Private companies and open-source groups operate networks of special sensors that can detect **radio waves** produced by lightning. These radio waves are used to calculate how far away a strike is in relation to the sensor. The data collected by multiple sensors allows the location of strikes to be calculated via triangulation. This data is used to create detailed maps of lightning strikes on a real-time basis."*  
 Source: [https://stormhighway.com/lightning\\_strike\\_maps.php](https://stormhighway.com/lightning_strike_maps.php), accessed 8/27/2020.

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