Farming in Solar Farms

Jesse Robertson-DuBois

FINICKY FARM

Northfield, Massachusetts

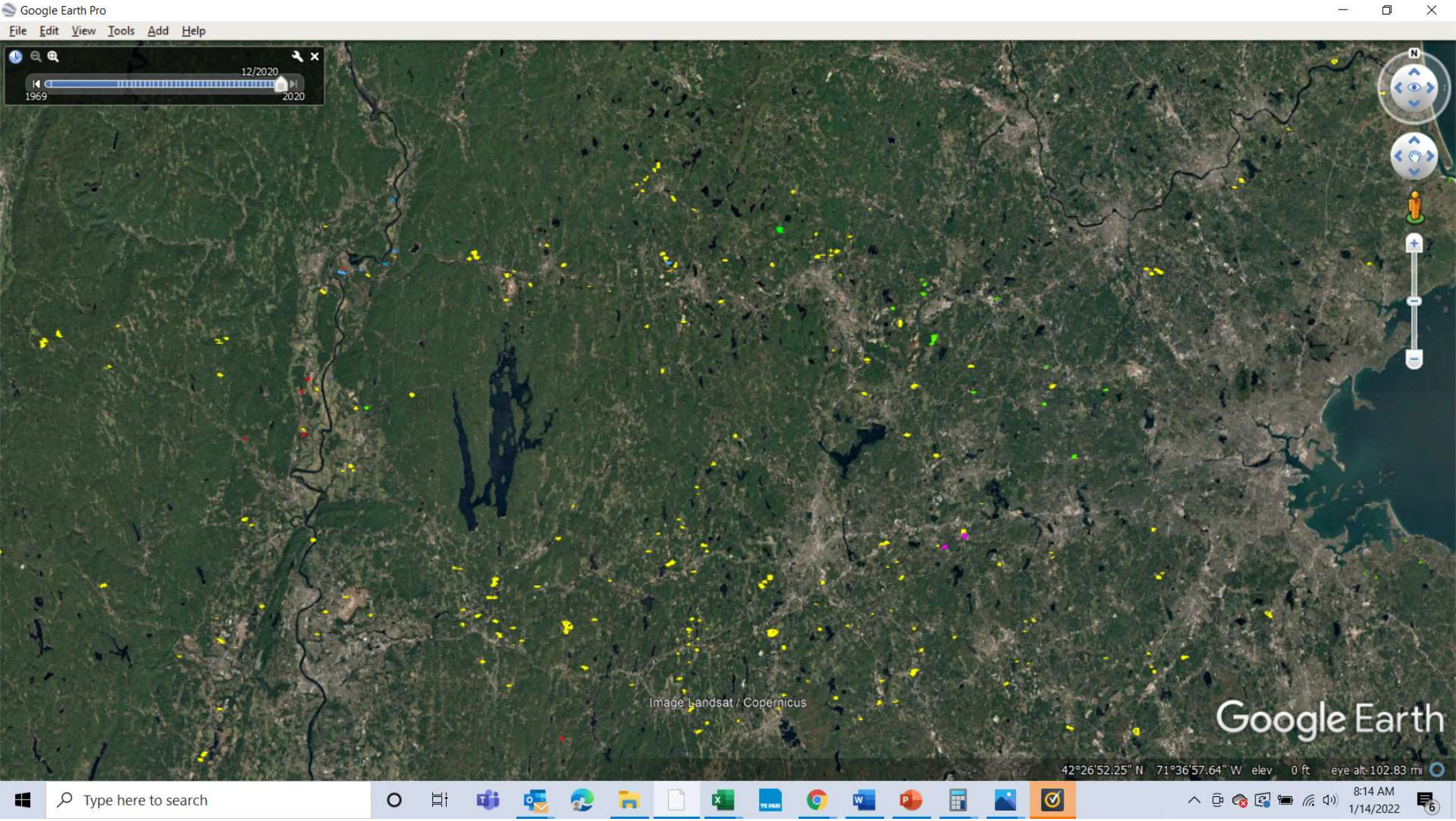
NOFA Massachusetts Winter Conference

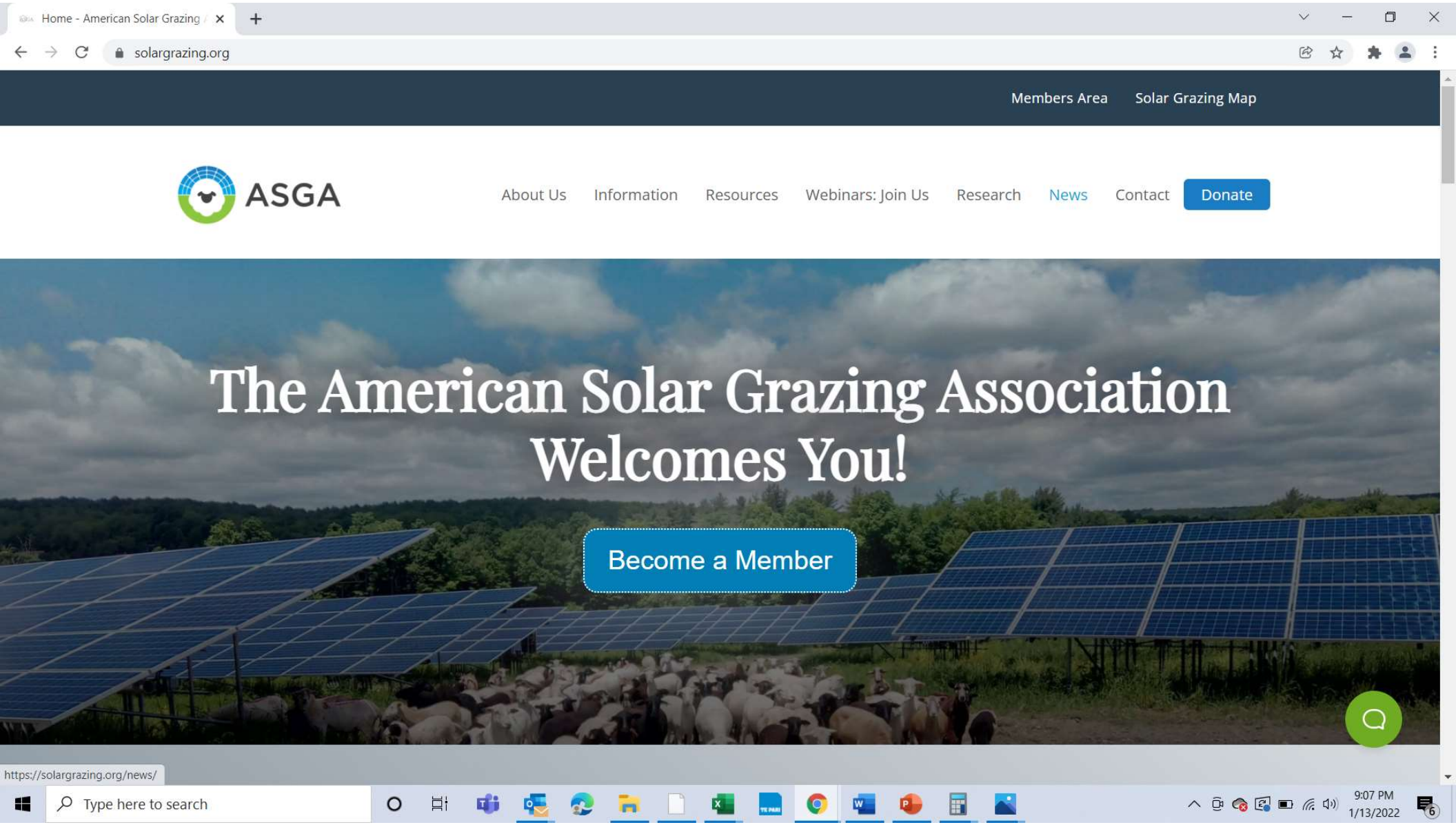
January 15, 2022





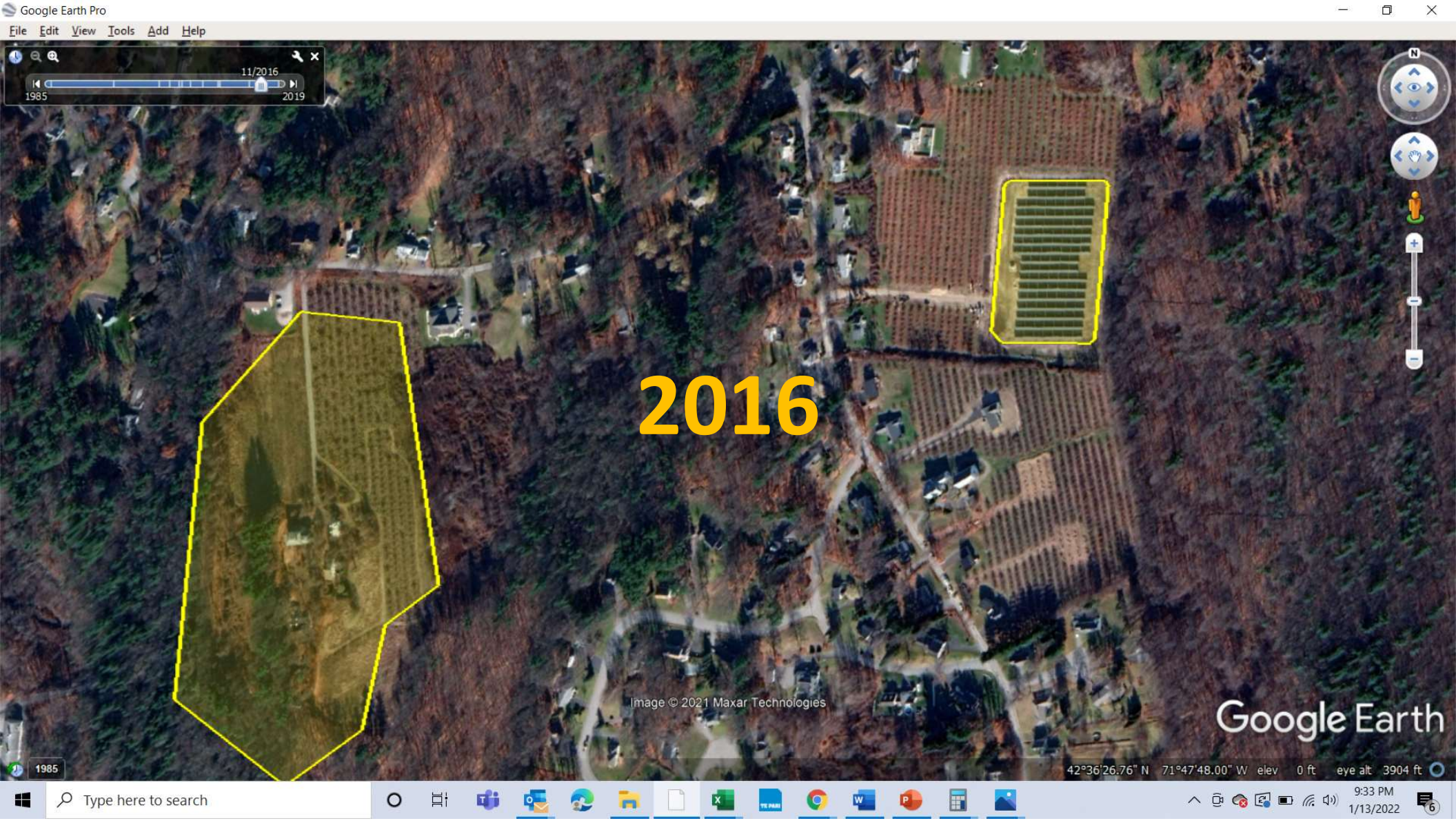
Solar Grazing
Solar Policy
Agrivoltaics

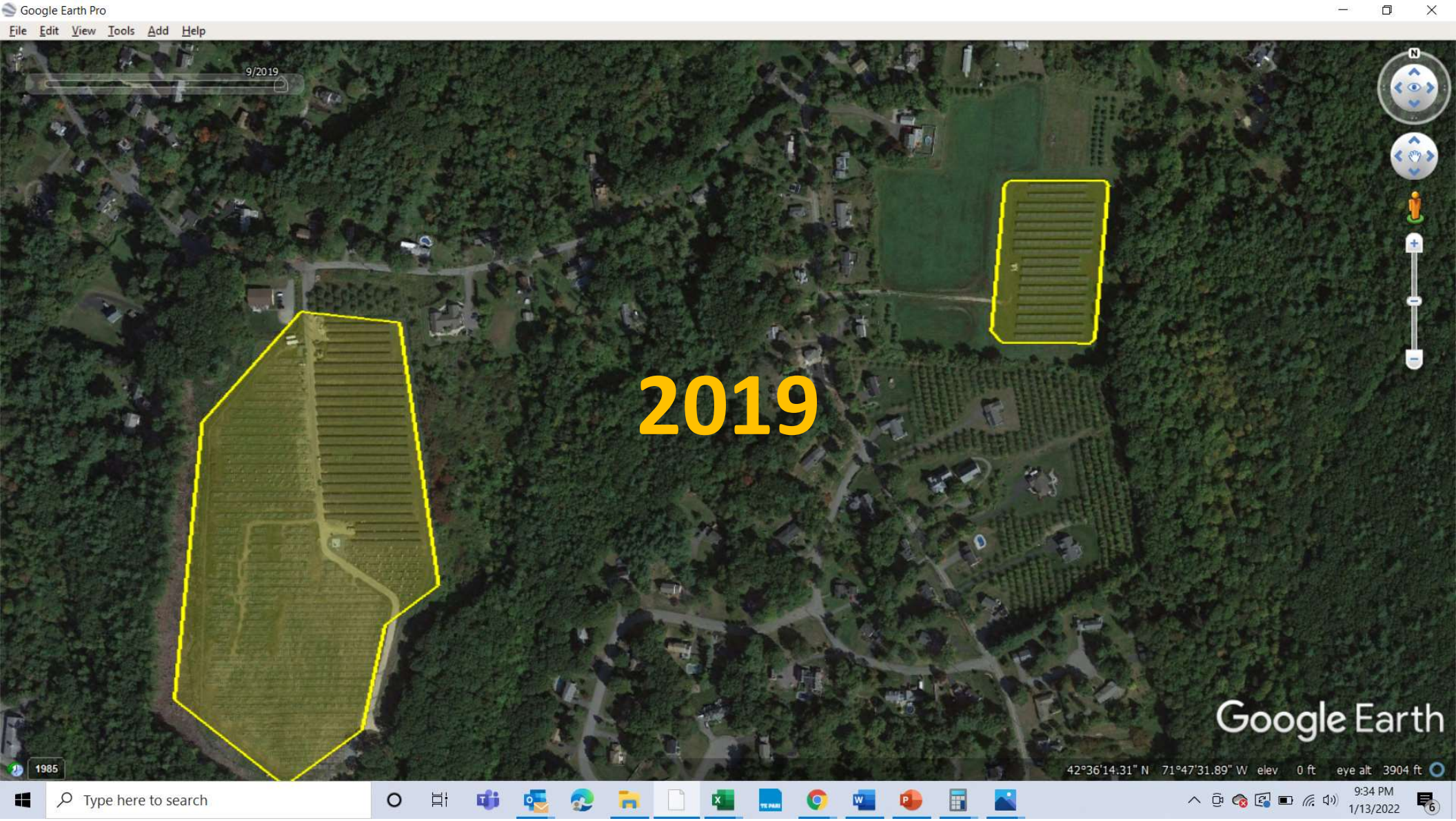

Google Earth Pro
File Edit View Tools Add Help
12/2020
1969
2020
Image Landsat / Copernicus
Google Earth
42°26'52.25" N 71°36'57.64" W elev 0 ft eye alt 102.83 mi
Type here to search
8:14 AM
1/14/2022


Home - American Solar Grazing
solargrazing.org
Members Area
Solar Grazing Map
ASGA
About Us
Information
Resources
Webinars: Join Us
Research
News
Contact
Donate
The American Solar Grazing Association Welcomes You!
Become a Member
https://solargrazing.org/news/
Type here to search
9:07 PM
1/13/2022


DANGER
CONSTRUCTION
AREA
NO TRESPASSING
NOTICE
ALL VISITORS
MUST REGISTER
AT OFFICE
NOTICE
AUTHORIZED
PERSONNEL
ONLY


Google Earth Pro
File Edit View Tools Add Help
4/2005
2005
Image MassGIS, Commonwealth of Massachusetts EOEA
Google Earth
1985
42°36'23.92" N 71°47'31.85" W elev 0 ft eye alt 3904 ft
Type here to search
9:31 PM
1/13/2022


Google Earth Pro
File Edit View Tools Add Help
11/2016
1985
2019
2016
Image © 2021 Maxar Technologies
Google Earth
1985
42°36'26.76" N 71°47'48.00" W elev 0 ft eye alt 3904 ft
Type here to search
9:33 PM
1/13/2022


Google Earth Pro
File Edit View Tools Add Help
9/2019
2019
Google Earth
1985
42°36'14.31" N 71°47'31.89" W elev 0 ft eye alt 3904 ft
Type here to search
9:34 PM
1/13/2022


2021

What's the catch?

- Contracts
- Bidding
- Big corporations
- Insurance requirements
- Safety protocols

- Managing remote sites
- "Solar seed mix" = **creeping fescue**
- Comprehensive vegetation management = **cleanup mowing inside & outside the fence!**


How can we do it better?!?

Solar Energy & Policy Crash Course

Technical & Contextual Background

- Capacity = Nameplate Rating
- Capacity factor = 13.3% avg in MA
  - Single-axis tracking = 17.4%
- 1kW capacity = ~1,000-1,500 kWhr
- 1 household = ~7,500 kWhr
- 1 MW = ~150-200 households
- **Distance to grid infrastructure is #1 factor for solar siting**

- **Would need ~17,000 MW capacity for all household usage from solar**
- Total MA usage = 40,000+ MW solar capacity
- **Current solar capacity = ~2,600 MW installed**
- Prior programs = ~2,000 MW (~300,000 households)
- SMART Program began in 2018

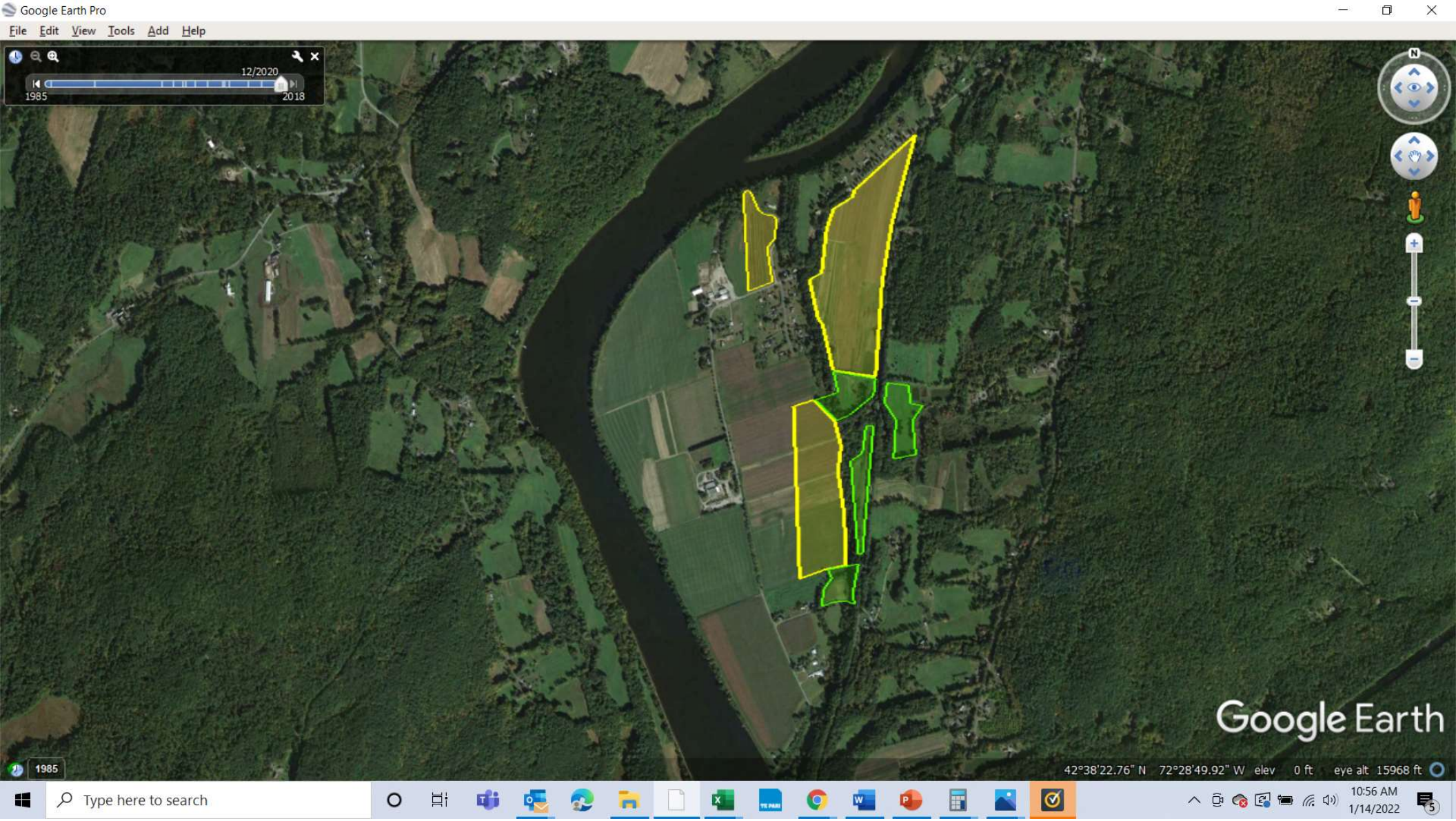
SMART Program Crash Course

- Incentives vary by utility, system size, and system type, declining over time
- Most forested habitat is off limits, except agricultural land, public-entity projects, and small projects ≤500kW
- All conserved land, wetland off limits
- Agricultural projects are limited to:
  - ≤ 200% annual farm usage
  - Building, parking or floating projects
  - Agrivoltaic (ASTGU) projects

Rooftop residential incentives = $0.39/kWhr to $0.15/kWhr

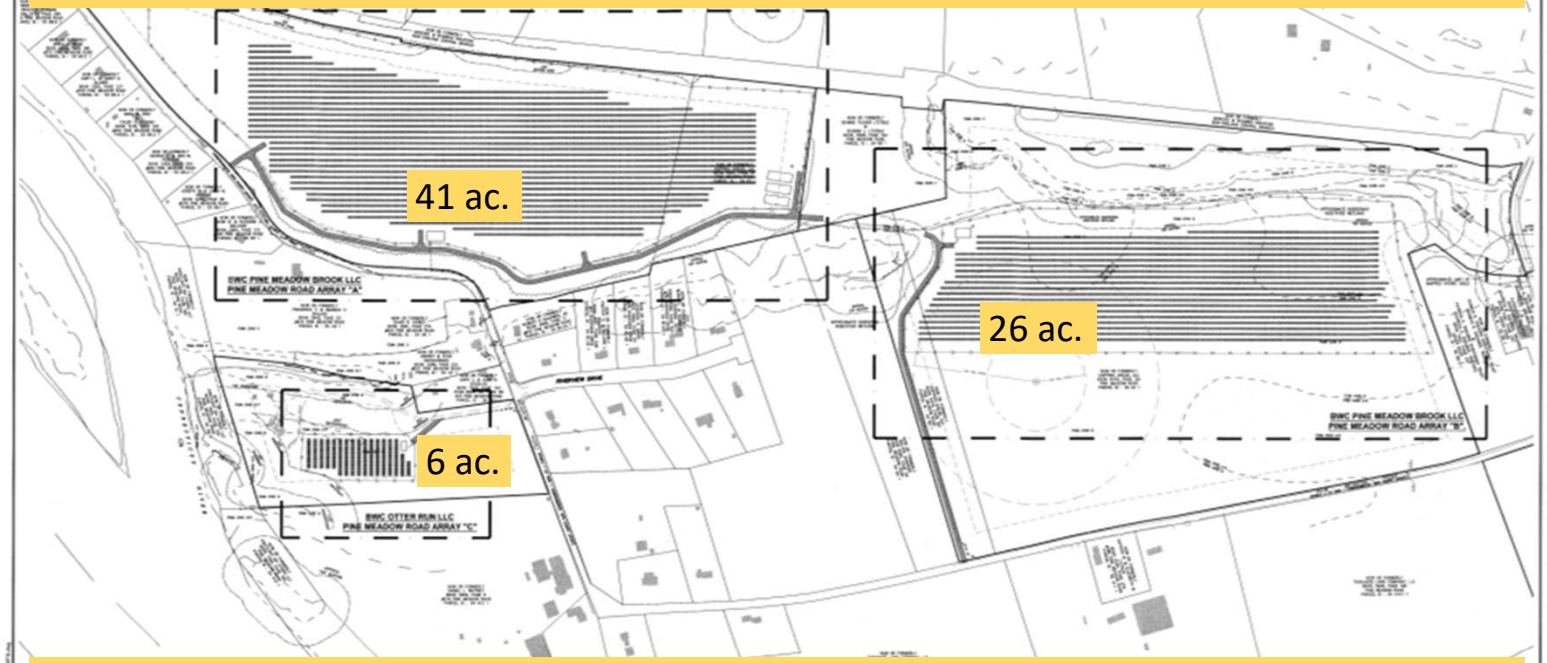
- Greenfield subtractor = -$0.00125 to -$0.0025/kWhr/acre impacted = ~-$.02/kWhr on a large project
- Pollinator adder = +$0.0025/kWhr/ac
- Building mounted adder = +$0.00192/kWhr
- Parking canopy = +$0.06/kWhr
- Floating or Brownfield = +$0.03/kWhr
- **Agrivoltaic/ASTGU = +$0.06/kWhr**

Large ground mount incentives = ~$0.26/kWhr to ~$0.06/kWhr


Google Earth Pro
File Edit View Tools Add Help
12/2020
1985
2018
Google Earth
1985
42°38'22.76" N 72°28'49.92" W elev 0 ft eye alt 15968 ft
Type here to search
10:56 AM
1/14/2022

Northfield Agrisolar Proposals:

- 70+ acres total in 3 parcels with 2 ASTGUs and 1 conventional array
- Scale driven by agricultural and interconnection viability
- Facilitating intergenerational & management transitions



FIELD ENGINEERING CO., INC.
CONSULTING ENGINEERS

PERMITTING

PROPOSED PINE MEADOW ROAD SOLAR ARRAY "A"
BWC PINE MEADOW BROOK LLC
PINE MEADOW ROAD (ASSESSORS MAP 53 LOT E1 AND MAP 54 LOT B7)
NORTHFIELD, MASSACHUSETTS

OVERALL ASSEMBLAGE PLAN

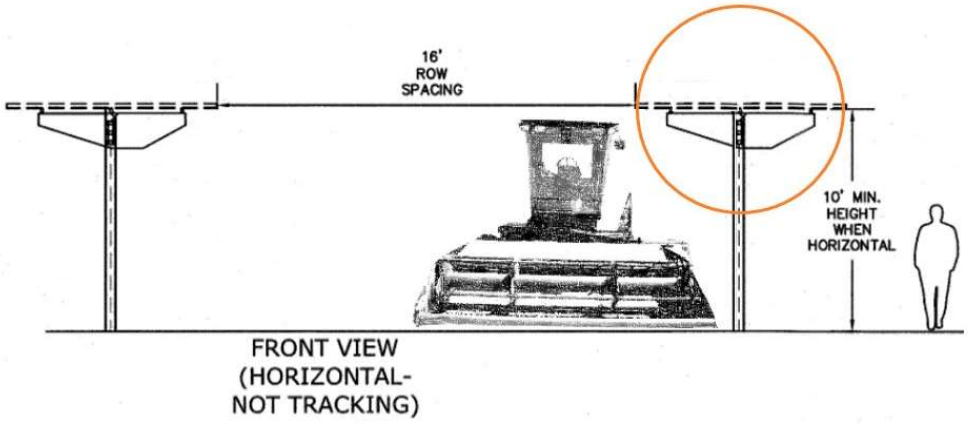
SL-1

Project includes:

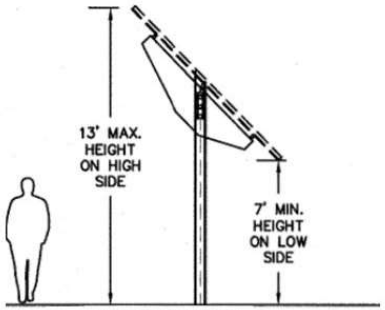
- Agricultural fencing
- New farm roads & barns
- Initial focus on sheep & forage
- Anticipate diversification more livestock, vegetables, small fruits and grains
- Contract grazing in conventional arrays

Northfield Agrisolar PV System:

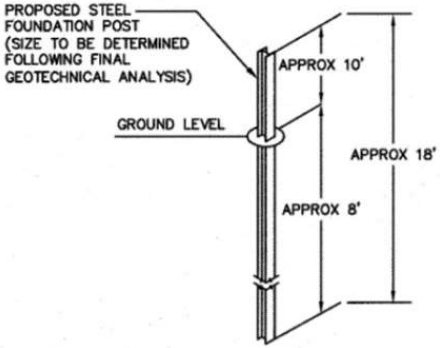
- Oriented w/ single-axis trackers in north-south rows
- 7’ wide panels on 23’ centers
- 16’ clear-height row spacing
- Clearance for most tractors & harvesters
- Example: 12’ self-propelled mower-conditioner, to scale. Note cab clearance from panel rotation.



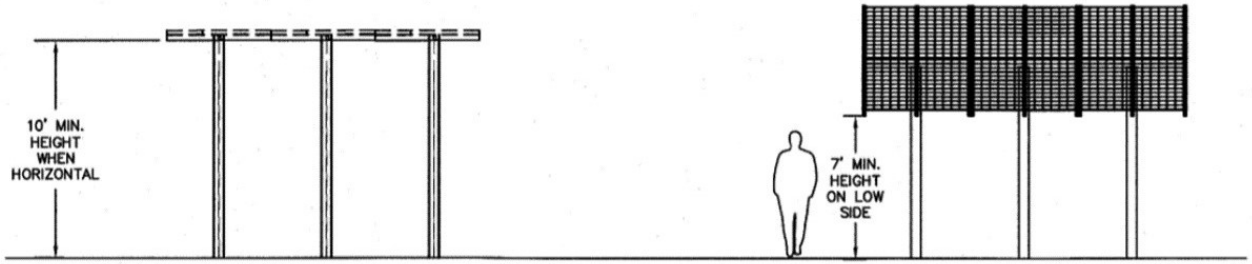
FRONT VIEW
(HORIZONTAL-
NOT TRACKING)



FRONT VIEW
(TRACKING
POSITION)



TYPICAL FOUNDATION
DETAIL
NOT TO SCALE



SIDE VIEW
(HORIZONTAL-
NOT TRACKING)

SIDE VIEW
(TRACKING
POSITION)

REPRESENTATIVE VIEWS
SOLAR PANEL INSTALLATION–TYPICAL
INSTALLATION
NOT TO SCALE

Northfield SMART Solar Projects Since December 2018

PROPOSED AGRIVOLTAIC:

- 3 large projects (70 acres)
- 2 ASTGUs, agricultural fencing, barns, roads
- 1 decision set
- 10.5 MW (~2,133 households)
- Estimated at $25M cost
- ~$2.38/watt cost estimate
- SMART incentive ~$0.16/kWhr

EVERYTHING ELSE INSTALLED:

- 24 small net-metered projects
- All net-metered, no adders, subtractors, storage
- 24 decision sets
- 182 kW (~37 households)
- Cost of $666,385 for 162 kW
- $4.11/watt average cost
- SMART incentive ~$0.25/kWhr

>50X the juice @ <2/3 the cost and incentive
WITH >1000 FEWER DECISION POINTS!!!

FINICKY FARM

The Robertson-DuBois Family

Northfield, Massachusetts

Jesse Robertson-DuBois

jesse@finicky.farm

413-358-1572