

**ZONING BOARD OF ADJUSTMENT
PLAINFIELD, NEW HAMPSHIRE**

NOTICE IS HEREBY GIVEN that the Board of Adjustment will hold a public hearing on the following application on **Monday June 13th 2016 at 7:30pm at the Meriden Town Hall:**

Case 2016-03 Kimball Union Academy: An application for special exception #24 Approved Solar Energy System to be constructed on the Kimball Union Academy campus behind the Miller Centennial Building. The ground mounted system will be 87kw dc power and will be located directly south of the existing array approved as part of case 15-02. Three rows of panels exist now; two additional rows (as a separate system) are planned. No additional tree removal is required and the additional panels are not expected to change the overall project's visibility. The property is located in the Village Residential (VR) zoning district. **The full project file is available for public inspection at the town office. An electronic version of the application plans is available online at www.plainfieldnh.org/zba.htm**

While not required to attend, abutters and interested parties are encouraged to attend either in person or by counsel and state reasons why the application should or should not be granted.

The Zoning Board will visit the site at 7:00pm, the night of the hearing; the public is welcome to attend this visit.

Notice prepared by Stephen Halleran on behalf of the
ZONING BOARD OF ADJUSTMENT
May 24th 2016

PLAINFIELD ZONING BOARD OF ADJUSTMENT
APPLICATION FOR APPEAL

2016
#2

PLEASE READ: This form should be completed after discussions with the town's zoning administrator about the proposal. If you have not already done so, please contact the zoning administrator (469-3201).

Applicant's name: Kimball Union Academy

Mailing address: PO Box 188, Meriden, NH

Property Street address: Behind 57 Main Street

Tax Map / Lot Number: 105/31

Zoning district: VR

Property owner of record: Kimball Union Academy

Type of appeal (check one):

- variance
- special exception # _____
- administrative decision

Applicants signature: for KUA: [Signature]

- Required Attachments:
- a) applicant signed description of the proposal.
 - b) site map(s) exterior/interior.
 - c) abutter list with mailing addresses.

Fee: application \$ 75
 notification \$ 10 Total \$ _____

Hearing Date: 6/13/16

In order to be on the meeting agenda for the above date, your paid application must be received at the town office no later than Monday _____ (ZBA rule 9.3).

Office Use

date filed: 7/26
 case number: 16-03
 attachments: Y / n
 fee paid: Y / n

TOWN OF PLAINFIELD ZONING AND BUILDING PERMIT APPLICATION



Property Owner:

Name: Phone:

Street: Email:

City State Zip:

Project: **Permit Type:** (Check one) Building Zoning

Street Address:

Tax Map: Lot Number: Lot Acreage: Zoning District:

Proposed project distances to property lines (in feet): Front: Rear: Side: Side:

State Approved Septic Design #: Driveway Permit #:

Please provide a written description of the project including appropriate dimensions:

Contractor Information:

Builder:	Electrician:	Plumber:
Name: <input type="text" value="Norwich Technologies"/>	Name: <input type="text"/>	Name: <input type="text"/>
Phone: <input type="text" value="603-667-1479 (Terry Donoghue)"/>	Phone: <input type="text"/>	Phone: <input type="text"/>

Applicant Signature: For KUA: *[Signature]* Date: 5/19/16

Required Attachments:

Please provide a copy of plans detailing the project. If construction plans are not available, attach a hand drawn map detailing the project.

Permits cannot be issued without receipt of the proper fee. If you are unsure of the amount due or have any questions about your application, contact the town office (603-469-3201).

TOWN USE: Current Use: Yes / No ZBA: Yes / No PB: Yes / No

BOARD OF SELECTMEN ACTION

_____ Approved _____ Denied

Permit #: _____ Date: _____



KIMBALL UNION A C A D E M Y

Office of Operations & Planning

Application for Special Exception

Ground-mounted Solar System

Kimball Union Academy is proposing the expansion of an existing installation of a ground-mounted solar energy system in the Village Residential Zone (VR) that will be connected to a commercial metering system. Therefore, the system requires a special exception and/or site plan review under Section 3.8 Solar Energy Systems of the Town of Plainfield Zoning Ordinance.

Project Description: The proposed solar energy system expansion will be approximately 60 x 220 feet in area and consist of 264 panels. The panels will be mounted on steel frames less than 14 ft tall when connected to the ground using ground screws. The system is designed to generate approximately 87 kW-DC/60kW-AC power. The system will be connected by underground conduit to a commercial meter that is located off the south-west corner of the Miller Bicentennial Hall. The additional panels will be located south of and aligned with an existing solar array although not electrically connected to it. No additional tree clearing is anticipated to accommodate the panels.

Location: The solar energy system will be located directly south of the existing solar installation and Miller Bicentennial Hall, toward the end of our current maintenance road that runs between Welch and Kilton Dormitories on a gentle south-facing slope. The size and location of the system was chosen to take advantage of already cleared and solar-tested area. We now have direct experience as evidenced by the existing panels that surrounding neighbors to the campus would have very little to no visual impact. An area of particular past concern has been visual impact on the residents of Baynes Road. A demonstrably effective buffer of existing wooded area will be left in place between the system and Baynes Rd houses. (see attached site plan) The system will be minimally visible to campus residences and travelers at the lower end Main Street and along Rt 120 just south of Bean Rd.

Fencing: The system will make use of a code-approved protective mesh to cover and conceal all electrical cabling. A small split-rail fence will also encompass the entire solar area as a perimeter setback. The system will also be used for educational purposes such as the tours during our recent Global Fair, Environmental Studies and STEM curricula as well as the generation of electricity. Students will gain a first-hand familiarity with the system and proper safety precautions to be exercised around it.

LEGEND

PROPERTY BOUNDARY

TREE LINE

EXISTING ELECTRICAL LINE (UG)

EXISTING ARRAY

PROPOSED ELECTRICAL LINE (UG)

PROPOSED ARRAY

STONE FENCE

TOPOGRAPHIC MARKER

SITE PLAN

KIMBALL UNION ACADEMY

KUA SOLAR III

60 KW-AC SOLAR ARRAY

Proprietary & Confidential

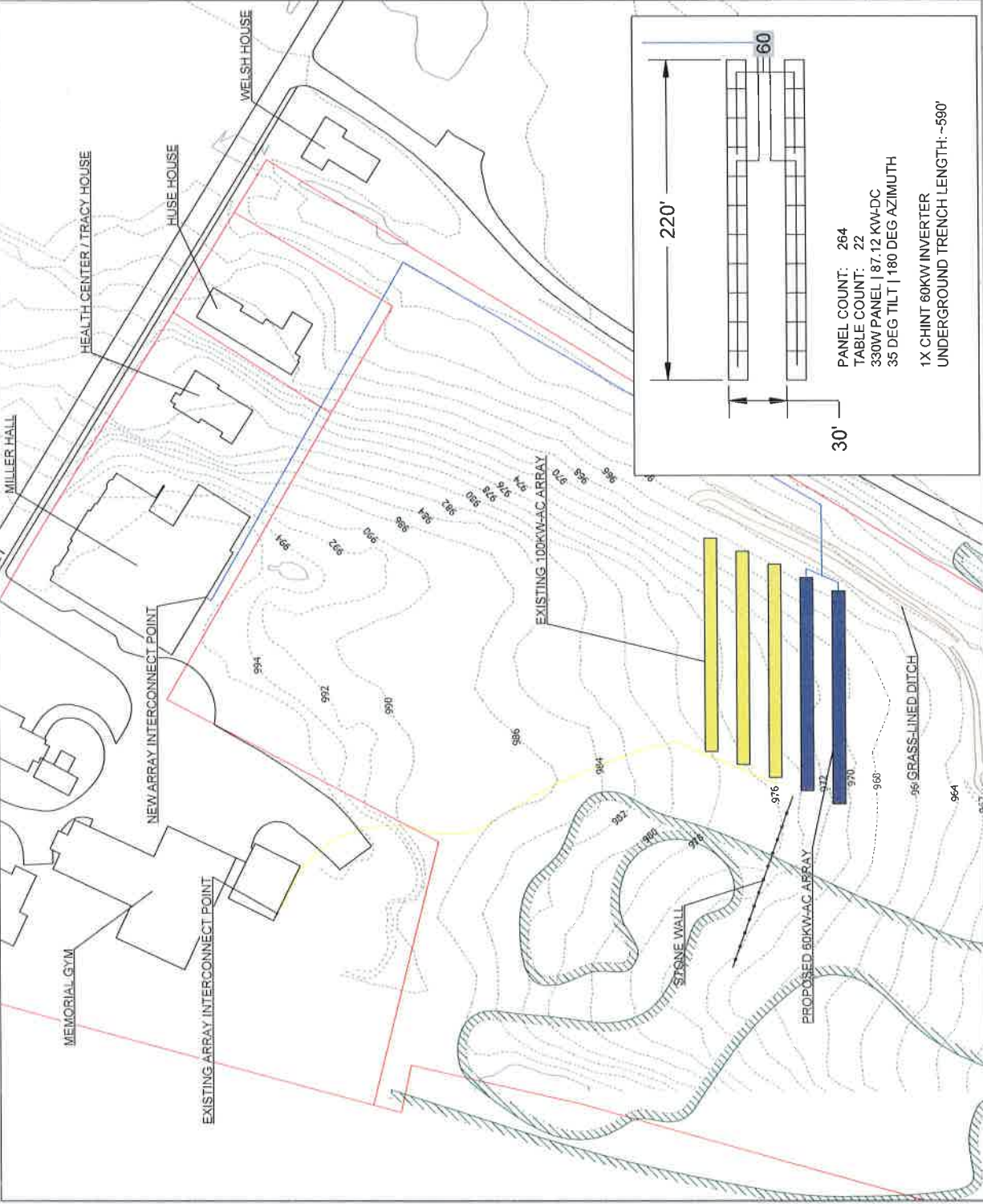


55 Bridge Street
White River Station, Vermont 05001
ozp@norwichtech.com

NT-21

04

Inch 0 1 2







Plainfield Zoning Board of Adjustment and Planning Board

June, 2016

Summary of 60kW Array



- Power Purchase Agreement (PPA) with KUA Solar III, LLC
- Combined with existing arrays, would supply >15% of electrical power for campus...contributing to 30% by 2030 renewable goal
- Construction would occur this year

- Estimated 25-year system generation:
~2,000,000 kWh
- Estimated CO₂ avoided over 25-years of system operation: 2,200,000 lbs. CO₂
- Equivalent to carbon emissions from burning 440 tons of coal, or 2100 barrels of oil, or 100,000 gallons of gasoline

Time is right



- Use Federal and particularly State incentives for add-on systems before they expire
- Great opportunity to make commitment to the environment & do the right thing
- Curriculum opportunities

3.8 Solar Energy Systems (SES)



- Application for Building permit for 60kW/AC (>7kW requiring ZBA special exemption hearing) ground mounted solar photovoltaic array on Kimball Union Academy grounds.
- All ground mounted SES connected to commercial meter require site plan review by the Planning Board

Application Requirements for either or both ZBA and PB



- Names and addresses of the owners of the property where SES is proposed
- Abutter list
- Written description of the project
- Site map of the property and proposed facility design
- Visual analysis
- Decommissioning plan

Standards to be met



- Location: Minimize visual impact
- Fencing: Not required but may be deemed necessary by Town's boards
- Utilities: distribution lines should be underground if possible
- Approved solar components
- Utility Company Approval: Liberty Interconnection Application
- Decommissioning: Must provide provisions acceptable to the town that insure that the facility will be removed when no longer in use.

Names



- Applicant: Kimball Union Academy

**KIMBALL UNION
ACADEMY**

SOLAR III

ABUTTER LIST

BAYNES ROAD
HOME OWNERS ASSOCIATION
C/O PENSGEN
13 BAYNES ROAD
MERIDEN, NH 03770

BAYNES ROAD
HOME OWNERS ASSOCIATION
C/O PENSGEN
13 BAYNES ROAD
MERIDEN, NH 03770

BIA THROW, CRAIG F
& PAULA C
885 RITE 120
MERIDEN, NH 03770

BRAGINETZ, THOMAS JAMES
& ELIZABETH JANE
PO BOX 395
MERIDEN, NH 03770

ESTEY, LORI D
PO BOX 381
MERIDEN, NH 03770

HEWETT, NICOLE L
& ROBERT D JR
PO BOX 339
MERIDEN, NH 03770

JUDD, ALBERTA
PO BOX 103
MERIDEN, NH 03770

L'HEUREUX, CONRAD
& MICHELLE
PO BOX 426
MERIDEN, NH 03770

MERIDEN VOLUNTEER FIRE DEPT
PO BOX 337
MERIDEN, NH 03770

MILLARD, ROBERT MADOULE
MILLARD, HUN
PO BOX 85
MERIDEN, NH 03770

MVD LLC
PO BOX 1212
CONCORD, NH 03302-1212

MVD LLC
PO BOX 1212
CONCORD, NH 03302-1212

PENSGEN, MARK
& ELIZABETH
13 BAYNES RD
MERIDEN, NH 03770

SWETT FAMILY 2008 TRUST, THE
SWETT, RICHARD & MARCIA TRS
PO BOX 295
MERIDEN, NH 03770

TOWNSEND, SARA M REV TR
23 ALICE PECK DAY DRIVE #106
LEBANON, NH 03766

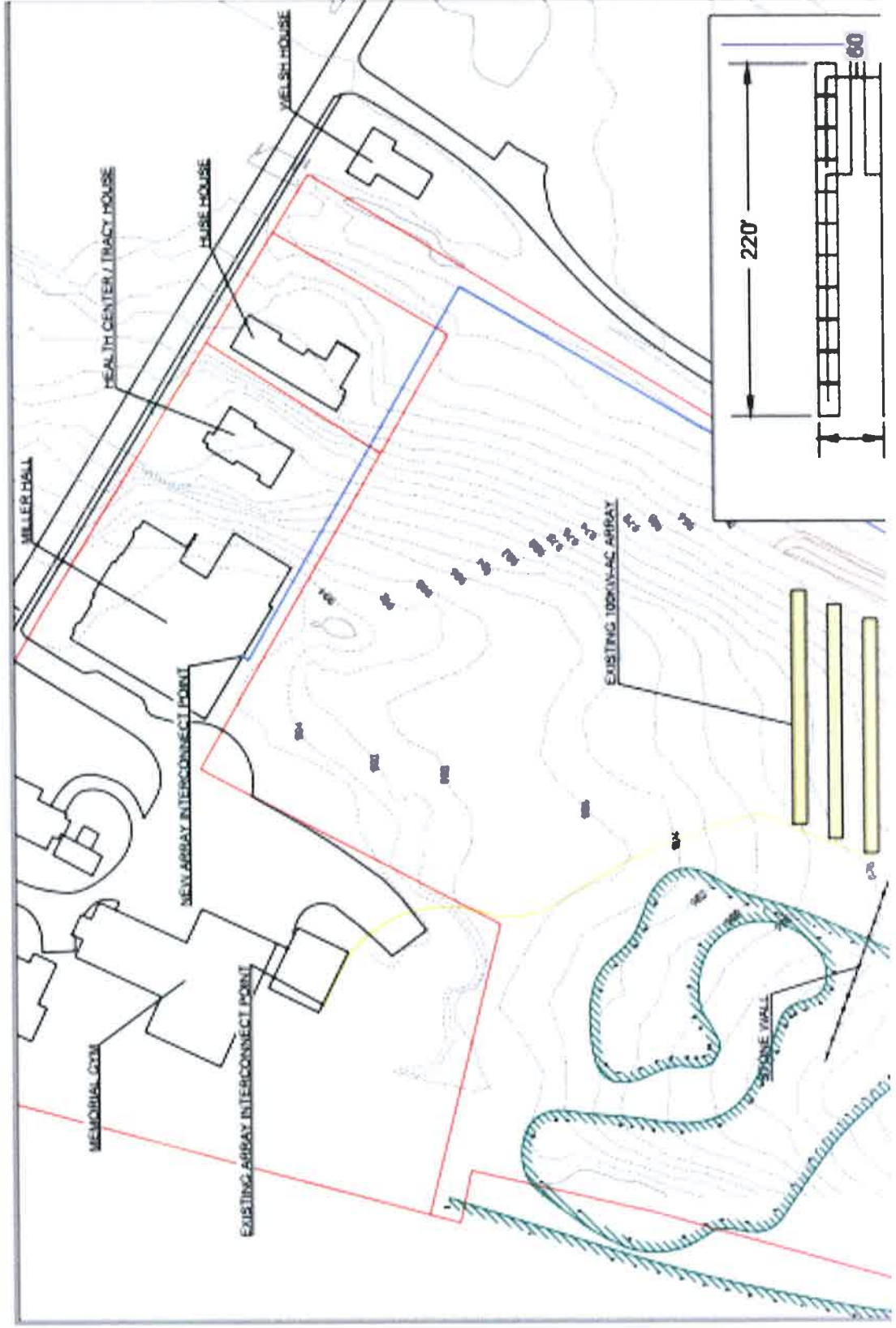
WALKER, MARK &
WALKER, DIANE
392 MERRY HILL ROAD
BARRINGTON, NH 03825-1212

Description of Project

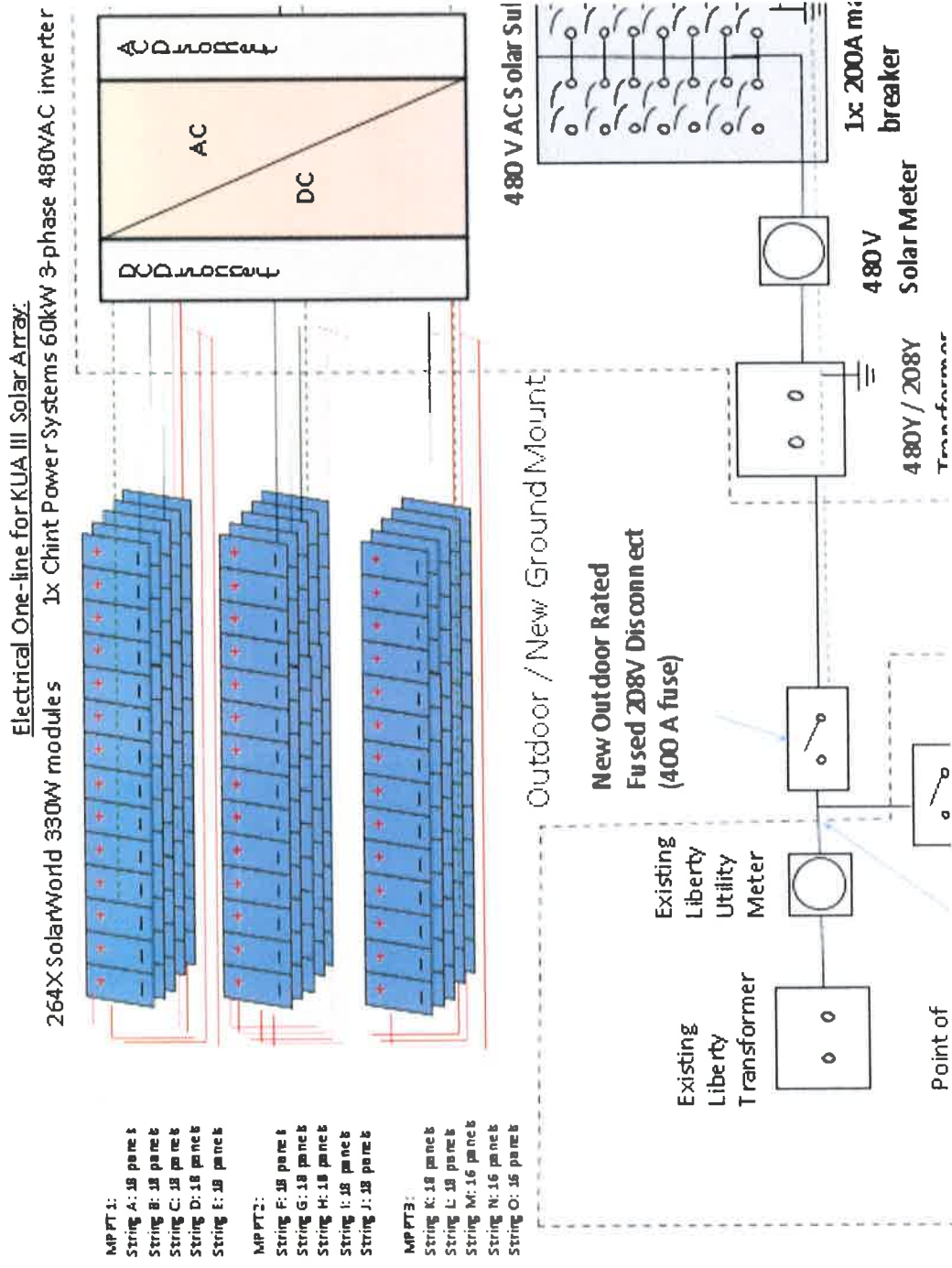


- 60 kW/AC ground-mounted solar array (<14ft height above ground) located approximately 230 yards behind the KUA's Miller Bicentennial Hall on Main St., Meriden. The overall site is bounded to the north by Main St., to the south by Bonner Rd., to the east by Rt 120, and to the west by Baynes Rd. 3-Phase interconnection to the electrical grid and Liberty Utilities will be via a transformer and meter behind Miller Bicentennial Hall.

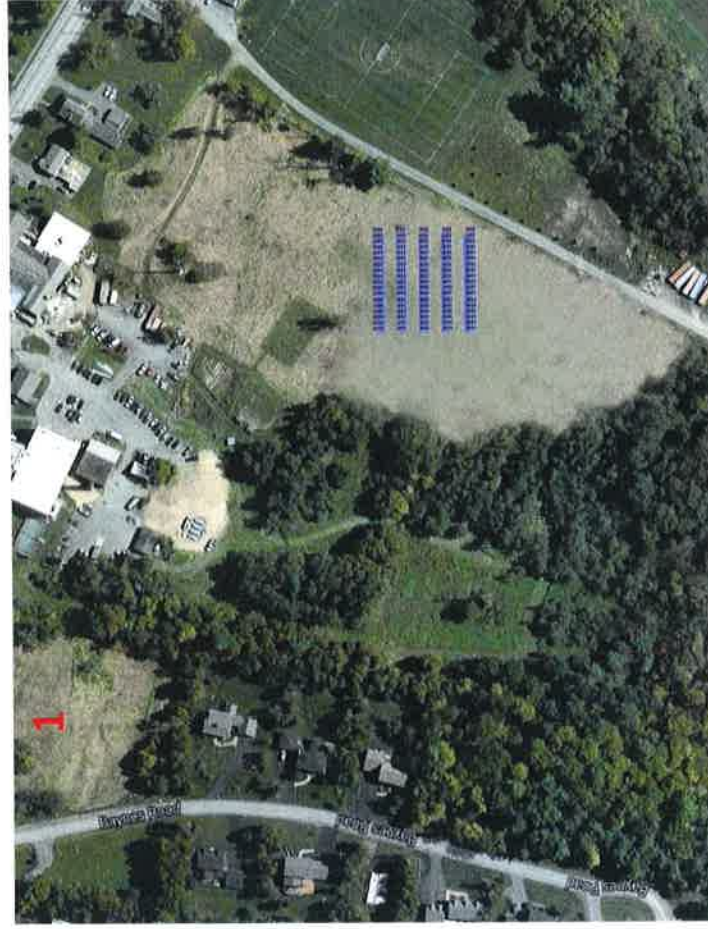
Site Plan



1-line Electrical Diagram



Visual Analysis



Solar array not visible



Visual Analysis



Solar array not visible



2-Bean Rd

Visual Analysis



Existing solar array partially visible in leafless winter setting. New rows will be to south of existing rows hundreds of feet from property line with natural screening.



Visual Analysis



4- Chellis Rd



Solar array not visible



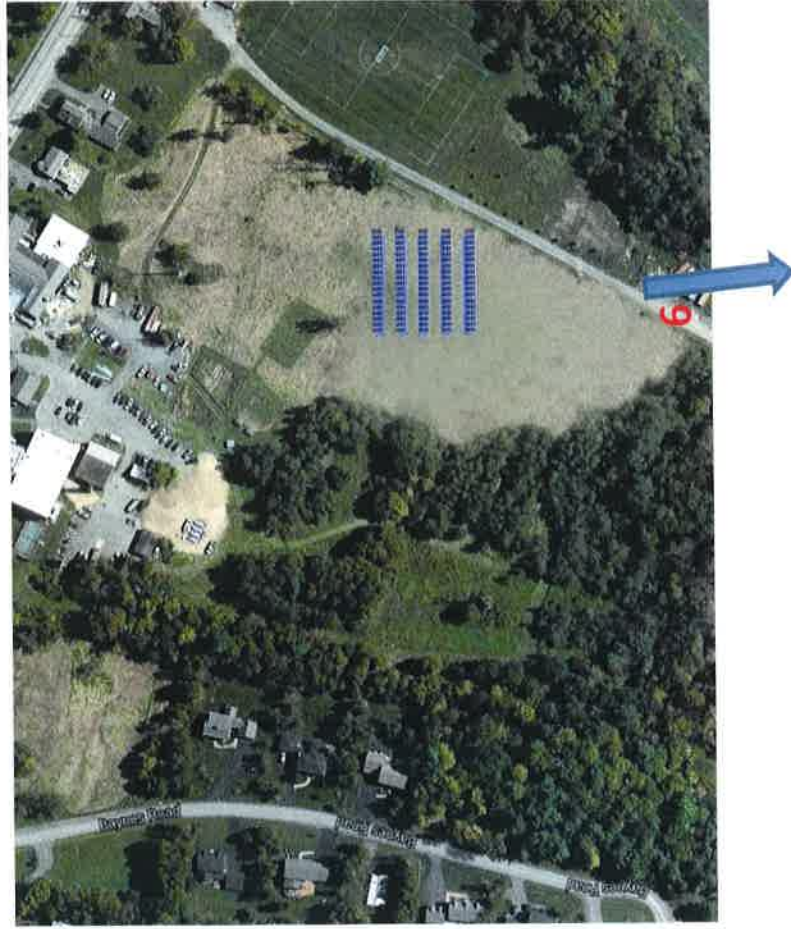
Visual Analysis



Solar array visible



Visual Analysis



Lot not visible from array location



Visual Analysis



Solar array not visible



7-Bonner Rd

May 2016

Visual Analysis



Solar array not visible



Visual Analysis



9

Solar array partially visible



Fencing



A few articles of interest on the fencing:
We have used "Solarscrim" for the protection of the DC wiring. It was specifically created for aesthetics. (see article at: <http://www.solarpowerworldonline.com/2013/12/company-finds-new-way-improve-solar-aesthetics/>). "Solarscrim, which offers a solution for circuitry protection for ground-mounted solar arrays, now offers a new product. The solution, called Under the Array, provides an efficient and affordable way to install a beautiful circuitry barrier across an entire solar panel deployment, as a substitute to chain link fencing. Solarscrim's Under the Array solution meets National Electric Code (NEC) 2011 Section 690.31(A) which requires that panel circuitry not be readily accessible."

National Electric Code (quoted from HomePower): *Many of the new sections in Article 690, Part IV, "Wiring Methods," were moved from other locations. There also are some new requirements. Previously, DC conductors had to be installed in raceways on arrays with a maximum voltage greater than 30 V that were installed in "readily accessible locations" (e.g., ground mounts). Now, Section 690.31(A) allows them to be guarded—"covered, shielded, fenced, enclosed, or otherwise protected...[which] removes the likelihood of approach or contact by persons or objects to a point of danger." This means that screening, some wire-management systems, or even lattice-wrapping the exposed sides and back of an array may be acceptable, rather than having to use a raceway or render the array inaccessible (such as with a fence, or by making it high enough to require a ladder). The authority having jurisdiction (AHJ) will have the final word on acceptability of individual strategies.*

Vermont fire safety suggests protecting each individual solar module with protective screening, which is what we suggest. They also go on to suggest a 7 ft fence if you don't protect each module DC wiring. (<http://firesafety.vermont.gov/sites/firesafety/files/pdf/Misc%20Forms/Solar%20Panel%20Memorandum.pdf>) "The NEC Handbook makes the following comment at this code opening: "Most PV modules do not have provisions for attaching raceways. These circuits may have to be made "not readily accessible' by use of physical barriers such as wire screening" While this may suggest a solution, it is not always practical to install physical barriers on each individual module because of the number of modules involved...."

Alternatively, in lieu of protecting each individual module, the Division will also accept protective arrangements complying with the National Electric Safety Code Section 11. 110 (a) which provides that electric supply stations may be guarded by a grounded metal fence with a height that satisfies any one of the following: a. Fence fabric, 2.13 m (7ft) or more in height. b. A combination of 1.8 m (6') or more of fence fabric and an extension utilizing three (3) or more strands of barbed wire to achieve overall height of the fence not less than 7'. c. Other types of construction, such as nonmetallic material that present equivalent barriers to climbing or other unauthorized entry...."

Approximate Price for Fencing:

5' vinyl coated chain link fence 1200', with (2) 14ft gates (each with w/2 7ft swinging gates coming together in the middle) installed. Corners and gates posts in 4 ft concrete, other posts driven to 3 ft. Approx \$20/ft or \$25k"

Wiring-”Not readily accessible”



Decommissioning Plan



- Remove modules
- Disassemble rack/cut aluminum
- Pull posts
- Remove electrical equipment and underground wires
- Recycle/dispose of materials
- Grade and seed areas of disturbance

THE END



- Questions?

APPENDIX



Summary of PPA



- 60kW/AC Power Purchase Agreement (PPA) with Norwich Technologies
- Defines fixed purchase price of renewable energy generated by the system over 20-year period
- Option to purchase entire system in years 6&10 at depreciated cost and large potential return (KUA owns all the power system produces)
- Straight up purchase is a simpler assignment for Development Office than arranging KUA-friendly tax equity investor
- Must be built within 6 months of NH PUC Rebate award. It will be built in 2016.