EE/CprE/SE 492 STATUS REPORT 5

3/14–4/3

Group number: sdmay25-02

Project title: Ames Microgrid Evaluation and Substation Consulting

Client &/Advisor: Adam Arnold (Burns & McDonnell) and Dr. Zhaoyu Wang

Team Members/Role:

- **Sean Carver - Transmission Team (Substation)**
- **Bethany Danley - Distribution Planning Team**
- **Thomas Edwards - Distribution Planning Team**
- **Nathan Kallal - Distribution Planning Team**
- **Mina Khalil - Transmission Team (Substation)**
- **MacKenzie Woods - Transmission Team (Substation)**

o **Weekly Summary**

Over the past few weeks, the Ames Microgrid Evaluation and Substation Consulting team has made significant progress across both the Transmission and Distribution Planning teams. The Transmission team completed multiple revisions of elevation and general arrangement (GA) drawings while transitioning files from AutoCAD Electrical (ACADE) to Bluebeam. The Distribution Planning team advanced the OpenDSS model, refined solar feasibility assessments, and planned upcoming deliverables. A key focus was on ensuring proper documentation formats and finalizing project components for submission. Meetings with the clients provided critical direction for the team's next steps. The Transmission team aligned on cable routing, elevation and general arrangement updates, etc. Meanwhile, the Distribution team tackled solar viability and battery sizing research, preparing for a finalized model review. The team's communication and collaboration have remained strong, ensuring a steady workflow.

o **Past week accomplishments**

- Transmission Team:
    - Met with client, updated Semester 2 schedule and reviewed completed deliverables/revisions
    - Elevation Drawings:
        - Elevation A-A: Rev. 3
        - Elevation B-B: Rev. 2
        - Elevation C-C: Rev. 2
        - Elevation D-D: Rev. 1
    - GA Drawing
        - General Arrangement: Rev. 2

        - Converting from ACADE to Bluebeam, picked up comments from Rev. 1
- Distribution Planning Team:
    - Met with our client to discuss the implementation of solar.
    - Needed to change the date of model completion to 4/7 due to scheduling.

o **Pending issues**

- Transmission Team: Creating blocks in ACADE, switching other drawings from ACADE to Bluebeam.
- Distribution Planning Team: The Distribution team has no pending issues.

o **Individual contributions**

NAME	Individual Contributions	Hours this week	HOURS cumulative
Sean	I supported Mina, giving instruction on how to complete the GA.	1	56
Bethany	Researched the addition of battery storage to add on to the solar power. I have also ran the power analysis in OpenDSS to have our outputs ready for 4/7.	10	67
Thomas	Completed all line numbering for OpenDSS, wrote code for connection buses, and developed the model map.	12	83
Nathan	I continued researching rooftop solar panels, completing my initial assessment of the total area available on campus.	8	62
Mina	I took over the GA since Sean was out. I transferred the GA from AutoCad to Bluebeam. I put appropriate scales on the GA and electrical equipment.	10	67
MacKenzie	Completed work on REV. 3 Elevation A-A, REV. 2 Elevation B-B, REV. 2 Elevation C-C, and REV. 1 Elevation D-D. Took detailed meeting minutes of the Substation Meeting.	8	75

o **Comments and extended discussion**

Regarding non-technical concerns, there are currently no issues. Our team is collaborating

effectively, and communication has been smooth across meetings and tasks. We feel confident in our ability to continue working together successfully as we move forward with the project.

o **Plans for the upcoming week**

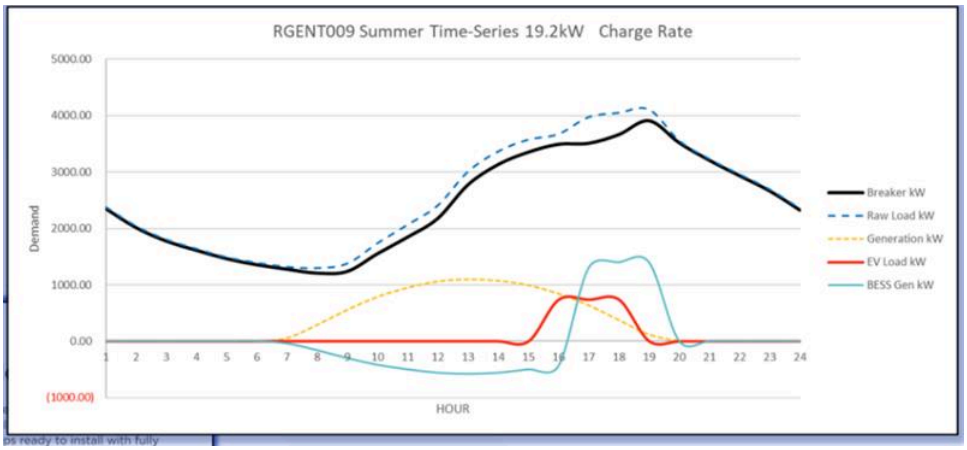
- Sean: I plan on helping with the GA once the comments come back. I would also like to start on clearance checks.
- Bethany: I plan on getting ready to present the model and battery storage on 4/7.
- Thomas: I plan on continuing to clean up the model. I am also pivoting my focus to some other research to support decisions we have made in the project like power factor and BESS support on campus.
- Nathan: I plan on working with our client advisor to research different options for the type of solar panels available, focusing on cost-effectiveness.
- Mina: I plan to pick up any comments if there will be any sent. I will also clean up the GA a little bit more.
- MacKenzie: I plan on making blocks for the A-frame updates as well as picking up comments on the Elevation Drawings.

o **Summary of weekly advisor meeting**

Monday, 3/24 Meeting with Adam Arnold - Distribution Team

On the first Monday after spring break, the distribution portion of the team met with Adam to discuss progress this month. Thomas showed the progress for the model, with the map elements almost being completed. It is still pending some slight cleanup and values for things like transformers and breakers. Nathan showed his progress on the solar front, with viable space on a handful of larger buildings on campus. Bethany's computer crashed, so she was unable to show her progress.

After a progress update, the team set expectations for the next week. The goal is to have the base of the model completed (Bethany has taken the lead on this, picking up where Thomas left off), a full proposal for the viability of solar (continuation of what Nathan is doing with cost estimates for panels) (example deliverable shown below), some battery sizing research (group effort), and a further understanding of what deliverables will be expected for the EE 492 course from the class meeting on 3/27.



Monday 3/24 Transmission (Substation) Team Meeting with Client:

Below are the minutes from our meeting on March 24th.

Safety Moment – Pedestrian Safety Tips

- Keep your eyes up and your phone down.
- Look before crossing the street.
- Always walk on sidewalks.
- Wear bright-colored clothing, especially at night.
- Make eye contact with drivers.
- Do not run into the street or cross between parked cars.

Project Schedule & Action Items

- **Elevation Comments:** Submitted; updates in progress.
- **Cable Routing:** Pushed back until after GA is finalized.
- **Bluebeam GA Cells:** Sent in the file—please verify that we have them. We will be using Bluebeam to scale drawings.
- **File Format:** All project files should be in PDF format for the final submission. Do not submit AutoCAD files.
- **GA Updates:**
    - Mina will work on the GA and aims to complete the next revision by **Monday, March 31st**.
    - Reminder to fill out the side tables when making revisions on the PDF.
    - Hold off on cable and conduit work until GA is finalized.

Elevation Updates
Elevation A

- Ensure proper visualization—easier if you have both the GA and Elevation pulled up on your computer

- Update all dimensions once the GA is finalized.
- **Bus Support & Combo Stand:** Adjust for clearance; move so the breaker connects directly to the switch.
- **Breaker to Switch Distance:** Adjust to 15'.
- **Backbone Alignment:** Ensure backbone is centered with the breaker and all switches are equidistant from it.
- **SW2 Arrester Stand:** Only include the arrester stand, not a bus support. Show the cutoff with a cut mark and a squiggle symbol.
- **Stand Type:** Ensure correct stand types are used; verify consistency across all drawings.

Elevation B

- CAD will provide cells for bus transitions.
- **A-Frame Bus Supports:** Used for high-to-low bus transitions; ensure proper 90-degree configuration.
- **Backbone Considerations:** No backbone for other breakers except where the main feed enters.

Elevation C

- Ensure correct placement of arrester stands.
- Add cut marks to clarify placement

Elevation D

- Properly label high bus, low bus, and phases in all views.
- Ensure the correct bus support configuration.

Next Steps

- Mina will start updating the GA, using the go-by GA for dimensions (note: the go-by does not include the control enclosure).
- Team members should complete necessary updates as soon as possible.
- Elevations should be completed by Friday, March 28th.

Monday, 3/31 Meeting with Adam Arnold - Distribution Team

Adam asked for a delay for this meeting due to a last minute call with a client. Here was the proposed agenda, which will now be discussed on 4/7.

- Finished model (mostly bethany, pending any issues)
- Solar breakdown from nathan
- Battery sizing research?
- Deliverables for end of year discussion
    - Design doc
    - Poster
    - IRP Presentation
    - Demo video