

## ***EE/CprE/SE 492 STATUS REPORT 3***

***2/14-2/27***

***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 two weeks, the Transmission Team engaged with the client, completed Rev. 0 of the LLBOM, progressed on Rev. 0 of the Elevation and Rev.1 of the GA, and finalized the Construction One-Line. The Distribution Team met with the client on 2/17 to analyze the load profile and discuss OpenDSS and solar options. On 2/24, the Transmission (Substation) Team met with the client to refine the Elevation Drawings, aligning them with the GA before moving to cable analysis. MacKenzie is leading the Elevation Study, due March 5th, while Mina finalizes the LLBOM by Friday, February 28th. Sean finalized the GA as of Wednesday, February 26th. The team is also selecting Section 10 figures to justify equipment choices for the cable schedule/conduits.

The distribution team met as a unit on 2/25 to further discuss how to best attack the OpenDSS steps. Thomas walked the other team members through the file structure and what needed to be done, and he is continuing to work through the geographic positioning of each load in miles. After discussion, Bethany will begin numbering each load in an intuitive manner in hopes that when lines are coded from bus to bus they are easy to write (I.E. load 1 is connected to load 2, load 2 to load 3, and so forth). Nathan will continue digging into the solar possibilities, with Google Earth being a path forward to measuring available rooftop space.

### **o Past two week accomplishments**

- Transmission Team:
  - Engaged with our client to gain insights on our deliverables
  - Completed Rev. 0 of the LLBOM
  - Began work on Rev. 0 of Elevation

- Completed Construction One-Line
- Continued/Finished work on Rev. 1 of GA
- Distribution Planning Team:
  - Met with our client to check data values and plan next steps
  - Created plan to finish OpenDSS model

o **Pending issues**

- Transmission Team: Issue regarding GA sizing in ACADE, awaiting feedback from client.
- Distribution Planning Team: We're still continuing to learn more about how to use OpenDSS to finish our model.

o **Individual contributions**

| <b><u>NAME</u></b> | <b><u>Individual Contributions</u></b>   | <b><u>Hours this week</u></b> | <b><u>HOURS cumulative</u></b> |
|--------------------|--|-------------------------------|--------------------------------|
| Sean               | I completed the next revision of the GA. I can't figure out how to scale the equipment.  | 7                             | 55                             |
| Bethany            | I attended the meeting with our client on 2/17 and then met with the distribution group. I've been working on the line numbering in the OpenDSS model.   | 5                             | 52                             |
| Thomas             | Grouped each campus building by street/neighborhood, created a detailed plan for other teammates to help work in OpenDSS, and started graphing each load using miles and a developed X/Y system.   | 6                             | 66                             |
| Nathan             | I attended the meeting with our client in 2/17. I have been working on modeling the solar viability for all the buildings on campus. I have been charting the rough estimates for the square footage of roofs and whether it would be viable to place solar panels on them | 5                             | 50                             |
| Mina               | I completed the BOM and sent it to Burns and Mac, waiting for their review and comments. I attended all the meetings and picked up another task with conduit and cables.   | 6                             | 52                             |
| MacKenzie          | Completed and submitted the last revision  | 5                             | 62                             |

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|--|---|--|--|
|  | for the construction one-line. Started work on Rev. I Elevation. Took detailed meeting minutes of the Substation Meeting. |  |  |
|--|---|--|--|

o **Comments and extended discussion** *(Optional)*

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 weeks**

- Sean: Our client has given me some guidance on how to scale the equipment. I will do this and add dimensions. I don't know what else that I need to do right now, but when I get the comments back I will likely need to add the control enclosure.
- Bethany: I will continue to work on the line numbering in the code for the OpenDSS model.
- Thomas: I will continue my work with the geographic spacing and complete this by the end of next week. Afterwards, I will help use Bethany's progress to begin coding lines from load to load for the model.
- Nathan: After I finish charting the square footage for campus roofs, I will research different types of solar panels/inverters to determine the best options. I will chart notes and data down in our drive to keep track of all pertinent information and specifications.
- Mina: I will pick up any comments from the BOM after it gets reviewed and I will start working on the conduit and cables.
- MacKenzie: I plan to continue work on the elevation study, review Mina's LLBOM, and meet with Sean to discuss the Elevation and its relationship with the GA.

o **Summary of weekly advisor meeting**

Monday 2/17 Distribution team meeting with Client:

On 2/17, the Distribution subteam met with Adam (the client on the distribution side) to discuss the progress since their last meeting in December. They talked through the load profile Excel spreadsheet and generated graph, and how the load shape is uniquely situated in comparison to other load profiles in the way that it peaks at 7 AM (when classes commence) and troughs off at 6 PM (when campus clears out). Typically, a circuits' load is increased at that 6 PM time as people return home and begin using more lights in the dark. After this discussion, we moved into discussing how OpenDSS was working and any concerns. The client has another team at UMKC that is also beginning work on OpenDSS, so he recommended a professor if there were any questions unable to be answered by ISU faculty. We also discussed plans to research solar options, looking at square footage on the rooftops on campus and how to maximize daylight for energy production.

## Monday 2/24 Transmission (Substation) team meeting with Client:

### **Key Discussion Points:**

#### **1. Elevation Drawings & GA File:**

- The GA file provides a bird's-eye view, while the elevation study represents the side view.
- Highlighted arrows in the GA indicate elevation views.
- Elevation drawings should focus on side views, side dimensions of equipment, and spacing.
- Equipment names (e.g., switch) should be included rather than just stock numbers.
- The goal is to start with elevation details before moving to cable analysis.

#### **2. Cable Conduits/Schedule:**

- Recently uploaded to the OneDrive with the ISU schedule.
- Team decided to **hold off** on cable conduits for now until LLBOM is done/GA becomes more finalized.
- Standard project flow: **GA → Elevation → Cable & Conduits**.
- Mina may take ownership of the Cable Conduits portion after completing the LLBOM.

#### **3. Next Steps for Elevation Study:**

- **MacKenzie** will take on the elevation portion.
- Work with **Sean** to align elevation and GA.
- Sean will update today; work can begin after that.
- Rough draft of the elevation study is due **next Wednesday, March 5th** (can be submitted earlier).
- If there are questions, email the client first before proceeding.

#### **4. LLBOM Update:**

- Mina's LLBOM is almost done; due **Friday**, but may be completed earlier.

#### **5. Schedules & Section 10 Figures:**

- Review and select section 10 figures relevant to the project.
- Figures should outline **what equipment is installed and how** it is installed.
- Example: **Station Service 25 KVA** – Identify figures that apply.
- Justify equipment selections and align with the **one-line diagram** and GA.
- Not all equipment will have cables/conduits (e.g., non-motor-operated switches).
- Flag selected section 10 figures in the **binder (shared on OneDrive)** for reference.
- When completed, email flagged selections for review to the client.

## Monday 2/24 Distribution team meeting with Client:

The distribution team had a scheduled meeting with Adam on 2/24, but he had to cancel last minute due to a scheduling conflict.