APPENDIX E—DISTRIBUTION LINE MINIMUM DESIGN REVIEW INFORMATION AND SUGGESTED WORKSHEET

The following guidelines are provided, and corresponding information must be submitted with each Permit application for Pole Attachments on Utility's system. Utility may direct that certain Attachments do not require the submittal of Design Review Information. These Attachments are noted at the end of this section.

Each Permit application must include a report from a professional engineer registered to practice in the State of Michigan, and experienced in electric utility system design, or a utility-approved employee or contractor of Licensee. This report must clearly identify the proposed construction and must verify that the Attachments proposed will maintain Utility's compliance with NESC Class B construction for the loading district as outlined in the NESC Section 25.

In addition, the Utility may require more stringent standards beyond NESC Section 25 for specific areas depending on future use and construction. As such, the NESC is a code structure specifying minimum standards that may be increased to Utilities perceived level of safety and allowing for future expansion without modification of the system each time a new attachment is presented by an outside party. The applicant should verify with the Utility Engineering Department the owner's current standard to be applied.

Utility may or may not require that all of the following information be submitted at the time of the Permit application. The applicant shall have performed all required calculations and be ready to provide the detailed information below within fifteen (15) calendar days of notice. Applicant shall keep copies of the engineering data available for a period of twenty (20) years.

In determining compliance, the following minimum conditions shall be used in the calculations for pole strength:

1. All single phase lines shall be assumed to have been reconductored to 4/0 AWG ACSR, code name Penguin conductor for both phase and neutral. If a larger conductor size exists, the larger size shall be used in the calculations.

2. All three phase lines shall be assumed to have been to 336 MCM AWG ACSR, code name Linnet) conductor for three (3) phases and neutral. If existing conductors are larger than 336 MCM AWG ACSR, the larger size shall be used in the calculations.

3. All pole lines shall assume a secondary/service conductor, installed from pole to pole, of #4/0 AWG triplex cable, with an ACSR messenger.

4. For pole strength calculations, all poles shall be as they actually exist, or be considered Class 4 for calculations.

5. All line angles or dead ends shall be guyed and anchored. Transverse pole strength shall not be assigned to attaching pole users for line angles, *i.e.*, pole should be viewed as being void of other cables, conductors, wires or guys and considering only the applicant's wires/cables for guying calculations.

6. Points of attachment shall be as they actually exist on the poles.

7. For a Utility-approved joint use of anchors, the Licensee shall utilize guy insulators in its guys.

Lessee shall comply with any NESC and/or Utility safety factors, whichever is more conservative, in their designs. The engineer for the Permit applicant shall provide for each application the following confirmations:

- **Required permits that have been obtained** (insert n/a if not applicable):

________ (y/n) U.S. Corp of Engineers.

________ (y/n) Highway—state, county, city.

________ (y/n) Railroad.

________ (y/n) Local zoning boards, town boards, etc.

________ (y/n) Joint use permits, if required.

________ (y/n) Notified other pole users of contacts or crossings.

- **Confirm that you have:**

________ (y/n) Obtained appropriate franchise(s).

________ (y/n) Obtained pole/anchor easements from land owners.

________ (y/n) Obtained crossing and overhang permits.

________ (y/n) Obtained permit to survey R/W.

________ (y/n) Completed State of ________ Department of Transportation requirements.

________ (y/n) Placed permit number on plans.

________ (y/n) Complied with ________ Underground Facility Location requirements.

________ (y/n) Included sag/tension data on proposed cable.

Calculations are based upon the latest edition of the NESC and the latest editions of the requirements of the State of ________.

It is Licensee's responsibility to obtain all necessary permits and provide the Utility with a copy of each.

The engineer for the Permit applicant shall provide for each Pole(s) the following information:

- Project ID ___________________________
- Pole number ________________________ [if pole tag missing, contact Utility]
- Pole class____________________________ [existing—*i.e.*, 4, 3, 2…]
- Pole size ____________________________ [existing—*i.e.*, 35, 40…]
- Pole type ____________________________ [Southern Yellow Pine, Douglas Fir…]
- Pole fore span _______________________ [feet]
- Pole back span_______________________ [feet]
- Calculated bending moment at ground level _______________ [ft–lbs]

<u>Existing</u>:

- Power phase condition ________________quantity of________________ AWG/MCM ______________________ CU/AA/ACSR @________________feet above ground line
- Power neutral condition _______________quantity of________________ AWG/MCM ______________________ CU/AA/ACSR @________________feet above ground line
- Power sec condition __________________quantity of________________ AWG/MCM ______________________ CU/AA/ACSR @________________feet above ground line
- Telco #1 cables __________qty of___________dia @___________ ft above ground line
- CATV #2 cables _________qty of___________dia @___________ ft above ground line
- User #3 cables___________qty of___________dia @___________ ft above ground line
- User #4 cables___________qty of___________dia @___________ ft above ground line

- User #5 cables__________qty of__________dia @__________ ft above ground line
- User #6 cables__________qty of__________dia @__________ ft above ground line

Proposed:

- Proposed cables__________ qty of ________ dia @_________ ft above ground line
- Proposed cables__________ qty of ________ dia @_________ ft above ground line

AGL = Above Ground Level

The minimum vertical clearance under all loading conditions measured from the proposed cable to ground level on each conductor span shall be stated above. Variations in topography resulting in ground elevation changes shall be considered when stating the minimum vertical clearance within a given span.

Calculated pole bending moment at ground level: __________________________[ft–lbs]

Pole breaking bending moment at ground level: ___________________________[ft–lbs]

Calculated transverse safety factor: _______________ [ratio should be greater than 1.00]

Proposed loading data [provide similar data for each cable proposed]:

A. Weight data (cable and messenger)—

1. Vertical weight, bare = ____ [#/ft]

B. Tension data (final tensions on messenger)—

1. NESC maximum load for area of construction: _____________________ [lbs]

2. 60° F, NO wind: ____ [lbs]

Permit applicant’s engineer shall provide for each transverse guy, or dead end to which guys and/or anchors are attached, the following information:

- Pole number ____
- Calculated cable messenger tension under
  NESC maximum loading conditions ____________________________________ [lbs]

If connection is:

- A dead end, is it a single or double? ____________________________________[S, D]
- A change in tension, what is change? ____________________________________ [lbs]

- A line angle, what is angle change? ________________________________ [degrees]
- What is tension change at angle? ______________________________________ [lbs]

<u>For each dead end</u>:

- Point of attachment for guy hook _________________________________[feet AGL]
- Anchor distance from pole ____ [feet]
- Calculated guy tension ____[lbs]
- Rated guy working strength ____[lbs]

<u>For each change in tension</u>:

- Point of attachment for guy hook _________________________________[feet AGL]
- Anchor distance from pole ____ [feet]
- Calculated guy tension ____[lbs]
- Rated guy working strength ____[lbs]

<u>For each line angle</u>:

- Point of attachment for guy hook _________________________________[feet AGL]
- Anchor distance from pole ____ [feet]
- Calculated guy tension ____[lbs]
- Rated guy working strength ____[lbs]

<u>For each anchor</u>:

- Anchor distance to nearest anchor ____________________________________ [feet]
- Calculated anchor tension____[lbs]
- Rated anchor strength ____[lbs]
- Soil composition ___________________________________ [sandy, loam, clay, rock]