PUGET SOUND ENERGY

Sammamish – Juanita Transmission Line Project
Pole Installation Narrative

Within the City of Redmond, Puget Sound Energy (PSE) will be installing 5 different pole types: direct embed wood poles, direct embed wood poles with guy anchors, direct embed steel poles, steel poles with foundations, and wood H-frames. A majority of the poles will be direct embed wood poles. Based on soil conditions or in areas where the transmission line turns at an angle, additional support is needed in the form of guy anchors or steel poles with or without foundations.

Sammamish-Juanita Poles within City of Redmond

Pole ID	Pole Material	New or Replacement
South of Sammamish Substation		
SAM-LOC 0/5	wood	replacement
SAM-LOC 0/4	wood	replacement
SAM-LOC 0/3	steel w/foundation	replacement
SAM-LOC 0/2A	steel	replacement for 0/2
SAM-MOR 0/2	steel w/foundation	replacement
SAM-NOB 0/3	steel w/foundation	replacement
SAM-NOV 0/1	steel w/foundation	new
Sammamish Substation to Willows Road NE		
0/1	steel w/foundation	new
0/2	steel w/foundation	replacement
0/3	wood	new
0/4	wood w/guys	new
0/5	wood	new
East of Willows Road NE		
0/6	wood w/guys	new
0/7	wood w/guys	new
0/8	wood	new
0/9	wood	new
0/10	wood	new
0/11	steel	new
0/12	steel	new
0/13	steel	new

0/14	wood	new
0/15	wood	new
0/16	wood	new
0/17	wood	new
0/18	wood	new
0/19	wood	new
0/20	wood	new
1/1	wood	new
1/2	wood	new
1/3	wood	new
1/4	wood	new
1/5	wood	new
1/6	wood	new
1/7	wood	new
1/8	wood	new
Beverly-Renton Corridor		
15/9X	wood H-frame	replacement
21/1	wood H-frame	replacement

Direct Embed Wood or Steel Poles: For direct embed poles, whether wood or steel, the installation process is essentially the same. The pole hole is either dug using an auger attachment or by use of a vactor truck. If an auger attachment is used, the spoils from the hole are generally spread onsite. If a vactor truck is used, then the spoils are vacuumed from the hole and taken offsite. The pole hole depth is generally equal to 10 percent of the overall pole length plus two feet. For example, a 90 foot tall pole will be embedded into the ground 11 feet, with 79 feet above grade. Typically, the hole diameter is 12 to 18 inches greater than the pole diameter.

Once the pole is placed into the hole, gravel backfill is placed around the base of the pole to stabilize the pole. In areas of soft soils, a steel casing may be used to hold the excavation open. In this case, the casing can be vibrated in and the dirt removed with a vactor truck. Once the pole is installed and backfilled, the caisson will be cut below grade and backfill placed around the base of the pole at grade.

For poles that require guy anchors, the pole is installed and then the anchors are attached to the pole using guy wires. The number and placement of anchors is dependent upon the required tension for the pole. Depending upon site and soil conditions, anchors are either screwed into the ground (helical pier anchors) or installed by augering a hole, installing the anchor, encasing the anchor in cement, and backfilling the hole (plate anchors).

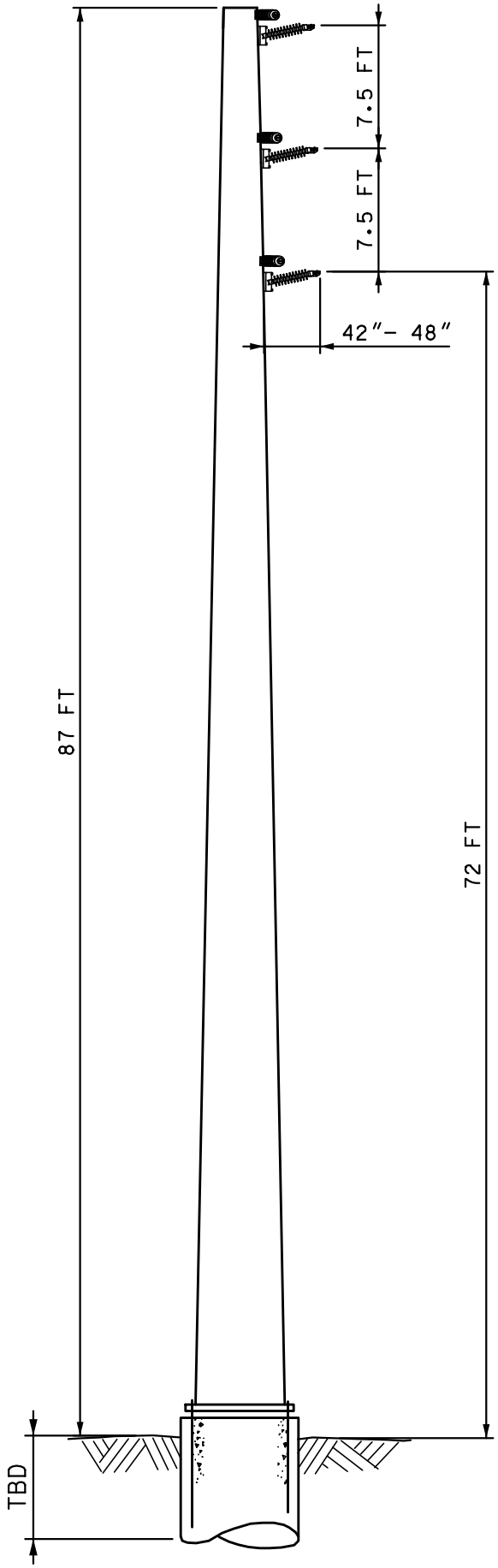
H-Frame Poles. H-frame poles are installed in the same manner as direct embed poles. Each H-frame includes two wood poles that share a cross arm and are connected and supported through wood supports and bracing.

Poles with Foundations. For steel poles with foundations, the hole is created using the same methods as direct embed poles. A reinforced-steel anchor bolt cage is installed in the excavated hole to provide structural support for the foundation. After the bolt cage is installed, the hole is filled with concrete and

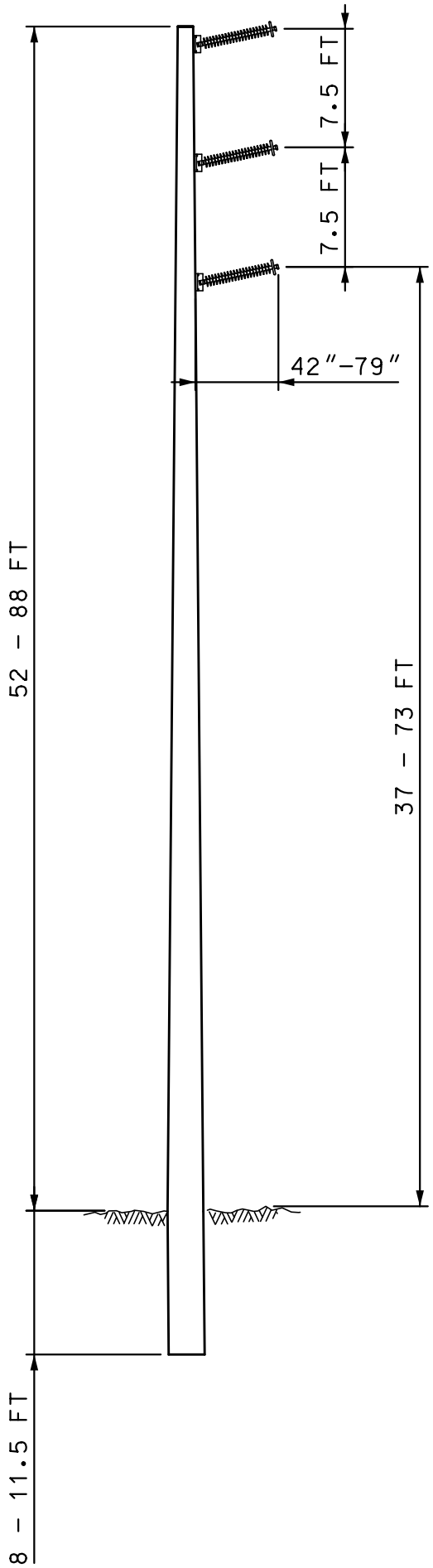
allowed to cure for up to 28 days. To construct the actual steel pole, two methods of assembly can be used, the first of which is to assemble the poles, braces, cross arms, hardware, and insulators on the ground. A crane is then used to set the fully framed pole by attaching to the drilled pier foundation. Alternatively, aerial framing can be used by setting the first pole section on the foundation, and subsequently adding the remaining sections and equipment via a crane.

Pole Replacement. In instances where a pole is being replaced, a new pole is installed first adjacent to the existing pole. This allows for the aerial conductor to be transferred from the old pole to the new pole before the old pole is removed. South of Sammamish Substation, some pole replacement is occurring in a linear position away from the existing pole. In these cases, the transmission conductor will be restrung.

ATTACHMENT 17

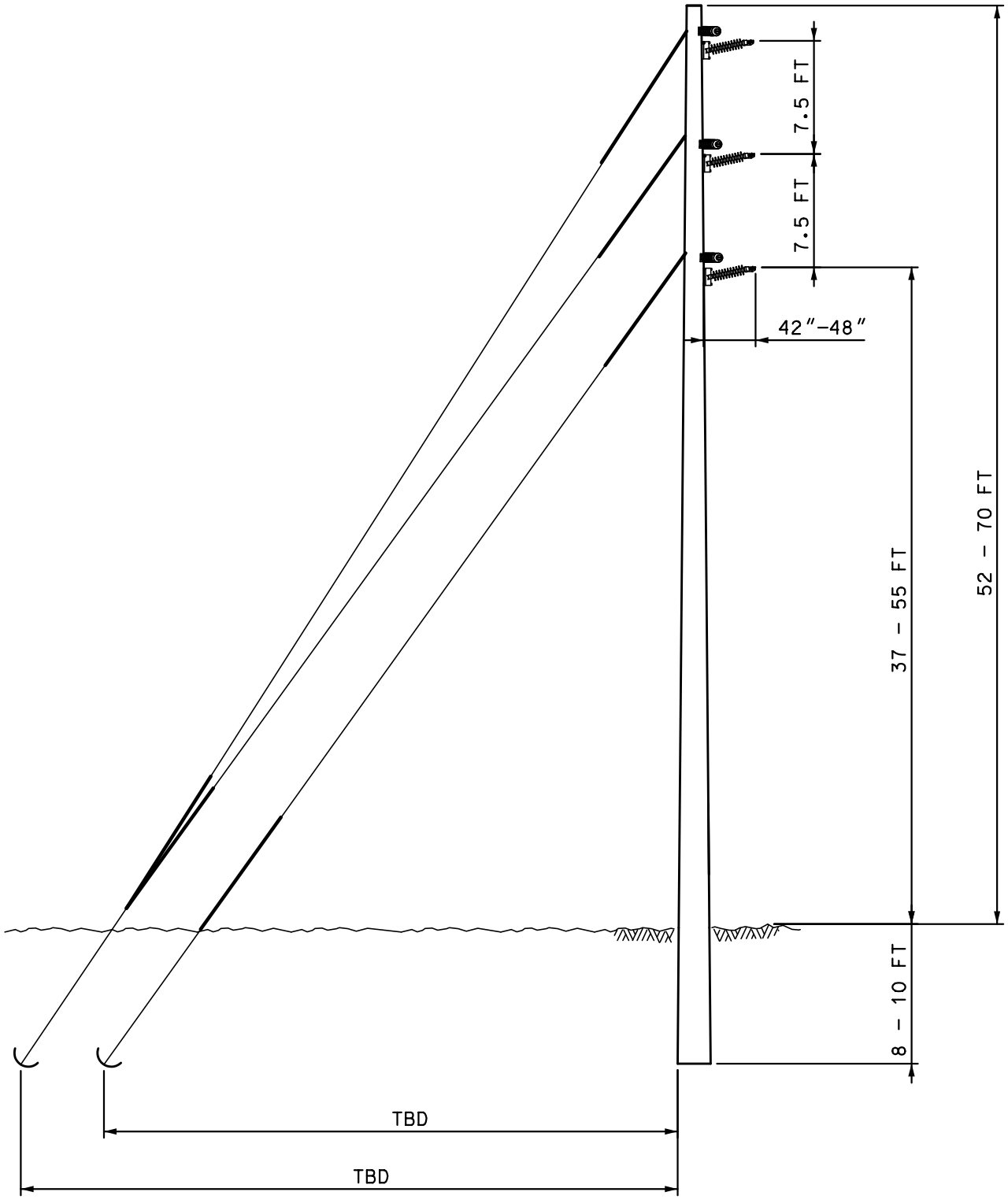


MATERIAL: STEEL
COLOR: GALVANIZED



MATERIAL: WOOD
COLOR: BROWN

ATTACHMENT 17



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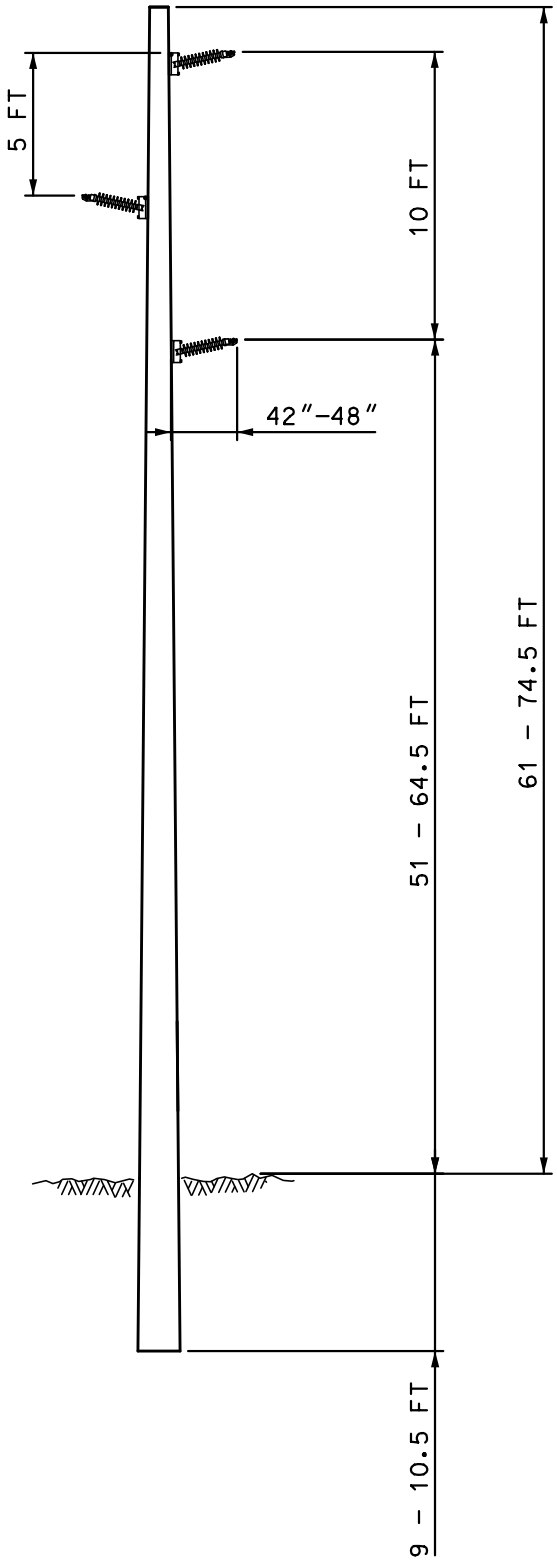
COLOR: BROWN



MATERIAL: WOOD
COLOR: BROWN

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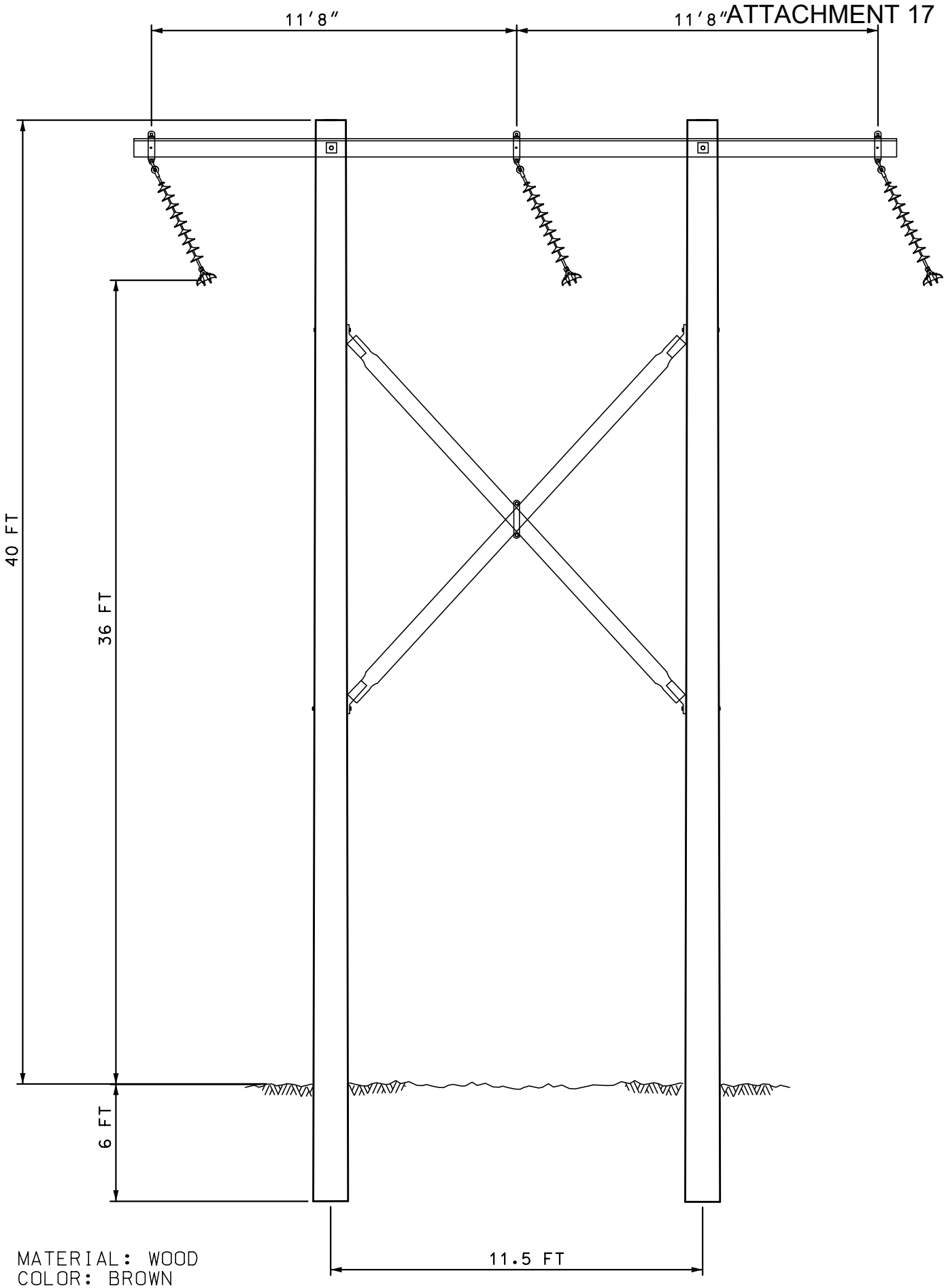
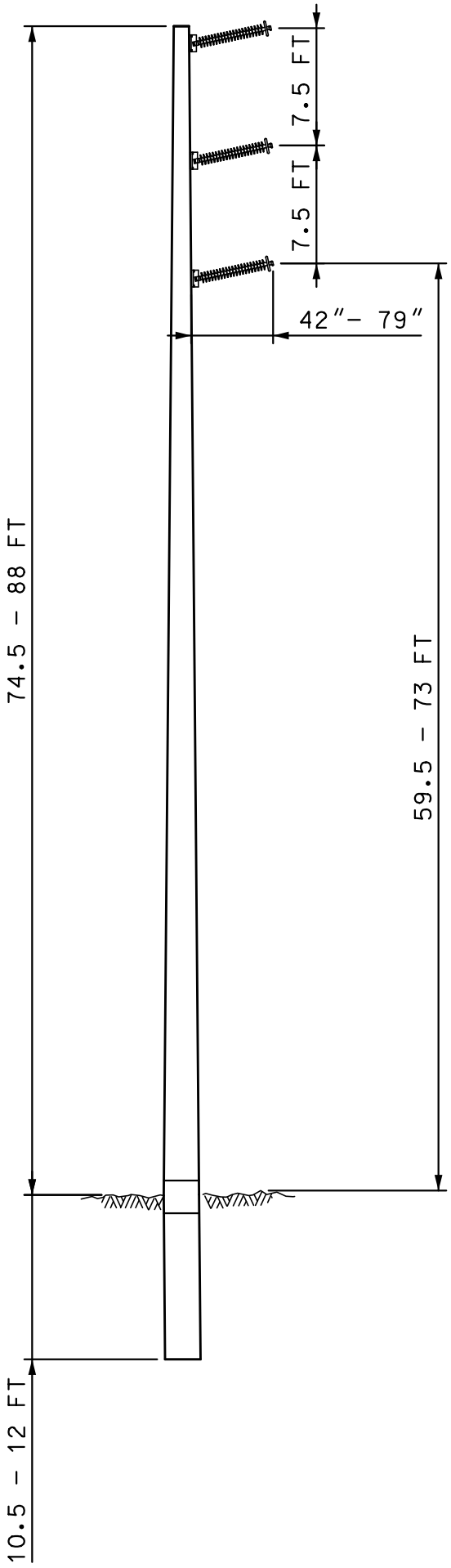


MATERIAL: WOOD
COLOR: BROWN



MATERIAL: STEEL
COLOR: GALVANIZED