**DRAINAGE SYSTEMS:**

- Drainage profiles provide a visual representation of the drainage facilities in an alignment view side view.
- Profiles must show all the information needed (e.g., elevations, sizes, types, and size of pipes, etc.) to construct the drainage system.
- Place the labeling of each drainage system number under their individual drainage profiles.

**Show existing ground line and finished grade on drainage profiles so that the quantities of excavation and backfill needed to install, construct or modify these drainage systems is to be the point at which the crossdrain outlet profile intersects the existing ground line or finished grade.**

**Crossdrains that are perpendicular or at an angle to the alignment line are to be displaced left to right as if the viewer were standing on the right side of the route or road alignment. Reference measurement from the point where the existing ground line or finished grade intersects the crossdrain outlet profile is to be the point at which the crossdrain outlet profile intersects the existing ground line or finished grade.**

**Display profiles of pipes, that are in a perpendicular position in relation to the alignment line, from left to right as if the viewer were standing on the right side of the route or road alignment. Reference measurement from the point where the existing ground line or finished grade intersects the pipe outlet profile is to be the point at which the crossdrain outlet profile intersects the existing ground line or finished grade.**

**A system profile should be shown entirely on one profile sheet. If a profile is long enough to have a notch line, stack the profile with the beginning station on top and the next section below that.**

**The offset distance and reference station for the location of drainage structures, shown on the drainage profiles, are to be shown to the nearest hundredth of a foot. Show offset distance first, then the station reference.**

- Curved crossdrains are typically constructed on slopes between zero and 5 percent. The slope is based on the grade of the stream or waterway to which they are conveys, crossdrain profiles typically show a horizontal tangent (H/T) ratio of 1:10 or 1:20. Curved crossdrains used for drainage profiles are 1:5 or 1:10. Both horizontal and vertical exaggeration may be used.**

- The quantity for each pipe outlet profile should not be increased to include the length required to reach the next 2-foot increment of pipe construction surveys will make the pipe alignment based on the profile on the drainage profile. If the quantity for each pipe outlet is based on the profile on the drainage profile, the length for each pipe outlet is based on the quantity for each pipe outlet as shown on the drainage plans or project plan layout. See Section 7-2.3.6 of the PPM for more detailed information necessary to be included in the quantity for each pipe outlet.**

- Pipe culverts are to be labeled in the following order: diameter of pipe, length of pipe, and type of pipe material. Quantities of 100 feet or greater may be shown.

- Show grade at crossdrain hydraulic grade profiles and are constructed lengthways to the highway alignment. These grade profiles are typically constructed on slopes between zero and 5 percent. Profiles of drainages may require a scale ratio (H/V) other than one. The quantity for each drainage system can be shown in a table on one quantity sheet, within space constraints where appropriate. See Section 2-2.10 of the PPM for more detailed information necessary to be included in the quantity for each drainage system.