

CONSTRUCTION STAKING

By Richard M. “Mike” Benton, PSM



In recent years, planners and engineers have had to exercise greater creativity to produce residential, commercial, and infrastructure project designs that are capable of providing economic success while being aesthetically pleasing and environmentally friendly. These designs are frequently characterized by a whole different approach that brings with it a new set of challenges for surveyors to accurately provide construction staking to implement the design.

Historically, construction staking was straight-forward. Typically, a land surveyor was requested to stake features that were straight and rectangular in shape with a small number of stakes required to facilitate construction of the design as planned. Current designs tend to contain many curved features and have a low tolerance for errors. Thus, the contractor requires accurate field staking to be able to construct the features correctly.

One example of creative design can be found in most new retention ponds. With land cost at a premium, retention ponds have become more intricate in design and shape to provide the required storage capacity with as little land area impact as possible. Another example is seen on roadway projects. In years past, roads would typically consist of straight sections, with few curves. Now, roadways are more frequently curved, with multiple radii and reverse curves common to maximize lot yields for subdivisions. This dramatically increases the difficulty and amount of construction staking required to support accurate construction of the project.



Storm system designs have also changed. Past designs typically required staking the stormwater control structure location at each end of the pipe run, which would provide enough guidance for the contractor to install the pipe. Now, with integrated curved designs intended to reduce the amount of impacted area and protect environmentally sensitive areas, multiple control points are needed to define the location of the curved sections of the pipe.

Due to the more creative designs, and designers generally providing less information on the plans to reduce the cost of designs, the surveyor must be more imaginative with their approach to staking the design features. One way to address this requirement is to increase the frequency of stakes to delineate a certain feature, along with the approach to pre-calculations to expedite the field effort. Another method, which Chastain-Skillman has adopted, is to transfer AutoCAD and other electronic data files directly to the field crew on the construction site. This reduces the need for the survey crew to interpolate data shown on the plans, and bridges the gap from the plan to the finished product on the ground.

When Chastain-Skillman surveyors receive plans for a new project, one of the key quality control steps we take is to review the staking increments needed to delineate certain project features, and look for possible conflicts within the design. Potential issues can then be proactively communicated to the designer and/or client for resolution prior to performing work in the field.

In summary, to remain competitive, project planners and designers have had to become more creative and employ design features that are different from historical practices. While these changes have posed new construction staking challenges for surveyors, creative approaches to communicating information and meeting construction contractor needs for guidance in the field have allowed our survey crews to help make these residential, commercial, and infrastructure projects technically and economically successful ventures for all involved.

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