PURPOSE: To Set Out Uniform Procedures for Establishing Bench Marks.

1. GENERAL:

A complete, tight and dependable set of bench levels is one of the most important items of the construction survey. A large portion of the pay quantities rely on elevations as the basis of measurement. A loose line of bench levels can be the basis of disagreement and claims.

The equipment used for this work shall be in good repair and adjustment. Levels should be checked by the two-peg method and adjusted if necessary. Each rod used should be checked for extended length and condition.

Before any staking involving elevations is done on the project, the bench marks shown on the plans will be checked for location and elevation. At this time, any bench mark that may be disturbed by construction will be re-established and any temporary bench marks needed will be set.

Bench marks will not be set on utility poles. In many instances they are unstable and a spike or bolt driven into a pole becomes a serious safety hazard to individuals using the bench mark and those charged with maintenance of the service. As an alternative, in the absence of topographical features to accommodate a bench mark, a steel rod no less than ½ inch in diameter and 2 feet in length may be driven into the ground and properly referenced.

2. PROCEDURE:

The following minimum procedure should be followed in checking and establishing bench marks:

2.1. During the reading process, the rod will be plumbed and readings will be recorded to the nearest 0.01 foot.

2.2. Back sight and foresight distances will be substantially balanced within any level loop.

2.3. Side shots on bench marks will not be permitted. The turn through method will be employed.

2.4. Bench marks will be established at intervals and locations consistent with good engineering practice and generally not in excess of 1000 feet.

2.5. Allowable vertical error in feet will be 0.05 multiplied by the square root of M where M is equal to the length of the level circuit in miles.

Errors in bench mark elevations will be corrected in a manner that will not effect the elevations of succeeding bench marks. When a major error which will affect the elevation of succeeding bench marks is found, the matter will be referred immediately to the County Engineer who will work out the details for making the correction.