

GUIDANCE DOCUMENT
Irrigation System, Microirrigation, Code 441

I. References

- A. Design Criteria
 - 1. Georgia FOTG Section IV, conservation practice standard, Irrigation System, Microirrigation, Code 441.
- B. Design Procedures
 - 1. NEH, Part 623, Irrigation, Chapter 7, Trickle Irrigation.
- C. Design/Layout Surveys
 - 1. TR-62 Engineering Layout, Notes, Staking & Calculations.
 - 2. NEFH Part 650, Chapter 1, Engineering Surveys.

II. Documentation

These instructions apply to micro irrigation systems through which water is distributed in the irrigated area by means of small diameter pipes and applied at or near the soil surface. Permanently installed mains and submains shall be documented according to documentation for Irrigation Pipeline, Code 430.

- A. Preliminary Investigation See NEH Part 652, Chapter 6, Irrigation System Design.
- B. Engineering Surveys

Gather sufficient survey data to plan the location and size of microirrigation system, calculate quantities and prepare cost estimates. Using the preliminary information obtained in A. above, determine the extent of survey data needed: (1) minimal survey; (2) moderate survey data, or (3) detailed topographic survey. Proceed as outlined below based on the survey requirement. All survey data shall be recorded in the engineering field book or in electronic files.

- 1. Minimal survey data is required where the mains and submains can be located and staked in the field without the use of a topographic map. It is adapted to areas where the topography is flat and such that the mains and submains can be readily located. Determine degree and direction of land slopes and key elevations by visual inspection or minimal surveying.
- 2. Moderate survey data is required where the mains and submains can be located and shown on a plan map using random measurements and rod readings for key elevations.
 - a. Profile around and across the area to be irrigated. Distances may be chained or paced.
 - b. Survey key elevations and locate on a sketch or photo. Distances may be measured from scaled drawings or photos of known scale.
- 3. Detailed topographic survey is required where a detailed contour map is needed to design and layout the system and is necessary where elevation differences are considerable.
 - a. Rod readings shall be taken on a grid spacing not exceeding 200 feet and as needed to define surface features such as breaks in slope, depressions, knobs, etc.
 - b. Establish reference points for use as vertical and horizontal control in layout and construction check surveys. Describe the location of these points in the field notes.
- 4. Note location of any utilities or utility markers.

C. Designs

1. Determine the system requirements.
See Part 652, National Irrigation Guide, Chapter 6B, Micro irrigation System, for design example.
2. Record the design information, including existing and proposed structures on forms NRCS-ENG523A (or equivalent) or other appropriate standard form. Design must conform to conservation practice standard Irrigation System, Microirrigation, Code 441 and the appropriate NRCS conservation practice standard for all components including flush valves and filters.
3. Show all additional computations on NRCS-ENG-523A (or equivalent) when a standard form is not available.
4. Prepare bill of materials and cost estimate as needed.
5. Develop engineering plans and specifications. As a minimum the plans and specifications shall include:
 - a. Plan map of the system. The detail shown on the plan map should be adequate to define the limits of the work and locate all the components of the system. A sufficient number of reference points need to be shown so that any qualified person other than the designer can layout the work.
 - b. Size, type, and quality of all emitters, laterals, and components.
 - c. Location and details of filters required.
 - d. Location and details of flushing system.
 - e. Location of utilities and notification requirements.
6. Develop a site specific O&M Plan for the practice.

D. Construction Layout

Review the plans and specifications with the landowner and contractor prior to the start of construction. Ensure the landowner/contractor thoroughly understand their responsibilities including obtaining all permits, easements, etc. Record layout information in the engineering field book.

1. Consult with the installer to determine layout needs.
2. Set stakes required to establish alignments, location, and elevation of pipeline, and other appurtenant structures, or furnish necessary information to installer.

E. Construction

Adequate site visits and checks shall be made during construction to verify that the plans and specifications are followed.

Any changes in the design must be reviewed and concurred by the landowner and shall be approved by the designer and person with appropriate engineering design job approval authority.

F. Construction Checkout

1. Check to determine that the completed practice conforms to plans, designs, and specifications.
 - a. Check the system for satisfactory operation. Lateral lines should have been flushed to remove sediment or foreign material, air purged, and leakage repaired before making any measurements.

- b. Check lateral size, length, spacing and manufacturer's markings; applicator locations, spacing, type, and kind; valves; filters; pressure regulators; and all other appurtenances for conformance to plan and design. Record on the engineering plans all changes to the plan and design.
 - c. The measurements shall be recorded along with their locations
 - d. Record survey data in the engineering field book, or other appropriate form. Include elevations and measured lengths and quantities which are needed.
- 2. Prepare as-built drawings showing final construction dimensions, details, etc. if changes were made during construction.
 - 3. If the practice meets NRCS standards and specifications, then the statement "This practice meets NRCS practice standards and specifications" shall be placed on the checkout document and signed and dated by the responsible person with appropriate level of engineering job approval authority.

G. Reporting and/or Certifying

After it has been determined and documented that the practice meets NRCS plans and specifications, it can be reported and certified. The extent of the practice to be reported is the number of systems and the irrigated area in acres. The extent of the practice to be certified is the quantities used as the basis for payment.