

**NATURAL RESOURCES CONSERVATION SERVICE
DOCUMENTATION REQUIREMENTS FOR
IRRIGATION LAND LEVELING**

CODE 464

Design Criteria

Design in accordance with the criteria listed in [National Engineering Manual, Section KS523.2](#) and [Conservation Practice Standard 464, Irrigation Land Leveling](#). The design should also conform to the instructions for the design of gravity irrigation systems in [Section KS652.0605\(b\) in National Engineering Handbook 652 \(NEH 652\), Irrigation Guide](#), and follow the format of the overall irrigation development plan in [Section KS652.0106\(f\) in NEH 652](#) for the operating unit. Refer to [Section KS652.0710\(e\) in NEH 652](#) for land leveling design procedures and aids.

Surveys

The field will be grid-staked. Except for special cases, the grid will be laid out on 100-foot by 100-foot spacing. All significant fringe areas will be included in the staking. Where possible, stake the grid so that all short stations or fringe areas are located on 1 or 2 sides of the field. This will simplify computations.

Record leveling notes electronically or on Forms NRCS-ENG-28, Loose Leaf Field Sheet, and NRCS-ENG-29, Loose Leaf Field Sheet, or [Forms KS-ENG-37 and KS-ENG-37a, Field Notes](#) (or equivalent) or plane surface design job sheets.

Set at least 1 permanent bench mark. Set reference hubs as needed.

Take shots at significant points on all fringe areas and record horizontal dimensions referenced to a known grid point.

Take shots on any significant highs or lows in the field that occur between the grid stakes. Record the location of these by referencing to a known grid point.

Design

Develop the design in accordance with the "Design Criteria" section above.

If the design is done manually, prepare a land leveling map and list the following:

- Original ground elevation, planned or design elevation, and cut or fill at each grid point— Refer to [Section KS652.0710\(e\) in NEH 652](#) for an explanation of leveling map format.
- Draw in fringe areas with elevations at significant points.
- Bench mark data, hubs, and map scale.
- Water delivery elevation and location if gravity outlet.
- Direction of irrigation.
- Water distribution system (open ditch, buried, or gated pipe) and also any water control structures that are needed.
- Drainage system including any needed structures.
- Prepare a table with headings for field number or letter, area in acres, cut yardage, fill yardage, percentage of cut to fill ratio, and cubic yards per acre for each field. The bottom line of the table should be a sum of the totals for the entire area being leveled. Yardage can be computed using the 4-point method, AutoCAD. A computer program can be used to compute the yardage and complete the design information (if available).
- Draw in and label field benches.
- Show location of any buried utilities and make notations (if needed) as to depth of cut or other pertinent information.

Layout

Mark the cuts and fills on the grid stakes using the leveling map as a reference. This may be done by anyone adequately trained under Natural Resources Conservation Service (NRCS) supervision.

Land Leveling Checkout

Checkout tolerance shall not exceed ± 0.1 foot from the design elevation with no reverse grade in the direction of irrigation.

The person doing the checkout should sign and date the land leveling map, certifying that the completed job conforms to the original design and is within the allowable tolerances.