STATEMENT OF WORK
IRRIGATION SYSTEM, MICROIRRIGATION (441)
Arizona (2010)

These deliverables apply to this individual practice. For other planned practice deliverables refer to those specific Statements of Work.

INVESTIGATIONS AND SURVEYS

Deliverables

1. Preliminary site assessment or investigation to determine the field and/or irrigation system layout, and identify crop types, tillage practices, water use (peak consumptive use) and may include:
   a. Soil or geological investigation to determine soil conditions, including type, texture, intake rate, available water holding capacity (AWC), characteristics (physical and chemical properties), depths, topography, water tables, inhibiting layers, etc. Classification shall be by the Unified Soil Classification System (SM, CL, etc.) and shall include the texture (silty sand, lean clay, etc.).
   b. Water source (i.e., available flow rate, volume, seasonal variation) and water quality test results (if applicable).
   c. Verify appropriate state or local laws for permitting and approval requirements and notify landowner of his/her responsibilities.
   d. Verification or certification of used materials (if any).
2. To adequately plan and layout this practice, a detailed topographic survey is required, that adequately details:
   a. Site topography, as needed to show the irrigation system position and component layout, irrigation methods, physical features of the site (field boundaries and slope), including existing features/practices, ground elevations, location of any utilities or markers, etc.
   b. If applicable, a permanent benchmark(s) may be set and described. Preferably, the elevations and coordinates should be based on a local (assumed) or coordinate system (State or grid) and clearly stated on the plan. Datum may be in the form of Northing and Easting coordinates or Longitude and Latitude.

DESIGN

Deliverables:

1. Design documentation that will demonstrate that the criteria in NRCS practice standard have been met and are compatible with other planned and applied practices.
   a. Practice purpose(s) as identified in the conservation plan.
   b. Completed Irrigation Planning Worksheet and Irrigation System Inventory Worksheet from NEH Part 652 “Irrigation Guide” must be included in the Conservation Plan. These worksheets can be downloaded from the NRCS website at:
      http://policy.nrcs.usda.gov/RollupViewer.aspx?hid=17092
      NRCS can also make the fillable “pdf” versions of these forms available to TSPs and outside consultants if requested in writing or by email.
   c. To comply with the Arizona Supplement §AZ501.05 to the NEM Part 501, Subpart A, a design report or narrative showing the functional requirement of the job, design procedures, and assumptions must accompany the engineering drawings and specifications submitted for review and approval. Such report must be prepared either by or under the direct supervision of an AZ licensed Civil or Agricultural Engineer with proficiency in Irrigation system design. Systems designed by Engineers licensed in other branches of Engineering will also be acceptable provided that the Engineer performing the work furnishes documented evidence that he or she is qualified by education, technical knowledge or experience to perform the irrigation design work per the provisions of Arizona Board of Technical Registration rules R4-30-301 “Rules of Professional Conduct” and that the work is exempt under Arizona Revised Statute (ARS) §32-143.
   d. List of required permits to be obtained by the client.
   e. Compliance with Federal, State, Tribal, and local utility safety laws and NRCS policy (NEM Part 503-Safety, Subpart A - Engineering Activities Affecting Utilities 503.00 through 503.06) including Arizona Supplement §AZ503.02 to the NEM Part 503, Subpart A. A completed and signed Utility Check Sheet form NRCS-ENG-006 must be included in

the job file.

f. List of facilitating/component practices. Subsidiary and applicable components shall be designed in accordance with applicable conservation practice standards.

g. The design of a practice is the application of the Field Office Technical Guide practice standard criteria, practical experience and judgment, including all related computations and analyses to develop plans and specifications. All computations and decisions made during the design of a practice are to be checked by another qualified individual. Design computations, calculations or analysis shall include, but not limited to

   i. System Capacity: Determine the irrigated acres for each field/block or zone and system requirements as related to meeting the needs of the intended use (peak consumptive use, AWC, soil type and texture, impervious layers or water table, irrigation system efficiency or application rates, quantity, and timing of irrigation water availability, deficit irrigation, etc.).

   ii. Application, Rate, Frequency, Duration, Pressure, Uniformity and Percent area wetted, etc.

   iii. Hydraulics including. Perform a hydraulic analysis of the system using approved irrigation software (NRCS design spreadsheets, or approved equal) simulating the proposed irrigation system. Analysis should include type size and spacing of laterals, emitters, emitter discharge rate etc. required, pressure rating of regulators, elevation changes along lateral, lateral height, and friction loss determination for lateral(s), mainline, pump column, minor losses, etc. Include support

   iv. Filters and chemical injection. Provide information on the type, make, model and capacity of proposed filter and chemical injection system if included as part of the system.

   v. Irrigation fittings and appurtenances (type, size, pressure settings, capacity, head loss, location) shall be designed in accordance with applicable conservation practice standards or published manufacturer literature. Filters and chemical injection if considered in the design.

   vi. If applicable, type, size and efficiency of pump system, including capacity (gallons per minute) and total dynamic head (TDH).

   vii. Irrigation Water Management (IWM) Plan that must include (a) Micro Irrigation System Detailed Evaluation Worksheet and (b) Pumping Plant Detailed Evaluation Worksheet. These worksheets can be downloaded from the NRCS website at: http://policy.nrcs.usda.gov/RollupViewer.aspx?hid=17092
   NRCS can also make the fillable “pdf” versions of these forms available to TSPs and outside consultants if requested in writing or by email.

2. The Construction Drawings shall meet all the graphic and content requirements as set forth in the NEM, Part 541, Drafting, and shall include following required system components, but are not limited to:

   a. Project location map, including section, township and range, North arrow, cooperator/owner acknowledgement and certification signature blocks, engineering job class (cover sheet);

   b. References that the owner/cooperator are responsible for all permits, rights-of-way, easements and the contact, coordination and location determination of any existing utilities or clearances (buried utility disclaimer);

   c. If applicable, a map showing the location of the practice(s) or system in reference to a known or established benchmark or reference point with the location, description and elevation clearly shown. Topographical features and/or controls shall be shown, showing tie in with existing or other planned practices;

   d. Field surveys and notes, soil investigations or geologic soil boring locations and soil classifications, earthwork or material estimates/quantities, if applicable;

   e. System overview and layout (i.e., location and orientation of practice in relation to existing or planned facilities; identify the water source (reservoir, well, pump, etc.); stationing and alignment for all underground conveyance pipelines; field or irrigated boundaries; location of sprinkler systems; mainline and lateral line locations; vegetative requirements; construction/installation criteria, including State and Federal [OSHA] safety requirements, etc.);

   f. Micro irrigation system or parts details provided by the manufacturer/supplier where

applicable.

g. Appurtenance and/or fittings (i.e., valves, air vents, regulators, pressure relief valves, pressure regulators, flow meters etc.), as required, for proper system functionality.
h. Construction details/requirements for the conveyance pipelines, inlet structure, pump, back flow preventers as applicable.
i. Construction notes, details or specifications to clarify a component and furnish directions or site specific requirement, i.e. quantities of materials.
j. Layout with size, type, etc. of mainline, sub-main, Header manifold, laterals, drip tapes, flush lines etc.
k. Filter and chemical injection system with the necessary valves pressure gauges etc. if applicable.
l. Type of control system planned (automatic, semi-automatic or manual)
m. Use Arizona Construction and Material Specifications for each item of work and material, as applicable and available. Additional specifications may need to be written to provide full material and installation instructions. Fill in blanks and add or delete items from the specifications to make them fit the job as needed.
n. The cover sheet of the construction drawing must contain the NRCS Utility Statement as prescribed in the AZ Supplement §AZ503.02 to the NEM Part 503, Subpart A.

3. Design report and/or inspection plan, as appropriate (NEM Part 511, subpart B, Documentation, 511.11 and Part 512, Subpart D, Quality Assurance Activities, 512.30 through 512.32)..
3. Operation and Maintenance Plan
4. For designs completed by non-NRCS personnel, provide Certification that the design meets practice standard criteria and comply with applicable laws and regulations (NEM Subpart A, 505.03 (a) (3)). Certification shall be made by a licensed professional as governed by the AZ State Technical Board of Registration, and as stated in the NEM AZ505.1 (b).
5. Design modifications during installation as required.

INSTALLATION

Deliverables

1. Review the plans and specifications with the landowner and contractor prior to the start of construction (i.e. Pre Installation conference with client and contractor).
2. Ensure that the landowner/contractor thoroughly understands their responsibilities, including obtaining all permits, easements, etc. and/or verification that client has obtained required permits. Verification that client has obtained required permits.
3. Staking and layout according to plans and specifications including applicable layout notes.
4. Installation inspection (according to inspection plan as appropriate). Adequate site visits and/or construction checks shall be made during installation to verify that the plans and specifications are followed.
    a. Actual materials used (Part 512, Subpart D Quality Assurance Activities, 512.33)
    b. Inspection records
5. Facilitate and implement required design modifications with client and original designer
6. Advise client/NRCS on compliance issues with all federal, state, tribal, and local laws, regulations and NRCS policies during installation.
7. Certification that the installation process and materials meets design and permit requirements.

CHECK OUT

Deliverables

1. As-Built documentation.
    a. Extent of practice units applied
    b. Drawings, Each sheet of the drawing shall have a “As-Built” stamp and date on them. Any changes or modification, addition or deletions to the approved drawings shall be clearly identified with red ink in the as-built drawings.
    c. Final quantities
2. Certification that the installation meets NRCS standards and specifications and is in compliance with permits (NEM Subpart A, 505.03 (c) (1)). If the practice meets NRCS standards and

specifications, then the statement “This practice meets NRCS practice standards and specifications” shall be placed on the check out documentation and shall be signed and dated by the responsible individuals.

3. After it has been determined and documented that the practice meets NRCS plans and specifications, it can be reported and certified (Progress reporting).

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Irrigation System, Microirrigation, 441
- NRCS National Engineering Manual (NEM).
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook

State Contact: State Conservation Engineer or Water Management Engineer (Irrigation Specialist)