STATEMENT OF WORK
Irrigation System, Surface and Subsurface (443)
Montana

NRCS Technical Contact: Area Engineer (406) XXX-XXXX
NRCS Administrative Contact: District Conservationist (406) XXX-XXXX

The Statement of Work is a list of deliverables that the Technical Service Provider (TSP) shall submit to the landowner and the NRCS in order to meet the intent and purpose of Practice Standard 443 "Irrigation System, Surface and Subsurface." The TSP shall prepare and document the deliverables for Design, Installation, and Check Out, and above all, follow the criteria established in Practice Standard 443. The deliverables shall be submitted to the landowner and the NRCS in both hard copy and electronic (MsWord or pdf) format. Note: The technical references posted with the deliverables are recommendations.

DESIGN

Deliverables:

1. The TSP shall consult with an NRCS representative regarding the statements of work (technical deliverables) and Practice Standard 443 prior to design and construction. The landowner shall sign and submit a TSP-2 Form which authorizes the NRCS to provide the TSP with additional information from the NRCS case file, such as the contract item numbers and preliminary planning information.
2. The TSP shall personally make an initial site visit with the client for the purpose of collecting design information.
3. The TSP shall prepare and document the design deliverables under the subsection headings shown below. Documentation shall demonstrate that the practice is compatible with other planned and applied practices at the project site. The TSP shall identify and engage a qualified person to check the design methodology, technical references, plan drawings, and computations for accuracy.
   a. Narrative Design Report:
      i. Executive summary (background, applied practices, parties involved, Federal/State programs, cost, etc.).
      ii. Design objective(s).
      iii. Design references.
      iv. Discussion of assumptions and analyses performed under subsection headings shown below.
      v. Discussion of estimated quantities, material selections, construction methods, and cost.
      vi. Discussion of design alternatives that were considered.
   b. Survey:
      i. A local benchmark control.
      ii. Topography survey for contour elevations, horizontal alignments, grades, and locations of critical features (approximate property lines, utilities, roads, pivot point, trees, buildings, etc.).
      iii. Survey notes, which includes survey points and GPS coordinates obtained by the contractor.
   c. Soils:
      i. Identification of all soil map units at and around the site (Reference: NRCS Web Soil Survey).
      ii. Soil profile classification at least 10 feet below the vertical limits of the ditch or canal. Classification includes the Unified Soil Classification System, plasticity index, soil moisture, soil stiffness, color, shear strength, etc. (References: Soil borings and field/lab tests).
      iii. Soil profile classification down to the crop rooting depth. Classification includes the USDA Textural Classification, available water holding capacity, intake family, and slope. (Reference: NEH, Part 652, National Irrigation Guide, Chapter 2 "Soils;" Montana Irrigation Guide, Chapter 2 "Soils;" Montana Irrigation Manual, Chapter 2 "Soils").
      iv. Water Table Description. Soil mottling (redoximorphic features), seasonal high water table elevation, apparent water table elevation, and apparent source of water (localized lenses, regional water table, or irrigation-induced water table).
      v. Geologic investigation. Depth to shale/bedrock or other root limiting feature, connectivity to water tables.
   d. Crops:
      i. Crop Peak Consumptive Use (Reference: Irrigation Water Requirement (IWR) software).
      ii. Recommended management depth (References: NEH, Part 652, National Irrigation Guide, Chapter 3 "Soils;" Montana Irrigation Guide, Chapter 3 "Soils;" Montana Irrigation Manual, Chapter 3 "Crops").
      iii. Maximum Allowable Deficit (MAD) for soil moisture.
   e. Hydraulics:
      i. Irrigated area under the irrigation system.
      ii. System capacity based on (a) peak consumptive crop use, and (b) available water holding capacity.

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iii. Pipeline capacity based on friction and minor loss calculations.
iv. Velocity and surge calculations.
v. Pipe diameter, pressure class, and pipe bedding design and specifications (Reference: Unibell Handbook of PVC Pipe).
vi. Floatation calculations, e.g., empty pipes surrounded by saturated soils.
vii. Thrust block calculations.
viii. Air and vacuum relief vent calculations for size and capacity.
ix. Pressure relief valve and water control valve design and specifications.
x. Strength analysis for above ground ditch crossings.

f. Estimated Quantities and Cost Estimate:
   i. Calculations, sketches, and computer output to support estimated quantities for **all** material and construction components.
   ii. Item, units, unit cost, estimated total cost for **all** material and construction components.

g. Construction and Material Specifications:
   i. Applicable base specifications.
   ii. Items of work and construction details (special provisions) specific to the job.

h. Construction Inspection Plan:
   NOTE: The objective of the Construction Inspection Plan is to identify critical elements of construction, schedule quality control activities, describe the process for change orders, and document "as-built" construction in such a manner that the engineer-of-record can seal and certify the project as meeting NRCS Practice Standard 443.
   i. Critical construction and material items that require inspection.
   ii. Required submission of shop drawings, material specifications, bills of lading, load tickets, etc.
   iii. Names, titles, and basic qualifications of inspectors who must supervise critical elements of construction. Include the contractor names if they represent the TSP as an inherent part of the quality control process.
   iv. Schedule of critical construction items.
   v. Safety details and protocol for hazardous operations where the TSP has superior knowledge of the work, e.g., electrical safety.
   vi. Establishment of local benchmark control and horizontal and vertical alignments.
   vii. Construction tolerances for lines, grades, compaction, concrete air/slump/compression, gradations, soundness, etc.
   viii. Locations and features that require as-built survey shots and photograph documentation.
   ix. Procedure for authorizing and documenting change orders. All change orders from the plans and specifications must be authorized and documented by the landowner, TSP, and NRCS.
   x. List of items that must be recorded on "as-built" drawings.

i. Operation and Maintenance:
   i. Critical elements of operation and maintenance.
   ii. Frequency of inspection.
   iii. Normal operating range or conditions.
   iv. Typical problems that may occur.
   v. Minor maintenance procedures.
   vi. Contact information for persons or entities that can assist with problems.

4. Plan Drawings:
   a. Cover Sheet:
      i. Location Map.
      ii. Estimated Quantities Schedule for **all** construction and material items.
      iii. Required permits and easements.
      iv. Utility notification statement.
      v. In addition to a Montana Professional Engineer (PE) seal, the TSP shall place a certification statement on the plan which states, "To the best of my professional knowledge, judgment, and belief, these plans meet NRCS Practice Standard 443."
   b. Plan View Sheet:
      i. Location and description of local benchmark control.

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ii. Horizontal alignments (stationing, deflection angles, horizontal curve data).
iii. Location and description of critical land features (buildings, roads, trees, utilities, approximate property lines).
iv. Location and description of appurtenances, e.g. elbows, vents, valves.
v. Direction of irrigation, beginning and ending of pipeline project.
vi. Show critical hydraulic information.

c. Profile View Sheets:
   i. Existing ground profiles with planned lines and grades of the improvement.
   ii. Station and elevation flags for all grade breaks.
   iii. Label pipe diameters and classifications.
   iv. Station, elevation and description flags for all appurtenances and inline structures.
   v. Vertical curve data (stationing, deflection angles, VPC, VPI, VPT).
   vi. Soil profile information.
d. Detail Sheets for Appurtenances:
   i. Detail sections.
   ii. Locations and elevation labels.
   iii. Details of pipeline appurtenances, which include but are not limited to gate spacing, filtering system, control valves, concrete works, dogleg details, pump outs, trench details, etc.
   iv. Make/model of parts, suppliers, performance ratings, gradations, or other critical information not shown in the specifications.
   v. Safety details and considerations.

INSTALLATION

Deliverables:

1. The TSP shall personally conduct a pre-construction conference with the landowner and contractor.
2. The TSP shall personally conduct at least one site visit during construction.
3. The TSP, or designated representative who works under direct supervision of the TSP, shall provide sufficient on-site inspection to ensure that the project is installed according to the plans and specifications--in such a manner that the TSP can technically certify construction as meeting the plans, specifications, and Practice Standard 443.
4. The TSP shall ensure that the landowner understands the plans and specifications, and has obtained the required permits and permissions to construct the project.
5. The TSP or designated representative shall establish or verify local benchmark control and stake horizontal and vertical alignments--in such a manner that the NRCS can use this control during Quality Assurance Reviews.
6. The TSP shall confirm that the assumptions used in the design are valid.
7. The TSP or designated representative shall inspect and document critical elements of construction as described in the Construction Inspection Plan which includes, but is not limited to:
   a. Verification and approval of shop drawings and material specifications.
   b. As-built survey of critical grades and elevations, as-built measurements of appurtenances.
   c. Tests for earthfill compaction, concrete, rock riprap, flexible membranes, etc.
   d. Collection of bills of lading, load tickets, etc.
   e. As-built photographs of staged construction.
8. Document change orders approved by the landowner and the NRCS.
9. The TSP has the responsibility to ensure that proper safety protocols are followed for hazardous operations in which the TSP has superior knowledge of the work, e.g., trench safety.

CHECK OUT

Deliverables:

1. The TSP shall personally conduct a final site inspection to technically certify that the completed construction meets the plans, specifications (including pivot Pipeline package), and NRCS Practice Standard 443.
2. The TSP shall prepare an “as-built” set of plans which document construction changes in red-line ink which includes, but is not limited to:
   a. Actual installed quantities and materials (manufacturer/model/size/schedule/grade/strength) for **all** material and

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construction items.
   b. Final elevations, lines, and grades of Irrigation System, Surface and Subsurface features.
3. Assemble shop drawings, material specifications, bills of lading, load tickets.
4. Assemble test results for earthfill compaction, concrete, etc.
5. The TSP shall place a certification statement on the as-built plan which states, "To the best of my knowledge, judgment, and belief, this practice was installed in accordance with the plans and specifications and meets NRCS Practice Standard 443 – Irrigation System, Surface and Subsurface."
6. The TSP shall complete TSP-1 Form, Part B. The TSP shall have the landowner sign and date Part C to verify completion and acceptance of the technical deliverables prior to NRCS receiving the form.

REFERENCES

- NRCS Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard - Irrigation System, Surface and Subsurface, 443 http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=MT
- NRCS National Engineering Handbook Parts 600-659 http://directives.nrcs.usda.gov/RollupViewer.aspx?hid=17092
- NRCS Web Soil Survey http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

PROCEDURES FOR NRCS TECHNICAL REVIEW (180-GM, Amend. MT411.2)

1. Statements of Work (Technical Deliverables):
   a. An NRCS staff with the proper Job Approval Authority shall customize the Statement of Work for each project to ensure that the technical deliverables for Practice Standard 443 are appropriately selected for the site.
   b. If multiple practices are applied on the same site, the Statements of Work shall be assembled as a clear and concise document to ensure the design and installation for all practices are compatible.
2. Pre-Project Conference:
   a. An NRCS staff with the proper Job Approval Authority shall consult with the TSP prior to commencement of technical services and completion of the TSP-1 Form to ensure that the TSP has received and understands the contract items, statements of work (deliverables), preliminary planning information, and Practice Standard 443.
3. Functional Review of DESIGN Deliverables:
   a. NRCS staff with the proper Job Approval Authority shall perform a functional review of the design deliverables before the start of construction and before a TSP design payment is issued to the landowner.
   b. The functional review shall ensure that planned practice will function as intended, and the appropriate design deliverables were submitted and properly documented by the TSP. The TSP shall identify and engage a qualified person to check the design methodology, technical references, plan drawings, and computations for accuracy. These items will not be checked by NRCS in detail.
   c. The functional review shall also ensure that the planned construction and material quantities are appropriately covered by the contract items and TSP-1 Form. If discrepancies are found between the planned quantities and the contract items, contract modifications shall be considered prior to construction.
   d. The functional review shall also be used to determine if the landowner understands the plans and specifications.
   e. NRCS staff will use written correspondence to notify the landowner and the TSP of technical errors, omissions, or deficiencies. Significant errors, omissions, or deficiencies shall be brought to the attention of the ASTC(FO), SRC, and SCE. They may warrant immediate action to suspend Federal funds for construction.
4. Construction:
   a. NRCS staff with the proper Job Approval Authority shall be familiar with the project and available during construction to assist the landowner and the TSP with decisions regarding contract modifications as a result of substantial changes during construction.
5. Functional Review of INSTALLATION and CHECK-OUT Deliverables:
   a. NRCS staff with the proper Job Approval Authority shall perform a functional review of the installation and check-out deliverables after construction is completed and before the final EQIP and TSP payments are issued to the landowner.
   b. The functional review shall ensure that the completed practice functions as intended, and the appropriate installation and check-out deliverables were submitted and properly documented by the TSP.

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c. The functional review shall ensure that construction meets the intent and purpose of Practice Standard 443 and it is compatible with other planned and applied practices at the site.
d. The functional review shall ensure that the construction quantities are appropriately covered by contract items. If discrepancies are found, contract modifications shall be considered before the final EQIP and TSP payments are issued to the landowner.
e. The functional review shall determine if the TSP-1 Form is properly completed and understood by the landowner and the TSP.

6. Release of EQIP and TSP Payments:
   a. EQIP and TSP payments to the landowner shall not be released before the technical deliverables provided by the TSP have been functionally reviewed by an NRCS staff with the proper Job Approval Authority.
7. TSP Quality Assurance Reviews (Spot Checking):
   a. Procedures for NRCS technical review were established to ensure that the practice meets the intent and purpose of Practice Standard 443 prior to the release of public funds.
   b. Procedures for NRCS technical review shall expedite the TSP Quality Assurance Reviews conducted by the NRCS on an annual basis. Basically, all practices designed, installed, and certified by a TSP will be functionally reviewed prior to payment, and the Quality Assurance Reviews will provide an opportunity to evaluate long-term performance and customer satisfaction with both the practice and the TSP.