

Application Guidelines

HB 1437 Agriculture Water Conservation Program

November 2023 Revision

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Recertification Program Guidelines

The 2006-2013 HB 1437 Agriculture Water Conservation Program was a joint effort among individual producers, local soil and water conservation districts (SWCDs), the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), and Lower Colorado River Authority (LCRA) to implement water conservation projects to conserve agriculture surface water in the lower Colorado River basin.

The recertification program (Program) provides grants to eligible producers to construct acceptable, on-farm, water conservation practices such as irrigation land leveling, multiple inlets, and internal levee structures. Proposed projects must meet NRCS specifications in effect at the time of the application.

Producers work with local contractors through LCRA to identify and plan the projects. LCRA, as the administrator of the HB 1437 Agriculture Water Conservation Fund, provides grant funds to help producers implement eligible water conservation projects that meet NRCS specifications.

Under this Program, producers may receive up to 50% of the cost of the approved acceptable practice up to a maximum cost per yard of dirt moved and a maximum total per unit structure cost for each structure category to be set annually by the LCRA Board of Directors.

1. PROCESS OVERVIEW

1. Producers submit an application online at www.lcra.org/agwaterconservation. LCRA screens applications for eligibility, approves field design work and verifies that work was completed according to design requirements through an approved contractor.
2. LCRA notifies applicant of award and signs a Cost-Sharing Agreement (Agreement) with applicant/producer.
3. Upon successful completion of the project and project certification by an approved contractor, the producer is reimbursed for up to 50% of the cost of the approved acceptable practice based on NRCS guidelines in place at the time of contract award for irrigation land leveling and water control structures, LCRA program requirements, the current per yard rate cap, and the current per unit structure cost. LCRA reviews completed projects annually to monitor conservation success.

For more information or to apply, contact Stacy Pandey at stacy.pandey@lcra.org or 512-578-7471.

2. ACCEPTABLE PRACTICES

The acceptable practices for calendar year 2024 funding are NRCS Conservation Practice Irrigation Land Leveling (Code 464) and Structures for Water Control (Code 587) with the additional requirement of permanent in-field levees and a per unit structure cost cap. Applications for other practices will not be considered.

3. ELIGIBILITY

Producers are eligible for consideration if they meet the following criteria:

1. The field for which the applicant is applying has been irrigated by an LCRA agricultural interruptible water service contract at least twice during the past 10 years.
2. The field for which the applicant is applying was surveyed prior to planting within the last three years.
3. To the extent reasonably practicable, the field for which the applicant is applying will be at least 70% irrigated by an LCRA agricultural interruptible water service contract whenever it is in production during the term specified in the Agreement unless LCRA-supplied water is not available during the season in which it is in production.
4. The producer will complete the project within two years of the effective date of the Agreement.
5. The producer will place the field that is the subject of the Agreement in rice production within two years of the effective date of the cost-sharing agreement, or the earliest practicable date after that time if LCRA has curtailed interruptible water supply to the producer's field consistent with the LCRA's state-approved Water Management Plan and other water rights, such as may be amended from time to time.
6. Proposed projects are for NRCS- and LCRA-approved practices only and provide for the conservation of surface water. If the NRCS-approved practice is irrigation land leveling (464), the field design must include permanent levees with at least two internal overflow structures per levee (minimum 15-inch pipe each), a permanent field perimeter levee, and have a levee density of less than 0.10 levees per acre. If the field is less than 20 acres, it is not required to meet this levee density requirement if it has a maximum of two sections (cuts) with one permanent levee. If the current field design is already predominantly permanent levees with a levee density of less than 0.10 levees per acre, the original leveling project must have been completed at least 10 years prior to applying. If the NRCS-approved practice is a structure for water control (587), it must be installed along with the irrigation land leveling practice (464).
7. If the producer previously received funding for a conservation practice from LCRA and/or EQIP, the producer must have maintained the conservation practice for the term specified in the previous funding agreement and kept the field in production at least once every six years.
8. If the producer has an SWCD-District Cooperative Agreement or EQIP contract, or has applied for an EQIP contract, that information must be disclosed to LCRA and LCRA reserves the right to adjust the cost-share such that the Producer pays a minimum of 20%.
9. The producer agrees to irrigate the field subject to the Agreement with LCRA system water for the service life specified in the Agreement, to the extent such water is made available by LCRA consistent with the LCRA's state-approved Water Management Plan and other water rights, such as may be amended from time to time.

10. The producer agrees to maintain the land leveling practice for the life of the agreement as needed if field settling occurs and to resurvey the land at least once every six years and provide LCRA documentation of this work upon request.
11. The producer agrees to allow LCRA or its authorized agents access to the field subject to the Agreement during reasonable times on business days to inspect the field. Inspection may include measuring area, elevation and water flows related to water conservation efficiencies.

4. FUNDING AND COST-SHARE RATES

Conservation projects for this program are funded through the HB 1437 Agriculture Water Conservation Fund. Money is deposited into the fund from a conservation surcharge on water transferred from the lower Colorado River basin to Williamson County. Surcharge funds are awarded as grants to producers to help implement agriculture conservation projects.

If the producer’s application is selected, LCRA agrees to provide up to 50% of the producer’s cost of implementing the approved practice up to a cost per yard rate cap, in accordance with the applicable NRCS cost rules and payment procedures for the approved practice. The cost per yard rate cap will be set annually.

LCRA reserves the right to reduce the cost-share rate in the event that the combined HB 1437 payment plus the NRCS payment exceeds the producer’s cost of implementing the practice such that the Producer pays a minimum of 20%.

LCRA reserves the right to change the cost-share rate if the total amount requested through eligible grant applications exceeds the total amount of available HB 1437 grant funds. In this event, the percent cost share will be prorated based on the following formula. The maximum cost-share rate for any single applicant will be 50% of the applicant’s total cost for the NRCS-approved practice.

$$Cost_Share_Rate = \frac{\$HB1437FundsAvailable}{\$TotalAmountofEligibleApplicationswithSamePriority} \times 50\%$$

5. DATES FOR APPLICATION SUBMITTALS

Applications must be submitted through the [online application form](#) on or before Feb. 29, 2024, at 5 p.m. to be eligible for funds. Applications received after this time will be returned.

Applications are good only for the year submitted. An applicant must include information for each field separately within the application form. There are no limits to the number of fields for which a producer may submit applications.

6. SELECTION AND AWARD NOTIFICATION

Selection Priorities

LCRA will select applications for eligibility in the following order of priority:

- **Priority 1**
 - a. The approved practice or conservation measure has been completed and certified by an LCRA-approved contractor, and NRCS or SWCD if applicable.
 - b. The field has reached its NRCS-defined 15-year practice life.
 - c. The field is 100% irrigated with LCRA surface water.
 - d. The proposed field design has only permanent levees, with a field levee density of less than 0.10 levees per acre, unless the field is under 20 acres and follows the requirements outlined in Section 3 of this document.
 - e. If the original land leveled field design included only permanent levees, the field was funded through the HB 1437 cost-share program.

In addition, for years in which LCRA has not curtailed interruptible water, higher priority will be given to applicants who intend to place the field in production within six months of project completion.

- **Priority 2**
 - a. All other applications.

Selection Process

Contracts will be awarded to eligible applicants based on priority order and the availability of grant funds.

All awards are subject to availability of funds from the HB 1437 Agriculture Water Conservation Fund. LCRA shall determine the amount of grant funds available each year.

LCRA will award grants to eligible applications in the Priority 1 category first. The cost-share rate is up to 50% but may be reduced if the total amount, in dollars, of eligible Priority 1 applications exceeds the amount of grant funds available. In this event, the cost-share rate shall be calculated according to the formula set forth in section 4.

If any funds allocated to Priority 1 applications remain uncommitted, LCRA will award grants to eligible applications in the Priority 2 category. The cost-share rate is up to 50% but may be reduced if the total amount, in dollars, of eligible Priority 2 applications exceeds the amount of grant funds available. In this event, the cost-share rate shall be calculated according to the formula set forth in section 4. At LCRA's discretion, LCRA may not award any grants in this priority if the computed cost-share rate is determined to be too low and not beneficial to the HB 1437 Agricultural Water Conservation program.

Selection Notification

LCRA will evaluate applications and notify applicant of award within 30 calendar days of the application deadline.

7. PAYMENT

When the practices are completed and certified by an LCRA-approved contractor or NRCS, the producer must submit a HB 1437 Payment Request to LCRA and attach a copy of certification from an LCRA-approved contractor and an approved NRCS Practice Certification and Payment Application form or comparable SWCD certification, if applicable.

Payment will be up to 50% subject to a cost per yard cap, or the prorated cost-share rate if there are insufficient grant funds for all applications with the same priority level, of the approved NRCS Practice Certification and Payment Application form and payment provisions of the Agreement. LCRA reserves the right to reduce the cost-share rate such that the Producer pays a minimum of 20% in the event the combined HB 1437 payment plus any NRCS payment (if applicable) exceeds the producer's cost of implementing the approved practice.

No payments will be made for partially completed work.

8. APPLICATION AND IMPLEMENTATION

1. The applicant/producer completes a field survey and provides a new field design document with the application.
2. The applicant completes the HB 1437 Agriculture Water Conservation Program Cost-Share Application at www.lcra.org/agwaterconservation.
3. If applicable, the applicant attaches a copy of the supporting EQIP contract or the local SWCD-District Cooperative Agreement to the HB 1437 application.
4. The applicant submits the application at www.lcra.org/agwaterconservation by the application deadline.
5. LCRA reviews the application to determine if the proposed conservation practice is eligible for HB 1437 funds and meets NRCS specifications.
6. LCRA notifies the producer of the award and, along with the producer, signs the Agreement.
7. The producer begins installing the conservation practices.
8. When the practices are completed, the contractor or producer has resurveyed the land and an approved LCRA contractor has certified that the practice was installed correctly according to the original survey design, the producer submits a HB 1437 Payment Request to LCRA. The producer must include in the request a copy of the survey design, a form signed by the approved contractor certifying the design, and related invoices. If

applicable, the producer must include in the request a copy of the approved NRCS Practice Approval and Payment Application form.

9. LCRA reviews the payment request and authorizes payment.
10. LCRA inspects the conservation practice every five years for the service life specified in the Agreement to verify the field is being maintained according to the original survey design.
11. If the conservation practice is not maintained by the producer for the service life specified in the Agreement, or the field is not placed in production within the timeframe specified in Section 3, Item 5, LCRA may seek repayment from the producer under the contract and may decline future funding of conservation practices for the same producer.

9. APPLICATION GUIDELINES SUBJECT TO CHANGE

These application guidelines, including the attachments, for the HB 1437 Agriculture Water Conservation Program may be revised; however, any revisions will not apply retroactively to:

1. Applications submitted prior to the application deadline for the same funding year in which the revisions are made; or
2. Agreements resulting from applications submitted prior to the application deadline for the same funding year in which the revisions are made.

10. ATTACHMENTS

1. 2024 payment rates for eligible irrigation conservation practices
2. NRCS irrigation conservation practice guidelines for irrigation land leveling and structures for water control

2024 payment rates for eligible irrigation conservation practices

1. Current eligible total cost per yard of dirt moved: \$1.80 per yard*
2. Current eligible total cost per 15-inch internal levee structure: \$692*
3. Current eligible total cost per 18-inch internal levee structure: \$762*
4. Current eligible total cost per 24-inch field perimeter check structure: \$1323*
5. Current eligible total cost per 18-inch field perimeter inlet structure: \$541*

* Costs estimates as of October 2023 for land leveling and equipment. Structure costs do not include labor. Costs eligible for reimbursement reflect cost of HDPE pipe in all structures. Producer pays the difference for aluminum pipe if preferred.



United States Department of Agriculture

Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
IRRIGATION LAND LEVELING

CODE 464

(ac)

DEFINITION

Reshape a land surface according to the planned lines and grades for irrigation.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Facilitate the efficient use of water on irrigated land
- Provide uniform distribution of water on irrigated land

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to leveling land irrigated by surface or subsurface irrigation systems. The leveling is based on a detailed engineering survey, design, and layout. This standard does not apply to NRCS Conservation Practice Standard (CPS) Precision Land Forming (Code 462) or Land Smoothing (Code 466).

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct all land leveling to comply with all Federal, State, Tribal, and local laws and regulations. The landowner is required to obtain all necessary permits prior to construction. The landowner/contractor is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

Before land is leveled, ensure it is suitable for irrigation and for the proposed methods of water application. Also ensure that soil is deep enough that, after leveling, an adequate usable root zone remains that permits satisfactory crop production with proper conservation measures. Limited areas of shallow soils may be leveled to provide adequate irrigation grades or an improved field alignment. The finished leveling work must not result in exposed areas of highly permeable soil materials that would inhibit proper distribution of water over the field.

Plan all land leveling work as an integral part of an overall farm irrigation system that enhances the conservation of soil and water resources. Also plan the boundaries, elevations, and irrigation direction of individual fields so the requirements of all adjacent areas in the farm unit can be met.

Design

Design grades, slopes, and field configurations using local irrigation guides; NRCS CPS Irrigation System, Surface and Subsurface (Code 443); NRCS National Engineering Handbook (NEH) (Title 210), Part 623, Chapter 4, "Surface Irrigation"; and 210-NEH, Section 15, Chapter 12, "Land Leveling." Final elevations from the leveling work must permit the delivery of required irrigation flows to the highest point on the field surface. Field elevations must be at least 0.33 feet below the water surface elevation at the point of delivery.

Field grades

If there is more than one method of water application or more than one kind of crop planned, the land must be leveled to meet the requirements of the most restrictive method and crop. Design all leveling work within the slope limits. Slope limits vary depending on water application method, ability to remove excess surface water, and control of erosion caused by rainfall. Reversing grades in the direction of irrigation is not permitted.

Slope for level irrigation methods

For level irrigation methods, the maximum elevation drop in the direction of irrigation will not exceed one-half the design depth of application for a normal irrigation. The difference in elevation across an individual basin or border strip will not exceed 0.1 feet.

A minimum slope of 0.02 percent in the direction of irrigation is recommended. A planned slope less than the recommended minimum shall be applied only where adequate irrigation and drainage of the land unit can be achieved.

Slope for graded irrigation methods

As soil and rainfall-induced erosion rates permit, the maximum slope in the direction of irrigation, for graded irrigation method is—

- Furrows—3 percent.
- Corrugations—8 percent.
- Borders for nonsod-farming crops, such as alfalfa or grain—2 percent.
- Borders for erosion-resistant grass or grass-legume crops or for nonsod-forming crops on sites where water application by the border method will not be required until after good crop stands have been established—4 percent.

In areas that contain soils classified as erosive, the maximum slope is—

- Furrows—0.5 percent.
- Borders with sod-forming grasses—2 percent.
- Other crops—0.5 percent.

Where slopes in the direction of irrigation are more than 0.5 percent, and where leveling designs provide for increasing or decreasing slopes, the following limits apply:

- The change in slope in any 100-foot reach will not exceed one-half the maximum permissible slope change along the length of run. However, short-level sections are permissible at the upper or lower ends of the irrigation runs to facilitate water control or to reduce runoff. The maximum permissible slope change is defined as the difference between the flattest and steepest design slope along the length of the run.

Cross slope

The maximum cross slope for basin or borders will be 0.1 feet per border-strip width. The allowable cross slope for furrows and corrugations depends on the soil stability, furrow size, and rainfall pattern in the area. Cross slopes must be planned such that breakthroughs from both irrigation water and rainfall runoff are held to a minimum.

The criteria for permissible variations in grades and cross slopes should be considered as minimum treatment. The objective should be to get systems with less cross slope applied. For graded furrow irrigation, the cross slope grade shall not exceed the furrow grade at any point except as follows:

Maximum Cross Slopes for Furrow Irrigation (%)

Furrow Grade (%)	Trans-Pecos LRA	All Other LRA
0.05 to 0.15	N/A	Twice furrow grade
0.15 to 0.30	N/A	0.3
0.05 to 0.10	0.3	N/A
0.10 to 0.30	0.5	N/A

Slope for subsurface irrigation methods

In areas where subsurface irrigation uses ground water-level controls, shape the field surface to parallel the expected subsurface water elevations. Base the leveling design on the desired depth of soil above the elevation of the ground water.

Surface drainage

Include provisions in the design for removing or controlling excess irrigation and storm water runoff in farm irrigation systems. Provide field elevations and field grade for leveling designs that permit proper functioning of the planned surface drainage system facilities.

CONSIDERATIONS

Account for additional excavation and fill as the result of constructing structures such as ditches, ditch pads, and roadways. Include the appropriate yardage when balancing cuts and fills and determining borrow requirements.

Consider related structures and measures needed to control irrigation water and storm water runoff. Consider land leveling effects on existing infrastructure including any underground utilities or buried pipe.

When determining or evaluating the length of irrigation runs, consider crop types, method of irrigation, soil-intake rates, field slope, irrigation stream size, deep percolation, and runoff.

Consider the depth of cuts and the resulting available plant rooting depths to saline soils and to shallow water tables.

In areas irrigating with sediment-laden water, consider increasing the required height of the water surface at the point of delivery.

Consider effects on instream flows and aquifers, and the effects to other water uses and users.

Land leveling can alter runoff and affect adjacent wetlands. Consider these impacts when planning leveling projects and ensure all policy and procedures are followed.

PLANS AND SPECIFICATIONS

Develop site-specific plans and specifications for irrigation land leveling and show the requirements for installing the practice to achieve the intended purpose.

As a minimum, include—

- Field boundaries.
- Planned cuts and fills.
- Earthwork volumes.
- Cut/fill ratio.
- Direction of irrigation.
- Design run slope and cross slope.
- Required water surface and location of irrigation water delivery.
- Tailwater return/disposal.
- Appurtenant structures.
- Location of utilities.
- State and local notification requirements.
- *Identification of and plan for proper field arrangement, water source and farm distribution system.*
- *An appropriate soil survey to include irrigation suitability, topsoil depths, depths to permeable layer or water table and any other feature which might affect design requirements such as allowable depths of cut, suitable borrow materials/areas etc.*
- *A Topographic survey of site showing physical features to include but not limited to existing practices/structures, location and elevations of any utilities, location and elevation of inlets and outlets, as well as any component which could affect adjacent areas. Surveys completed with electronic total station equipment or global positioning system (GPS) should consider a grid spacing of 25 to 50 feet (but no more than 100 feet) for existing ground data and contour development.*
- *Calculations for final earthwork volumes shall be according to approved methods or software. Cut/Fill Ratios (C/F) shall be based on local experience, soil texture, soil moisture and cut/fill depths. Recommended cut/fill ratios for design range between 1.2 to 1.5 for heavy clay soils.*
- *Documentation for final earthwork volumes shall include maps/reports of field size, existing elevation data, corresponding cut and fill data, design elevation data, slope and direction of design grades, cut/fill ratio used, average excavated volume, total excavated volume, maximum/minimum depths of cut or fill as well as import or export volumes included.*
- *An Irrigation Water Management plan, meeting NRCS Conservation Practice Standard, Irrigation Water Management (449).*

OPERATION AND MAINTENANCE

Develop a site-specific operation and maintenance (O&M) plan for use by the landowner or operator responsible for the irrigation land leveling practice. Document the required actions in an O&M plan to ensure the practice performs adequately throughout the expected life.

Ensure O&M requirements are included as an identifiable part of the design. Depending on the scope of the project, this may be accomplished in a brief statement in the plans and specifications or as a separate O&M plan.

At a minimum, the O&M plan includes—

- Checking grades after major storm event.
- Periodically removing or grading mounds and depressions.
- Periodic land grading to restore the design gradient.

REFERENCES

USDA NRCS. Field Office Technical Guide (eFOTG), Section IV, Conservation Practice Standard Irrigation System, Surface and Subsurface, 443.

USDA NRCS. 2012. National Engineering Handbook (Title 210), Part 623, Chapter 4, Surface Irrigation. Washington D.C. <https://directives.sc.egov.usda.gov/>

USDA NRCS. 1983. National Engineering Handbook (Title 210), Section 15, Chapter 12, Land Leveling. Washington D.C. <https://directives.sc.egov.usda.gov/>

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov/> and type FOTG in the search field.

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United States Department of Agriculture

Natural Resources

Conservation Service

CONSERVATION

PRACTICE STANDARD

STRUCTURE FOR WATER CONTROL

CODE 587

(no)

DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water.

PURPOSE

Apply this practice as a component of a water management system to—

- control the stage, discharge, distribution, delivery, or

direction of water flow. **CONDITIONS WHERE PRACTICE**

APPLIES

This practice applies to a permanent structure needed as an integral part of a water control system to serve one or more of the following functions:

- Convey water from one elevation to a lower elevation within, to, or from a water conveyance system such as a ditch, channel, canal, or pipeline. Typical structures include drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
- Control the elevation of water in drainage or irrigation ditches. Typical structures include checks, flashboard risers, and check dams.
- Control the division or measurement of irrigation water. Typical structures include division boxes and water measurement devices.
- Keep trash, debris or weed seeds from entering pipelines. Typical structures include trash racks and debris screens.
- Control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structures include tide and water management gates.

- Control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation. Typical structures include water level control structures, flashboard risers, pipe drop inlets, and box inlets.
- Convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures include bridges, culverts, flumes, inverted siphons, and long span pipes.
- Modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures include chutes, cold water release structures, and flashboard risers.
- Provide silt management in ditches or canals. Typical structures include sluice gates and sediment traps.
- Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- Create, restore, or enhance wetland hydrology.

CRITERIA

General Criteria Applicable to All Purposes

All structures designed under this standard must comply with applicable Federal, Tribal, State, and local

laws, rules, and regulations. Obtain all required permits before construction begins.

Seed or sod the exposed surfaces of earthen embankments, earth spillways, borrow areas, and other areas disturbed during construction in accordance with the criteria in NRCS Conservation Practice Standard (CPS) Critical Area Planting (Code 342). When necessary to provide surface protection where climatic conditions preclude the use of seed or sod, use the criteria in CPS Mulching (Code 484) to install inorganic cover material such as gravel.

Do not raise the water level upstream of water control structures on adjacent landowners without their permission *and a signed document consistent with NEM policy for that situation.*

Safety

Design measures necessary to prevent serious injury or loss of life in accordance with requirements of

Title 210, National Engineering Manual (NEM), Part 503, Safety.

Cultural Resources

Evaluate the existence of cultural resources in the project area and any project impacts on such resources. Provide conservation and stabilization of archeological, historic, structural, and traditional cultural properties when appropriate.

CONSIDERATIONS

Consider the following items when planning, designing, and installing this practice:

- Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
- Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on the field water table to ensure that it will provide a suitable rooting depth for the anticipated crop.
- Potential use for irrigation management to conserve water.
- Effect of construction on aquatic life.
- Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment, solutes, and sediment-attached substances carried by runoff.
- Effects on the movement of dissolved substances below the root zone and to ground water.
- Effects of field water table on salt content in the root zone.
- Short term and construction-related effects of this practice on the quality of downstream water.
- Effects of water level control on the temperatures of downstream waters and their effects on aquatic and wildlife communities.
- Effects on wetlands or water-related wildlife habitats.
- Effects on the turbidity of downstream water resources.
- Conservation and stabilization of archeological, historic, structural, and traditional cultural properties when appropriate.

PLANS AND SPECIFICATIONS

Prepare plans and specifications that describe the requirements for applying the practice according to this standard. As a minimum, include—

- A plan view of the layout of the structure for water control.
- Typical profiles and cross sections of the structure for water control.
- Structural drawings adequate to describe the construction requirements.
- Requirements for vegetative establishment and mulching, as needed.
- Safety features.
- Site-specific construction and material requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the operator.

As a minimum, include the following items in the operation and maintenance plan:

- Periodic inspections of all structures, earthen embankments, spillways, and other significant appurtenances.
- Prompt removal of trash from pipe inlets and trash racks.
- Prompt repair or replacement of damaged components.
- Prompt removal of sediment when it reaches predetermined storage elevations.
- Periodic removal of trees, brush, and undesirable species.
- Periodic inspection of safety components and immediate repair if necessary.

- Maintenance of vegetative protection and immediate seeding of bare areas as needed.

REFERENCES

USDA NRCS. National Engineering Handbook (NEH), Part 636, Structural Engineering. Washington, DC.

USDA NRCS. NEH, Part 650, Engineering Field Handbook. Washington, DC.

USDA NRCS. National Engineering Manual. Washington, DC.

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