



# **ERP Agricultural Exemption Application Package**

**Environmental Restoration and Water Quality Improvement Projects  
In Accordance with Florida Statute 373.406(9)**

## **Guidance Document**

Florida Department of Agriculture and Consumer Services  
Office of Agricultural Water Policy

**ADAM H. PUTNAM, Commissioner**

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## **SECTION I - Introduction:**

### ***a) Reason for Document:***

This document has been created to assist Professional Engineers (P.E.'s) with the development of an Environmental Resource Permit (ERP) Exemption package for projects that have a primary purpose of either environmental restoration or water quality improvement, since the process used and the format and amount of information in this package is considerably different than the one used to apply for traditional ERP's. This guidance document is intended to be used at this time on Best Management Practice (BMP) projects for cow/calf operations. The document may expand in the future to cover other agricultural BMP operations.

### ***b) Supporting Law and History:***

In 2000, the Florida Legislature wrote into law Section 373.406 (9), F.S. Under this Statute, the South Florida Water Management District (SFWMD) and Florida Department of Environmental Protection (FDEP) are authorized to exempt from Environmental Resource Permitting (ERP) certain activities on agricultural lands, which have been determined to be primarily for the purpose of environmental restoration or water quality improvement, with only minimal or insignificant cumulative adverse impact.

In 2002, the SFWMD and Florida Department of Agriculture and Consumer Services – Office of Agricultural Water Policy (FDACS – OAWP) jointly developed a “Section 373.406(9) Exemption Guidelines” document, to assist agricultural producers and SFWMD staff with the application and review process of the above-mentioned ERP Exemption. That document outlines the information required to submit and review a project believed to meet the intent of Section 373.406 (9), F.S.

An application cover sheet to an ERP Exemption was developed in 2003 by FDACS - OAWP and SFWMD. A key component of the application process is engineering information. Therefore, an “ERP Exemption Application Package – Guidance Document” was developed by FDACS - OAWP in 2004, to address the engineering issues associated with the application process. This document will allow design engineers and review engineers to have a better understanding of the engineering information to be included in the application package, and the role of engineers in the ERP Exemption Application process associated with environmental restoration or water quality improvement projects.

Updates have been done to this Guidance Document in December 2005 and December 2008 (this current version), to incorporate feedback by SFWMD staff, NRCS staff, FDACS staff, and engineering consultants, which came about from them using this document and going through this ERP Exemption process over the years.

## **SECTION II - Deliverables and Supporting Information:**

### ***a) Information Necessary to obtain an ERP Exemption:***

The Application Package consists of an Application Cover Sheet (Deliverable 1), a Summary Table of Key Hydrologic Results (Deliverable 2), a Summary Table of Estimated Construction Materials (Deliverable 3), and Signed and Sealed As-Built Engineering Drawings (Deliverable 4).

**All the information included in the Application Package needs to clearly and jointly justify why the proposed BMP project qualifies for an ERP Exemption under Section 373.406 (9) F.S., by showing it provides water quality or environmental restoration benefits via minimal earthen and/or structural work(s).**

Each application package should contain only one project unless the projects are hydrologically connected. An example of projects that are hydrologically connected is the placement of three structures in the same ditch or tributary waterway, where each structure is backing water up to the next upstream structure.

Similar projects at two separate geographic and hydrologic locations should be submitted as two separate application packages.

Multiple works at the same project site should be addressed in a single application package, to avoid confusion. A sample of multiple works at a single project site is the installation of a culvert and riser on an existing ditch, and the stabilization of the ditch banks immediately upstream and downstream of the culvert and riser, for erosion and sediment control.

Upon completion of the engineering work for a project, three complete sets of the ERP Exemption Application Package (including all applicable Exhibits) are to be mailed or delivered to the engineer at the FDACS – OAWP office in Okeechobee.

**A sample ERP Exemption Application Cover Sheet is enclosed in Appendix A of this document. Project P.E.'s will need to follow the same format used in this sample, when submitting a project for an ERP Exemption involving environmental restoration or water quality improvement.**

#### **i. ERP Exemption Application Cover Sheet for Environmental Restoration or Water Quality Improvement Projects – Deliverable 1**

The application cover sheet consists of several administrative and technical sections. All sections require some descriptive language regarding the key topics/issues covered under each section. All these descriptions should be brief and to the point.

These sections also contain exhibits, in the form of aerials, soils maps, topographic maps, and engineering drawings, among others. All exhibits should be clearly labeled and easy to understand, and should include the project's name. North arrows and other mapping information such as scales and legends should also be shown and clearly labeled on all exhibits. Examples of such exhibits can be found in Appendix A of this document.

### **(1) First Page – Administrative Information**

The first page of the Application Cover Sheet contains administrative information about the owner of the land in which the project is being proposed, basic information about the project size and location, the professional engineer and consulting company developing the application package for the project, and package routing and approval/disapproval dates.

**Dates Received by SFWMD, Date Returned to FDACS, Application Number and Project Reviewer(s)** should remain blank, as they are used by SFWMD in tracking the application.

**Applying for:** The appropriate exemption condition should be checked by the Project P.E. "Modification of Existing Project" should only be checked when there is an existing ERP permit.

**Project Name** will be provided by the FDACS – OAWP Okeechobee office to the Project P.E. This name will be used as one of many means for FDACS – OAWP to track and file the project.

**Applicant** is the owner of the property on which the project is being proposed. Lessee, and contact information should be completed if applicable. Although the Applicant (owner) will be responsible for ensuring that the project is constructed as proposed in the application, the Lessee will be copied on the final letter granting the exemption so that they are aware of any BMPs required to be implemented on the property.

**Ownership Area** is the continuous area of land owned or controlled by the applicant, on which the project resides.

**Ownership Area Location** should contain at a minimum the Section(s), Township(s), and Range(s) of continuous ownership area under which the project resides.

**W.O.D. No.:** (Works of the District permit number), will also be provided by FDACS – OAWP Okeechobee office to the project P.E., before he/she begins work on the application package.

**Project Location** is the section, township, range and county; **and** the latitude and longitude of where that the project site is located.

**Landuse** is agricultural via a cow/calf operation. ERP exemptions per Section 373.406(9) F.S. apply only to activities on agricultural lands that provide environmental restoration or water quality improvement.

**Project Size** is only the area (in acres) where earthen and/or structural works are proposed for the project. In most cases, the project size should be less than an acre. Do not include drainage and/or associated wetland acres in the project size.

**Project Condition:** The appropriate project condition needs to be checked by the Project P.E.: “New”, “Existing”, or “To Be Modified”. Projects that cannot be properly documented (via existing engineering drawings or dated pictures) as replacements to existing structures should be classified as “New”. An example of an “Existing” project is the replacement of a deteriorated structure with a like structure (both in size, invert elevation, and location). An example of “To Be Modified” project is the addition of a riser to an existing culvert.

**Receiving Body** is the first major (named) water body, which receives runoff from the project. The project may be located within the receiving water body, or it may be located upstream of the receiving body. Examples of a receiving water body include, SFWMD Named Basins, named canals, creeks, or sloughs.

**Project P.E.** is the P.E. who is responsible for the engineering design of the project(s) proposed in the Exemption Application Package. This individual is required to be a Professional Engineer registered in the State of Florida.

**Consulting Company(s)** is the individual and/or company, which developed the ERP Exemption Application Package. Contact information should also be included.

**Date FDACS Sent Application to SFWMD and 30–Day Deadline Reminder** should remain blank and will be filled in by the FDACS – OAWP Okeechobee office.

## **(2) Project**

### ***(a) Information:***

The **Project** section contains a brief project description (i.e. installation of a culvert and riser in a ditch just downstream of a wetland), the project’s effects on water quality (i.e. provide water quality treatment in the upstream wetland) and any impact the project may or may not have to the surrounding area (i.e. no flooding impacts to upstream or downstream neighboring properties). A general description of current and proposed conditions/works should also be included.

### ***(b) Required Exhibit(s):***

**Exhibit 1 – Aerial Photo/Project Location Map:** Exhibit 1 should consist of an aerial photo showing the project information including, project location, ownership boundaries, major roads, and receiving water body.

**Additional Exhibits:** Additional exhibits may be included if they aid in the explanation, justification or design of the project. An example of such exhibits is photographs documenting existing

structures, or preconstruction conditions that show the extent of erosion concerns. Each individual photograph should be dated and have a short explanation of the photo and its purpose (i.e. document an existing structure).

**(3) Soils:**

***(a) Information:***

The **Soils** section should contain a brief description of the soils on which the project is located. The soil information should be obtained from a United States Department of Agriculture – Natural Resource Conservation Service (USDA – NRCS) soil survey.

***(b) Required Exhibit(s):***

**Exhibit 2 – Soil Map:** Exhibit 2 should consist of a soil map showing the project's location and ownership area boundaries.

**(4) Hydrologic Features:**

***(a) Upland Information:***

The **Hydrologic Features** section should have a brief description of the pre and post - drainage flow types and directions at and in the vicinity of the project. Included in the description should be the drainage area that the project serves, and the receiving water body. Information on how the project may or may not significantly change those hydrologic features (especially water depth and flow) also needs to be included in this section.

***(b) Required Upland Exhibit(s):***

**Exhibit 3 – Hydrologic Features Map:** This map should consist of an aerial photo identifying the project location, applicable hydrologic features (ditches, swales, canals, creeks, sloughs, wetlands etc.), and flow directions and types (sheet flow, channelized flow, etc). The Topographic Map Exhibit may also be used as a replacement to this map, as long as all information can be clearly read and followed in that topographic map.

**Exhibit 4 – Topographic Map:** This map should show the project's location, drainage area/basin contributing runoff to the project, and the ownership boundaries. All topographic maps should have contour elevation lines at a minimum of five-foot intervals though one-foot intervals are preferred (if available), and should refer to the datum used (NGVD or NAVD MSL). Any applicable benchmarks and their elevations should also be clearly shown in this map.

***(c) Applicable Wetland Information:***

If a wetland is being proposed as a means of providing water quality treatment, the following information should be briefly discussed: condition of the wetland (pristine/ or impacted wetland to be

restored/rehydrated), wetland area, type of wetland (herbaceous or forested), and how will the proposed project provide water quality treatment using the wetland (i.e. the project will retain and treat runoff in the wetland, while restoring it or rehydrating it).

***(d) Required Wetland Exhibit(s):***

**Exhibit 5** will consist of a series of photographs that document the condition of the wetland. The photographs should be dated and in color, so that vegetation can be more easily differentiated, and other key wetland features be identified (ditched wetland, isolated wetland, forested wetland, wetland-upland transitional area, etc). Each individual photograph should have a short explanation and its purpose (i.e. document an existing ditch in a wetland).

**(5) Operation and Maintenance:**

***(a) Information:***

The **Operation and Maintenance** section should contain a brief summary of the project's O&M plan, which at a minimum should identify who is responsible for the operation and maintenance (which will most likely be the landowner) and how the project will be operated once it is constructed. The Plan should outline the operation of the structure(s) proposed in the project, both during the wet and dry season of a typical year. An example of an O&M plan for a flashboard riser may read as follows:

The operator (farmer) is responsible for the placement and removal of boards in the riser to control the upstream water elevation. During periods of high rainfall, typically June through September, most of the boards should be removed to avoid or minimize high water levels outside of the treatment area. Failure to remove boards during periods of high rainfall may lead to flooding of the surrounding lands. For maximum runoff treatment and retention of runoff during a typical dry season (October to May), boards should be placed up to a height of 24 inches above the culvert invert, so that runoff can be retained to an approximate depth of 6 inches in the adjacent wetland. Failure to place boards in the riser will result in limited water retention by the structure.

***(b) Required Exhibit(s):***

**Exhibit 6 – Operation and Maintenance Plan:** The Operation and Maintenance Plan (O&M Plan) for the project should be signed by the farmer and be consistent with the engineering drawings, and should include the type of information mentioned above. The Project P.E. is required to use the same standard O&M exhibit format shown in Appendix A of this document.

**(6) Exemption Determination:**

***(a) Information:***

The **Exemption Determination** section should clearly justify why the proposed project and its

construction (according to signed and sealed construction engineering drawings) qualifies for an ERP Exemption under Section 373.406(9), F.S. A copy of that Florida Statute can be obtained from the FDACS – OAWP Okeechobee office.

This section should emphasize that it does so by providing water quality or environmental restoration benefits via minimal earthen and/or structural works that do not impact any neighboring properties. Refer to the “Sample ERP Exemption Application Package” in Appendix A, for more information.

## **(7) Signed and Sealed Construction Engineering Drawings**

### ***(a) Information:***

All ERP Exemption Application packages need to be accompanied by a set of signed and sealed construction engineering drawings (Exhibit 7 – Construction Engineering Drawings). The drawings should follow the same format shown in the sample Exhibit 7 in Appendix A of this document, and contain the information necessary to construct the proposed project via a general contractor or farm operator. The drawings need to be legible and printed on paper no smaller than 11 inch x 17 inch (ledger size).

### ***(b) Required Exhibit(s):***

**Exhibit 7 – Construction Engineering Drawings:** The exhibit should consist of a set of signed and sealed engineering drawing(s) to be used in construction of the proposed project. Each drawing should be clearly labeled with projects name and landowner contact information.

Samples of the format to be followed in these drawings can be obtained from the FDACS – OAWP Okeechobee engineer or the USDA – NRCS. They are also available in Section IV.C of the NRCS Electronic Field Office Technical Guide (eFOTG), Okeechobee County, at [http://efotg.nrcs.usda.gov/efotg\\_locator.aspx?map=FL](http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=FL)

**All engineering drawings should be signed and sealed by a Florida-registered Professional Engineer.**

## **ii. Summary Table of Key Hydrologic Results – Deliverable 2**

A one-page table summarizing the key engineering design information and results should be included with the ERP Exemption Application package. The FDACS – OAWP Okeechobee engineer will use this summary to verify that the package is complete, and to provide any engineering comments/questions to the project engineer as applicable. It will also be used to respond to any questions by SFWMD’s staff during the review of the package. This summary table should contain the following:

- **Design Storm Used:** the storm event the professional engineer chose to design the structure(s) proposed in the project. If the professional engineer does not provide the design storm in this summary table, and the proposed project does not have any potential to impact human health and safety, it will be evaluated using the USDA NRCS Cypress Creek formula.
- **Pre and Post Water Levels:** Estimated water levels during the design storm, both before and after installation of the proposed structure(s)/works.
- **Pre and Post Flows and Velocities:** Estimated water flows and velocities for the design storm, both before and after installation of the proposed structure(s)/works.
- **Volume of Runoff Retained/Detained:** Estimates of the runoff volume retained/detained and treated as a result of installing the proposed structure(s)/works.

**Supporting Hydrographs/Routings/Calculations:** Any applicable computer hydrographs and/or routings, and/or hand calculations used in support of the information shown in the table should also be included. That information needs to be properly titled and labeled, so that it is consistent with all exhibits and the above table, and can be properly cross-referenced against them.

**A sample of the Summary Table of Key Hydrologic Results (Deliverable 2) is available in Appendix B of this document.**

## ***b) Information Necessary to Construct an Approved ERP Exemption:***

### **i. Summary Table of Estimated Construction Materials – Deliverable 3**

A one-page table summarizing the estimated construction materials should be included with the ERP Exemption Application package. This summary table should include estimates for all materials required for construction of the designed project (i.e. culverts and risers, concrete, earth fill, excavations, rip rap, etc).

Any special construction notes or material specifications should also be listed below this summary table and in Exhibit 7 – Construction Engineering Drawings.

A sample of the Summary Table of Estimated Construction Materials (Deliverable 3) is available in Appendix B of this document.

### **ii. Construction Engineering Drawings – Exhibit 7, Deliverable 1**

The signed, sealed and approved construction engineering drawings (Deliverable 1, Exhibit 7) shall be used to construct the approved ERP Exemption project.

Any special construction notes or material specifications should also be listed in those Construction Engineering Drawings.

### **iii. As-Built Engineering Drawings and Report – Deliverable 4**

Upon completion of the BMP project, it will be the responsibility of the Project P.E. to verify that it does or does not meet the intent of the project P.E.'s design. This will be accomplished by using the approved signed and sealed construction engineering drawings (Exhibit 7 in Deliverable 1) and a set of signed and sealed As-Built Drawings, in addition to a brief (maximum two page) report. These As-Built Drawings and report should clearly identify any modifications to the original approved design and should include any survey information required for verification of the project construction.

The As-Built Drawings should follow the same format as the Construction Engineering Drawings (Exhibit 7), with the as-built information overlaid on the construction/design information in the drawings. Two sets of signed and sealed as-built engineering drawings are required to be delivered and approved by the FDACS – OAWP Okeechobee engineer.

A sample of a set of As-Built Engineering Drawings (Deliverable 4) can be found in Appendix C of this document.

#### ***c) Supporting Engineering Information***

##### **i. Key Design Information**

The Project P.E. preparing the ERP Exemption Application Package will need to identify clearly the criteria he or she used to design each BMP project. Identification of the following criteria is required for any proposed project: design storm event, water quality type treatment, and applicable USDA – NRCS conservation practice standards met.

###### **(1) Design Storm/Criteria:**

Decisions about the design storm event and type of water quality treatment system to use can vary from project to project, depending on the location of the project. Projects that are hydrologically isolated and/or centrally located in a landowners extensive land area may be designed to a less stringent storm event criteria than projects that are close to a property boundary or public road, or are proposed in a major waterway. The water quality treatment type selected may also affect decisions about the design storm event. Projects proposing water quality treatment systems that use upstream (rehydrated or restored) wetlands will most likely provide more attenuation than projects with erosion and sediment control treatment methods, thereby allowing for protection from a bigger design storm.

**In all cases, it is the responsibility of the Project P.E. to communicate closely and frequently with the FDACS – OAWP Okeechobee engineer and the landowner, so that all parties agree on the design storm protection of the proposed project, prior to this Project P.E. completing his or her final design.**

**If the Project P.E. does not provide a design storm in his/her ERP Exemption Application package and the project does not have any potential to impact the health and safety of humans, the proposed project will be evaluated using the USDA NRCS Cypress Creek formula.**

All proposed BMP engineering projects will need to demonstrate structural stability and integrity, up to the design storm event chosen, or an event that is equivalent to a series of typical summer storm events, which ever is larger. Any washouts or sloughing of structures in projects is not acceptable, unless they occur during storm events over and above the design storm event, or a storm event equivalent to a series of typical summer storm events, which ever is larger.

Some examples follow:

A culvert-riser in the middle of a large ownership area is sized using a 2-yr 24-hr storm, which exceeds existing swale/ditch capacities but is less than the storm event equivalent to a series of typical summer storm events. The Project P.E. has contacted the FDACS – OAWP Okeechobee engineer and the landowner, and they have agreed to allow the surrounding land to flood during this and bigger storm events. The Project P.E. will be responsible for demonstrating that no neighboring landowners will be affected by the proposed culvert-riser during the 2-yr 24-hr storm. The Project P.E. will also be responsible for designing an “emergency” by-pass system (if necessary) for the proposed culvert-riser, to ensure that the structure will not wash out or slough, up to a storm event that is equivalent to a series of typical summer storm events.

A culvert-riser is proposed in Taylor Creek, a major waterway to Lake Okeechobee. Therefore, a minimum 25-yr 72-hr design storm event will need to be used. The Project P.E. will be responsible for demonstrating that no neighboring landowners will be directly or indirectly affected by the proposed culvert-riser up to the 25-yr 72-hr storm. The Project P.E. will also be responsible for designing an “emergency” by-pass system (if necessary) for the proposed culvert-riser, to ensure that the structure will not wash out or slough, up to the 25-yr 72-hr storm event.

**The Project P.E. is required to use the design storm event information in SFWMD’s “Environmental Resource Permit Information Manual”, to identify the inches of rainfall associated with a particular design storm event chosen.**

## **(2) Erosion and Sedimentation Control**

Some proposed projects may consist of structures or earthen works to reduce or control soil erosion, thereby improving water quality by minimizing downstream migration of soil and nutrients. Such projects should be engineered using a design storm event up to which erosion and sediment control benefits are expected, or an event that is equivalent to a series of typical summer storm events, which ever is larger.

Examples of erosion and sediment control projects are the installation of a stabilization drop

structure in an eroding waterway draining to a ditch or creek, or the reshaping and/or re-grading of a ditch bank that continuously sloughs.

### **(3) Treatment via Detention/Retention**

As already mentioned in the introduction of this document, a proposed project needs to provide environmental restoration or water quality benefits in order to qualify for an ERP Exemption.

The Project P.E. is responsible for identifying the type of treatment system being proposed, to provide water quality benefits. Some examples include re-hydrating and retaining runoff in an impacted wetland via a culvert-riser water control structure located in a ditch/swale that currently drains the wetland; or the installation of a culvert-riser water control structure in an existing upland ditch/swale, to reduce erosion and retain and treat runoff in the ditch/swale.

All proposed projects should allow the operator to control the water level and flow at the proposed structure(s). This will allow the operator to maximize the treatment and water management benefits offered by the proposed structure(s) during both the wet and dry seasons of the year. An example of a control structure is a flashboard riser or a partially fixed weir structure.

The Project P.E. is also responsible for estimating the volume of runoff that the proposed project will retain and treat during the design storm event, or a storm event that is equivalent to a series of typical summer storm events, which ever is larger.

### **(4) Meet USDA – NRCS Conservation Practice Standards:**

All proposed BMP projects will need to demonstrate structural stability and integrity, up to the design storm event chosen, or an event that is equivalent to a series of typical summer storm events, which ever is larger. Any washouts or sloughing of structures in projects is not acceptable, unless they occur during storm events over and above the design storm event or a storm event equivalent to a series of typical summer storm events, which ever is larger.

**Therefore, all structures in all proposed projects will need to meet applicable USDA – NRCS Conservation Practice Standards.**

The following table lists the USDA – NRCS Conservation Practice Standards that have been identified as applicable to a majority of the expected ERP Exemption Application BMP projects. Additional information on the water quality BMPs and USDA – NRCS Conservation Practice Standards associated with the proposed project(s) may be found in the FDACS “Water Quality Best Management Practices for Cow/Calf Operations in Florida” manual.

## Typical BMPs with Associated USDA – NRCS Conservation Practices Standards

Cow/Calf BMP	Purpose	USDA – NRCS Conservation Practice Standard
Culvert/Riser	To retain or control water quantities	Structure for Water control – 587
Channel Stabilization	To provide a stable water conveyance channel	Channel Stabilization – 584
Grade Stabilization	To prevent or control erosion by concentrated flows	Grade Stabilization – 410
Runoff Control	To provide or control drainage from surrounding pastures	Drainage Water Management – 554
Sediment Control	To retain or entrap sediment	Sediment Basin – 350

Note: The above are examples of typical cow/calf BMPs and the associated USDA – NRCS Conservation Practices Standards. Additional BMPs may require additional USDA – NRCS Conservation Practices. More information on USDA – NRCS Conservation Practices and standards may be found at <http://www.nrcs.usda.gov/technical/standards/nhcp.html>

Copies of the USDA – NRCS Practices Standards listed in the above table can be found in Appendix D of this document.

### ii. Site Topographic Survey Information

All survey work should be completed under the supervision of a Project P.E. or a licensed State surveyor. The extent of survey work will vary depending on the location and complexity of the project, and the type of treatment system being proposed.

For example, the installation of a new culvert and riser in an existing ditch/swale (to provide water quality treatment in the ditch only) will require, at a minimum, three cross-sectional transects (upstream, structure centerline, and downstream). In contrast, an erosion and sediment control project where several hundred feet of a ditch bank are going to be reconstructed will require significantly more cross-sections and detailed survey. Projects where wetlands are also involved, which will in turn provide additional water quality treatment, will require survey elevations along the perimeter and interior of the wetland, to identify the effects that the structure will have on the wetland, and to estimate the treatment volume provided by the wetland and ditches.

#### (1) Benchmarks

Survey works completed are to be based on either a permanent surveying marker or a temporary field benchmark. Temporary field benchmarks should be used if a permanent survey marker is not available in the vicinity of the project. All permanent and temporary benchmarks should be clearly marked at the project's site and referenced in the survey notes/aerials and in the engineering

drawing(s) included in Exhibit 7 – Construction Engineering Drawings.

All permanent and temporary benchmarks should also remain in place until completion and final inspection of the proposed project.

## **(2) Surveying Notes**

All surveying notes need to be clear and legible. The original notes need to be retained by the Project P.E. A copy of the pertinent/key survey information (either in table or in aerial map form) will need to be included in the ERP Exemption Application package to be mailed to the FDACS – OAWP Okeechobee engineer.

## **(3) Maps**

Some survey information is also available via standard maps. A good example of such information is the United States Geological Survey (USGS) Quadrangle Sheets, or any survey information available via the SFWMD. A copy of such information will also need to be included in the ERP Exemption Application package, if it was used in the design process of the proposed project. Such maps need to identify clearly the information that applies to the proposed project.

## **SECTION III - Package Routing/Review Process:**

Once a BMP engineering project has been agreed upon by the Conservation Planner/Assessor and the landowner, the Planner/Assessor will notify the FDACS – OAWP Okeechobee office of the project need. The FDACS – OAWP Okeechobee office will then meet the landowner, and/or Planner/Assessor and his Project P.E. at the project site. The type of project being requested will be explained in more detail to the Project P.E., so that he can proceed with his project design.

**An ERP Application package will not be submitted by the FDACS – OAWP Okeechobee engineer to SFWMD, until the property owner has given approval to the final design of the project shown in that Application package.**

The complete application package should be submitted first to the FDACS – OAWP Okeechobee engineer for final review, to verify that all necessary components of the package are included and complete. If the package is complete, the FDACS – OAWP Okeechobee engineer will deliver it to SFWMD and act as the facilitator between that agency and the Project P.E.

### ***a) Routing:***

The goal of providing guidance to the Project P.E. on the package routing and review process is to obtain consistency and efficiency in the delivery and review of the package. The information below outlines how routing of the ERP Exemption Application Package and communication among the different engineering parties will occur. These guidelines are intended to assist in reducing confusion, time delays, and any additional costs, which might arise from frequent package modifications.

#### **i. From Project P.E. to and from FDACS – OAWP**

All communications concerning assigned project(s) should be routed to the FDACS – OAWP Okeechobee engineer. The FDACS – OAWP Okeechobee engineer will handle all communications with SFWMD regarding the application package(s). The Project P.E. should only respond to information requests by the FDACS – OAWP Okeechobee engineer, concerning the assigned project(s).

All verbal communications between the Project P.E. and the FDACS – OAWP Okeechobee engineer should be documented by the Project P.E. (in writing or via e-mail), if any important design decisions/agreements were made on the project(s) during those conversations.

Once the ERP Exemption Application package(s) has been approved by the FDACS – OAWP Okeechobee engineer, the Project P.E. will need to mail or deliver two additional signed and sealed

copies of the complete package (including all drawings, and exhibits) to the FDACS – OAWP Okeechobee engineer, so that they can be sent to SFWMD.

In some instances, additional information may be required by SFWMD that is not provided in the original ERP Exemption Application Package. The FDACS – OAWP Okeechobee engineer will contact the Project P.E. to request that specific additional information, when such occurrences happen.

**At no time should the Project P.E. respond directly to SFWMD regarding information requests about any ERP Exemption Application Package.**

## **ii. From FDACS - OAWP to and from SFWMD**

The FDACS – OAWP Okeechobee engineer will submit two copies of the ERP Exemption Application Package to SFWMD, for review and approval. The third copy of the package and the summary table of key hydrologic results will be retained by the FDACS – OAWP Okeechobee engineer to answer inquiries from the SFWMD.

In some instances, additional information may be required by SFWMD that is not provided in the original ERP exemption application package. The FDACS – OAWP Okeechobee engineer will contact the Project P.E. to request specific additional information about that package, when such occurrences happen.

### ***b) FDACS - OAWP Clearing House:***

The FDACS – OAWP Okeechobee engineer will be the official clearing house of information pertaining agricultural BMP engineering projects and designs produced under this ERP Exemption Application Package. This is to provide uniform production, handling, review and approval of all project information, both to and from Project P.E. and the SFWMD.

## **Cursory Review of Package**

The FDACS – OAWP Okeechobee engineer will provide a cursory review of all ERP Exemption Application Packages prior to submitting them to SFWMD. The cursory review will consist mainly of reviewing the application package for completeness and that all information in the package is provided in the required format.

**Applications, which are incomplete or contain inaccuracies, will be returned to the Project P.E. so that he or she can make the appropriate corrections.**

## **Application Modifications**

There will be instances where the Project P.E. will need to make modifications to the ERP Exemption Application Package once it is submitted to FDACS and reviewed by the FDACS – OAWP Okeechobee engineer. Therefore, the Project P.E. should be prepared to respond to those modification requests in an expedited and efficient fashion, via close coordination with the FDACS - OAWP Okeechobee engineer.

In some cases, SFWMD may also request modifications in the Application Cover Sheet prior to granting an ERP Exemption. Should such cases arise, SFWMD requests will be routed through the FDACS – OAWP Okeechobee engineer, who will determine if the requested modifications are within the intent of Section 373.406(9), F.S. If the FDACS – OAWP Okeechobee engineer believes it is a valid request, requests will be made to the Project P.E. to make the applicable modifications to the ERP Exemption Application Package. Upon completion of the modifications, the Project P.E. will need to resubmit three original copies of the entire revised ERP Exemption Application Package to the FDACS – OAWP Okeechobee engineer.

## **Package Approval**

Once the ERP Exemption is granted by SFWMD, the Project P.E. will be notified by the FDACS-OAWP Okeechobee engineer of the approval.

A copy of the approval letter and signed/sealed Construction Engineering Drawings will also be given by SFWMD and/or the FDACS – OAWP Okeechobee engineer to the landowner, along with a copy of any relevant exhibits such as the O&M plan, so that he/she can proceed with construction and operation of the BMP project.

## **As-Built Engineering Drawings Approval**

The owner and their contractor will be responsible for using the Construction Engineering Drawings included in the approved ERP Exemption Application Package to build the BMP project. The FDACS – OAWP Okeechobee engineer will assist the owner and contractor during construction of the project and will contact the Project P.E. on any construction issues, as necessary. The Project P.E. will be contacted by the FDACS – OAWP Okeechobee engineer, once construction is completed. This P.E. will then be responsible for developing the As-Built Engineering Drawings for that project(s).

## **SECTION IV - Appendices:**

- a) *Appendix A: Sample ERP Exemption Application Cover Sheet – Deliverable 1***
  
- b) *Appendix B: Sample Summary Table of Key Hydrologic Results – Deliverable 2 and Sample Summary Table of Estimated Construction Materials – Deliverable 3***
  
- c) *Appendix C: Sample As-Built Engineering Drawings – Deliverable 4***
  
- d) *Appendix D: Applicable USDA – NRCS Conservation Practice Standards***

## **Appendix A**

**Deliverable 1 – Sample ERP Exemption Application Cover Sheet and Exhibits**

SAMPLE

**Request for a Water Management District Exemption from  
Water Management District (WMD) Environmental Resource Permitting**

*Pursuant to Section 373.406(9), Florida Statutes*

**To be completed by FDACS**

Water Management District:
Date Application Sent to District:
Date Application Received from District:
FDACS Staff Assisting:

**To be completed by WMD**

Application Number:
Date Application Received by District:
30-Day Response Due Date:
Date Application Sent/Mailed to FDACS:
WMD Staff Reviewer(s):

Project Name: \_\_\_\_\_

Applicant: \_\_\_\_\_

Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Ownership Area: \_\_\_\_\_

Ownership Area Location:

Section(s): \_\_\_\_\_ Township(s): \_\_\_\_\_ Range(s): \_\_\_\_\_

Project Location:

County: \_\_\_\_\_

Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_

Longitude: \_\_\_\_\_ Latitude: \_\_\_\_\_

Land Use: Agricultural Receiving Waterbody: \_\_\_\_\_

Project Size (acres): \_\_\_\_\_ Project Category: ( ) New ( ) Existing ( ) To Be Modified

Project P.E.: \_\_\_\_\_

Consulting Firm(s): \_\_\_\_\_

Phone No(s): \_\_\_\_\_

**Exemption Package Prepared By:**

\_\_\_\_\_  
\_\_\_\_\_

**Project:**

Project "ejones 122003" consists of the installation of an island-type water control structure in an existing field drainage ditch. The water control structure will utilize a riser/culvert combination as the principal spillway. Flows exceeding the capacity of the culvert/riser will spread out to the surrounding grass pasture. The riser/culvert proposed will allow retention and treatment of runoff in an upstream impacted wetland, which has been identified as W8. Wetland W8 is currently drained by an existing ditch that lacks means of controlling water flows. Please refer to Exhibit 1 – Aerial Photo/Project Location Map, for more information.

The principal spillway will consist of an 18" diameter, 30' long culvert with a 24" wide, and 2' tall flashboard riser. Earth fill will be used to create a berm with a top elevation approximately 1' above the surrounding natural ground.

The structure is at a minimum 450 feet from the closest neighboring property. Due to the distance to the nearest property and the maximum depth of water to be retained, the proposed structure should not have any flooding impacts to any neighboring properties.

Any spoil material from construction or maintenance will be used or disposed of on an upland portion of the property. Staked straw bales or other measures will be used to protect downstream water quality during the installation, depending on weather and the presence of water in the ditch. No upstream or downstream modifications to the ditch are anticipated during installation, with the exception of developing a stable outlet for the structure.

**Soils:**

The soil for this project is My- Myakka fine sand. Please refer to Exhibit 2.

**Hydrologic Features:**

Drainage in the vicinity of the project is from a southwest to northeast direction. The drainage area of the proposed project is approximately 113 acres. Runoff draining through this project eventually reaches Butterfly Slough via a field drainage ditch. No significant drainage features or directions are proposed to change by this project. Please refer to Exhibit 3 Hydrologic Features Map, and Exhibit 4 Topographic Map, for more information.

The water control structure will back water into the wetland identified as W8. Maximum depth of water retained in the wetland is currently 8" due to an existing ditch. With the installation of the water control structure, the maximum retained water level will equal 1.5 feet, or the surrounding natural ground surface. Any water retained by the structure will be contained in the wetland and the existing field ditch. Retaining water in the wetland will improve localized water quality, restoring and enhancing the wetland's appearance. Please Refer to Exhibit 5 (wetland photographs) for more information.

**Operation and Maintenance:**

Mr. Jones will maintain and operate the culvert and boards for this project. Please refer to Exhibit 6 - Operation and Maintenance Plan for additional information.

**Exemption Determination:**

Pursuant to 373.406(9) F.S., this project qualifies for an ERP exemption because the water control structure will provide water quality improvement and sediment reduction, via the re-hydration of impacted wetland W8, thereby reducing the potential for phosphorus transport to Butterfly Slough. Please refer to all of the above information, and Exhibit 7 – Construction Engineering Drawings, for more information.

SAMPLE

## Table of Exhibits

<b>Exhibit 1</b>	<b>Aerial Photo/Project Location Map</b>
<b>Exhibit 2</b>	<b>Soils Map</b>
<b>Exhibit 3</b>	<b>Hydrologic Features Map</b>
<b>Exhibit 4</b>	<b>Topographic Map</b>
<b>Exhibit 5</b>	<b>Photographs</b>
<b>Exhibit 6</b>	<b>Operation and Maintenance Plan</b>
<b>Exhibit 7</b>	<b>Construction Engineering Drawing(s)</b>

### Project: ejones122003

### Exhibit 1 - SAMPLE Aerial Photo/Project Location Map



Section 17  
Township 38S  
Range 35E  
Longitude: W 80 deg 49 min  
36 sec  
Latitude: N 27 deg 14 min  
40 sec

 Property Boundary

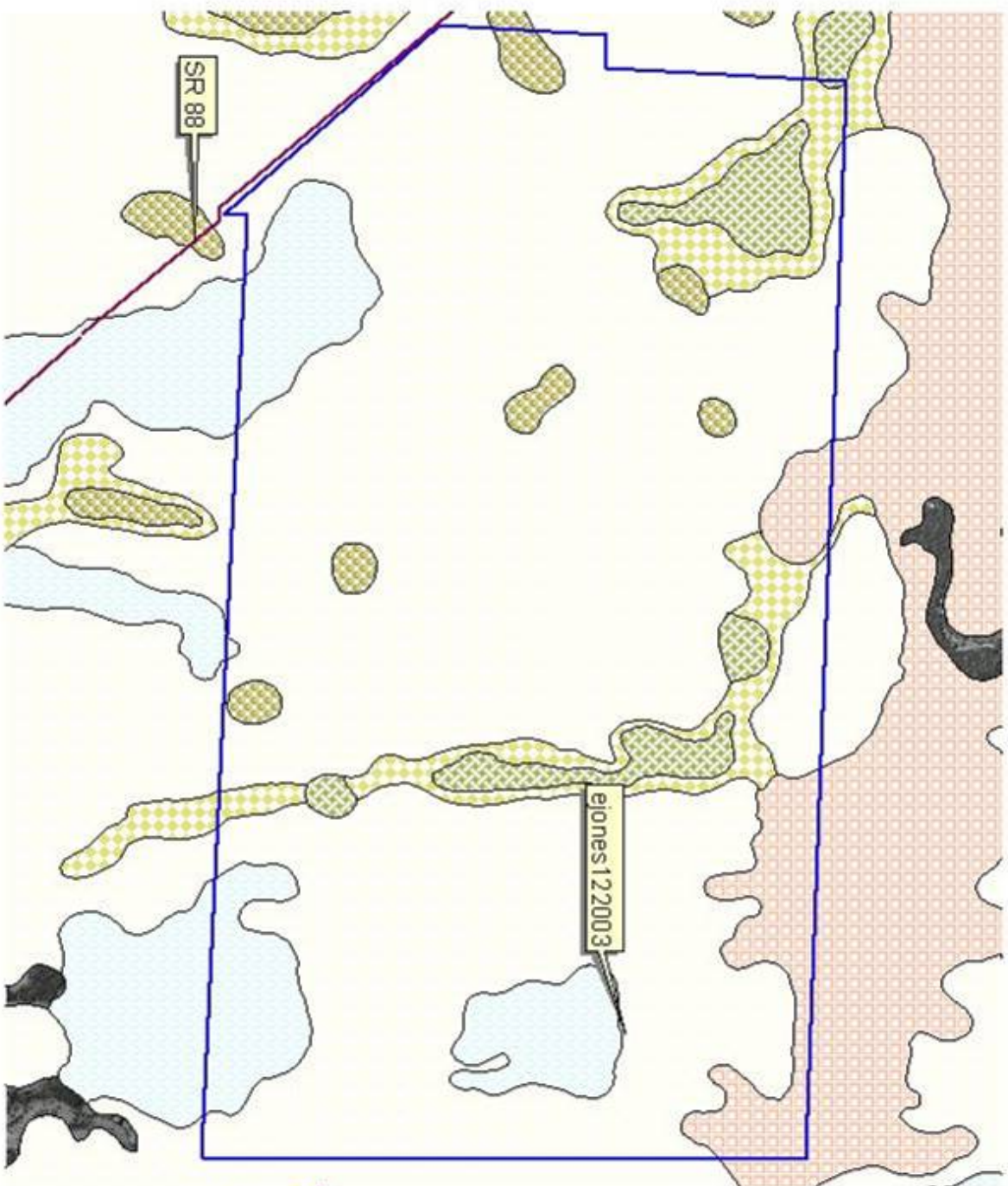


# Project: ejones122003

Exhibit 2 - SAMPLE  
Soil Map

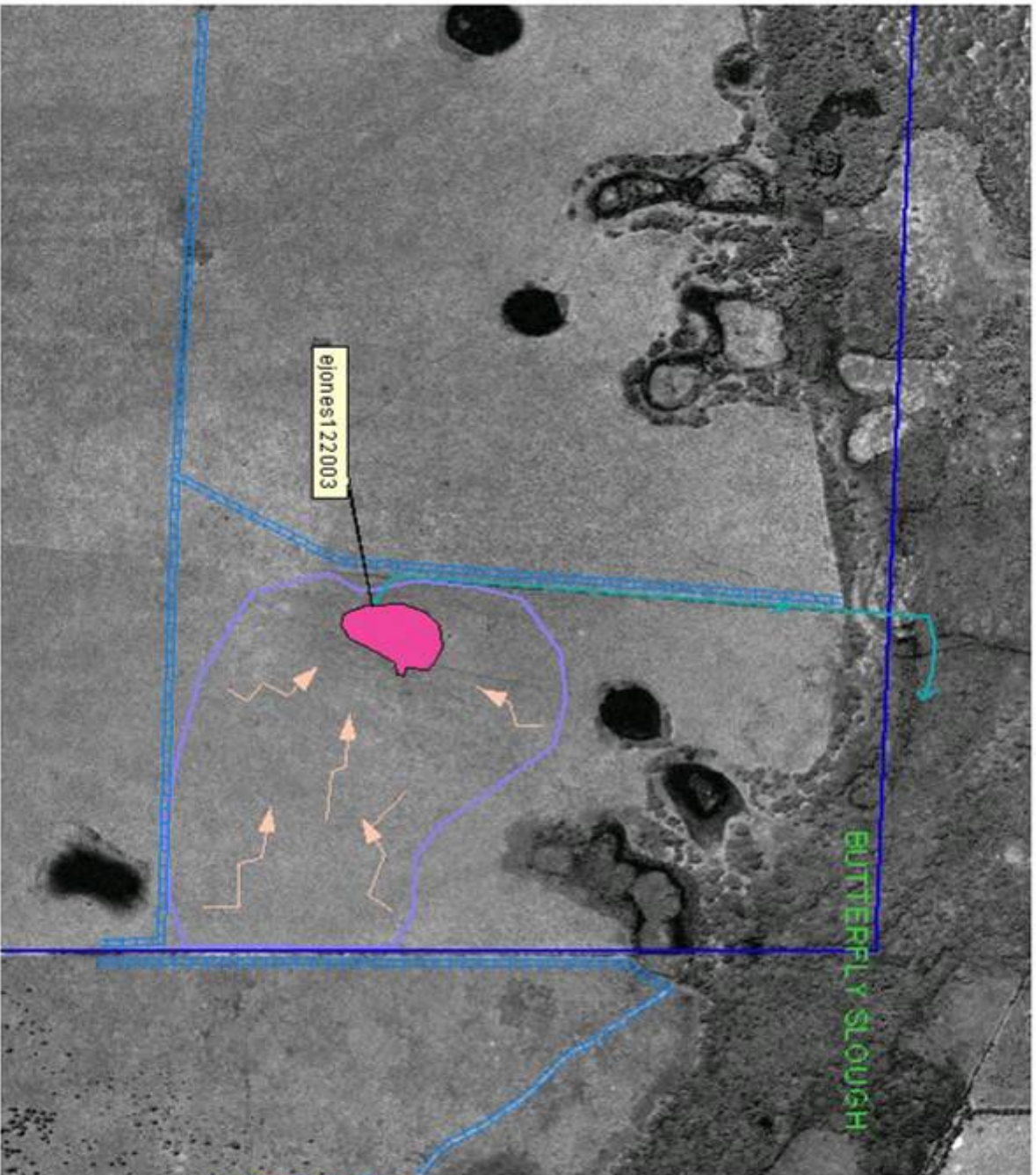
County: Okeechobee  
Section 17  
Township: 38S  
Range: 35E

Longitude: W80 deg  
49 min 36 sec  
Latitude: N27 deg  
14 min 40 sec



- SR 88
- Property Boundary
- SOILS
- 1 - MIAMI/ALEE FINE SAND
- 2 - MIAMI/ALEE FINE SAND
- 3 - FLORIDA, PLACID AND OKEECHOBEE SOILS
- 4 - BASKINER FINE SAND
- 5 - BASKINER AND PLACID SOILS
- 6 - FLORIDA, MIAMI, AND PLACID SOILS
- 7 - FLORIDA, MIAMI, AND PLACID SOILS

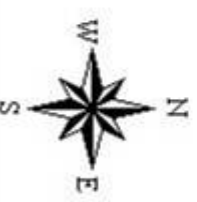
# Project: ejones122003



County: Okeechobee  
Section: 17  
Township: 38S  
Range: 35E

Longitude: W80 deg  
49 min 36 sec  
Latitude: N27 deg  
14 min 40 sec

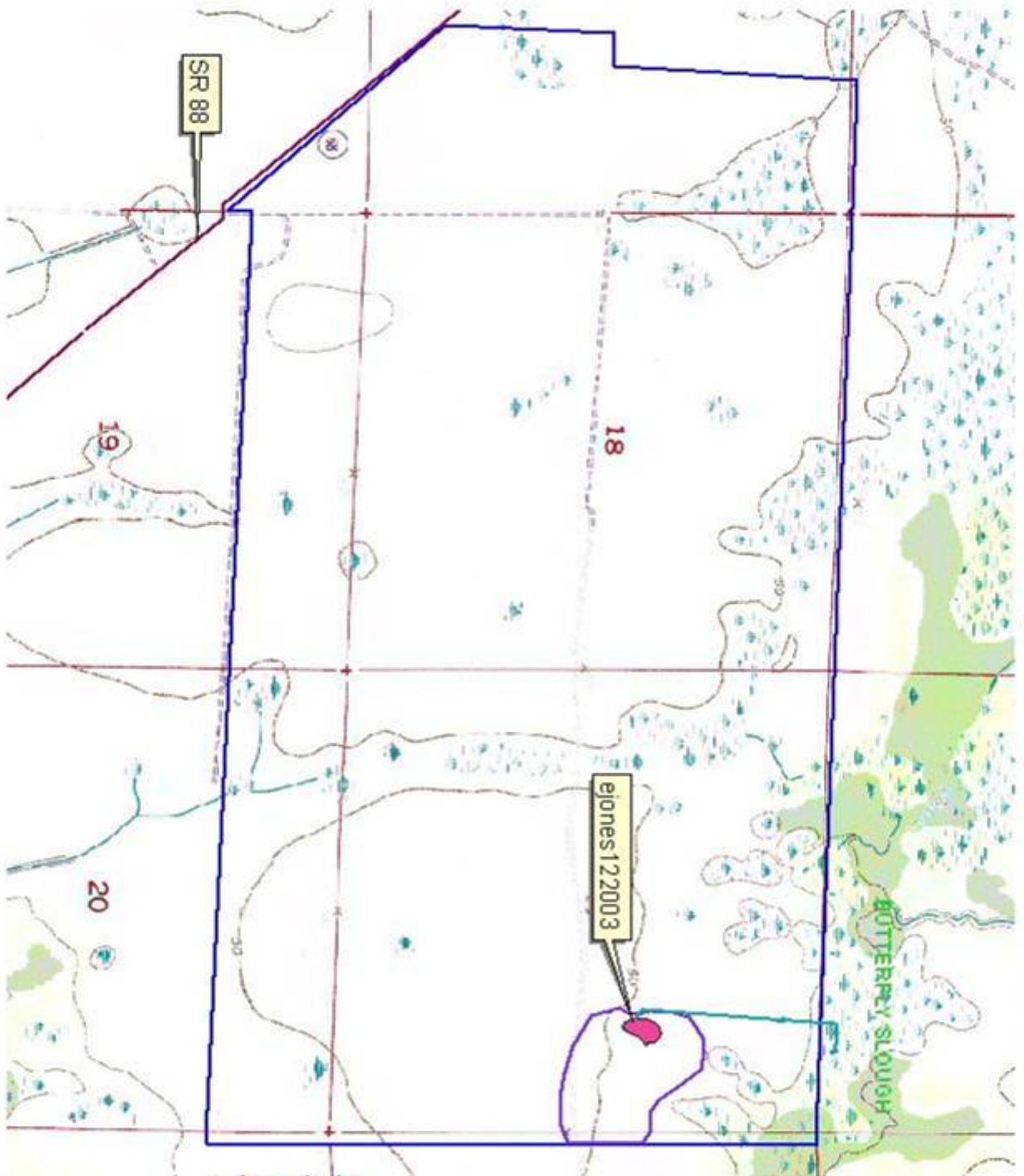
-  Drainage
-  Field Road
-  Drainage Ditch
-  Drainage Area
-  Wetland - W8
-  Property Boundary



# Project: ejones122003

County: Okeechobee  
Section: 17  
Township: 38S  
Range: 35E

Longitude: W80 deg  
49 min 36 sec  
Latitude: N27 deg  
14 min 40 sec



-  Drainage Ditch
-  Drainage Area
-  Wetland - W8
-  Stateroad 88
-  Property Boundary



**Exhibit 5 – Photograph(s) (SAMPLE)**

Project Name: ejones 122003



**Photograph 1 – Impacted Wetland W8**

**Photo taken: May 15, 2003**

## Exhibit 6 - OPERATION AND MAINTENANCE PLAN

### BMP Type: Water Control Structure – Culvert/Riser

**Cooperator:** Edward Jones \_\_\_\_\_ **Date:** \_\_\_\_\_

**Address:** 11000 Anywhere Lane, Jonesville, Florida 12345 \_\_\_\_\_

**Project Location:** Section 17 Township 38 S. Range 35 E.  
Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

**Project Name:** ejones 122003

**BMP Type:** Water Control Structure – Culvert/Riser

#### GENERAL

A properly operated and maintained BMP for water quality is an asset to your farm. This BMP was designed and installed to safely promote water quality.

This BMP will require you to perform periodic operation and maintenance to maintain satisfactory performance.

#### General Recommendations:

Maintain vigorous growth of desirable vegetative coverings. This includes reseeding, fertilization, and noxious vegetation control when necessary. Periodic mowing may be needed to control height.

Remove any obstructions that may restrict water flow into or from the structure. Ditches should be allowed to re-vegetate as much as is practicable.

Sediment which may accumulate upstream of the structure and restrict water flow, should be removed to original channel depths and spread in upland grasslands. Sediment should not be spread within 50' of major drainage structures.

Determine and eliminate causes of settlement or cracks in the earthen embankment and repair damage. (Including erosion to access road across the structure.) Repair cracks and weathered areas in concrete surfaces.

Repair or replace rusted or damaged metal and paint.

Replace weathered or displaced rock riprap to constructed grade.

Immediately repair any vandalism, vehicular, or livestock damage to any earthen fills, spillways, or outlets or other apparatuses.

**Specific Maintenance Recommendations for Project:** ejones122003

During periods of high rainfall or prolong periods of maximum board levels, more frequent inspections of the earthen embankment should be done to insure structure stability.

**Specific Operation Recommendations for Project:** ejones122003

The operator (farmer) is responsible for the placement and remove of boards in the riser to control the upstream water elevation. During periods of high rainfall, typically June through August, most of the boards should be removed to allow for maximum flooding protection. Failure to remove boards during periods of high rainfall may lead to flooding of internal surrounding lands. For maximum runoff retention, boards should be placed to a height of 19 inches; this will retain 10 ac-ft of water in wetland W8 immediately upstream of the structure. Failure to place boards in the riser will result in limited water retention by the structure.

**INSPECTIONS**

Yearly inspection of BMP should be done, to check for signs of embankment settling and erosion, proper vegetative cover, condition of riser/culvert including outlet erosion protection, obstructions to riser/culver, and general overall working condition of the structure.

Visual inspection of the BMP should be done after each major rainfall event for signs of embankment erosion and blockage to the culvert and/or riser.

Immediately repair any deficiency that was discovered during an inspection.

**The undersigned has read and agrees with all the above-mentioned terms and conditions of this Operation and Maintenance Plan.**

**Owner:**

**Date:**\_\_\_\_\_

**CONTACT YOUR LOCAL FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES – OFFICE OF AGRICULTURAL WATER POLICY FOR ANY ADDITIONAL TECHNICAL ASSISTANCE AS NECESSARY FOR THE IMPLEMENTATION OF THIS OPERATION AND MAINTENANCE PLAN, AS IT APPLIES TO YOUR SPECIFIC BEST MANAGEMENT PRACTICE.**



## **Appendix B**

**Deliverable 2 – Sample Summary Table of Key Hydrologic Results**

**Deliverable 3 – Sample Summary Table of Estimated Construction Materials**

## Deliverable Two – Summary Table of Key Hydrologic Results

**Project Name (per FDACS):** ejones 122003

**Brief Project Description:**

Installation of a new culvert and riser in an existing ditch. See the project's ERP Exemption Application Package for more information.

**Design Storm:** 10 year/72 hr (4.4 inches)

**Drainage Area:** Approximately 230 acres

**Project Resides in Body/Basin:** Sample Basin

**Reference/Datum Used for All Elevations:** USGS Quad Sheet (name)

Parameter	Existing	Post-Development	
		Structure	By-Pass Overflow Structure (if necessary)
Maximum Control/Board Elevation at Structure Location (ft)	18 (Existing Ditch invert)	19 (boards in Proposed Riser)	N/A
Maximum Water Level Upstream of Structure Location (ft)	20	21	Same (21)
Maximum Flow at Structure Location (cfs)	4.8	3.1	N/A
Maximum Water Volume Retained/Detained Upstream of Structure Location (ac-ft)	2	10	Same (10)
Maximum Velocity at Structure Location (ft/s)	1.5	1.3 @ boards	N/A
Hydrographs/Routings Used (attached)	YES	YES	N/A

**Important Notes:**

It is estimated that no erosion, sedimentation and/or sloughing is expected at the proposed culvert and riser structure location up to a 15 year 72 hour storm, because velocities will remain at or below 2 ft/s.

A by-pass overflow structure may be required above the 15 year 72 hour storm, to avoid any erosion, sedimentation or sloughing at the culvert and riser structure location.

No neighboring properties (at least 3 miles away) will be affected by the proposed culvert and riser structure, up to the 25 year 72 hour storm.

Refer to the project's ERP Exemption Application Package, for other information.

### Deliverable Three – Summary Table of Estimated Construction Materials

Project Name (per FDACS): ejones 122003

**IMPORTANT NOTE:**

This table shall always be completed in accordance with Exhibit 7 – the project’s construction engineering drawings and specifications, when estimating or bidding the project construction’s cost.

Item/Material	Amount	Dimension	Comments
Culvert – 24” dia Aluminum	1	40 ft	No bands needed
Riser – 36” dia Aluminum	1	6 ft tall	Requires board frame; attached to culvert
Concrete	0.75	yd <sup>3</sup>	Poured; site accessible by truck
On site Compacted Earthfill	10	yd <sup>3</sup>	Compaction in lifts is necessary, per Exhibit 7
Sod/Seed	212	ft <sup>2</sup>	Winter time installation; seed with rye
Crushed Shell (Road Base)	4	yd <sup>3</sup>	Shell available at ranch, 1 mile away
Other			

## **Appendix C**

### **Deliverable 4 – As-Built Engineering Drawings**

SAMPLE



## **Appendix D**

**Applicable USDA-NRCS Conservation Practice Standards**

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
Structure for Water Control  
(No.)  
Code 587



#### DEFINITION

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

#### PURPOSE

This practice may be applied as management component to control the stage, discharge, distribution, or direction of water flow.

#### CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is 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, or canal, or pipeline to operate under open channel conditions. Typical structures: 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: check, flashboard risers, and check dams.

Control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.

Keep trash, debris, or weed seeds from entering pipelines. Typical structure: debris screens.

Control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structure: tide and drainage gates.

Control the level of a water table, remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation. Typical structures: water level control structures, pipe drop inlets, and box inlets.

Convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons.

Modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures: deflectors, chutes, cold water release structures, and flashboard risers.

Provide silt management in ditches. Typical structure: sluice gate.

Create, restore, or enhance wetland hydrology.

#### CRITERIA

##### **General Criteria Applicable to All Purposes**

Planned work shall comply with all federal, state, and local laws and regulations. Plans

for water control structures may need to be permitted by the appropriate Water Management District (WMD) and comply with the appropriate WMD rules contained in Chapter 40-4 Florida Administrative Code (F.A.C.), Environmental Resource Permits: Surface Water Management Systems; Chapter 40-40 F.A.C., Standard General Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-41 F.A.C., Environmental Resource Permits: Surface Water Management Basin Criteria; Chapter 40-42 F.A.C., Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-44 F.A.C., Environmental Resource Permits: Regulation of Agricultural Surface Water Management Systems.

Water control structures shall be designed and constructed in conformance with provisions contained in Part 650, Engineering Field Handbook for Conservation Practices, Chapter 6 - Structures, Chapter 14 - Drainage, and Chapter 15 - Irrigation. Detailed information and criteria about water control structures are contained in the National Engineering Handbook Part 623 - Irrigation, Chapter 3; and Part 624 - Drainage, Chapter 6 and Chapter 10. Structures shall be designed on an individual job basis to meet site conditions and functional requirements. They shall be part of an approved engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes.

Structures must not create unstable conditions upstream or downstream. Water control structures installed in an open channel shall be designed to discharge the channel design flow at the designed channel hydraulic gradeline. Additional

capacity needed under flood conditions shall be provided by "island" type installation. Provisions must be made for safe reentry of bypassed flow as necessary. Where conduits are used, the diameter shall be based on design capacity but shall not be less than 6 inches in diameter. The length of the pipe shall be determined by the width and side slopes of the required embankment or roadway over the pipe and shall extend a minimum of two feet beyond the toe of the designed fill except where headwalls are used.

Structures shall not be installed that have an adverse effect on septic filter fields

The water level upstream of water control structures shall not be raised on adjacent landowners without their written permission.

#### Flashboard Riser and Culvert Structures.

These structures will be designed according to the hydraulic conditions under which they will function. Each condition will require a different design.

When this type structure is used for water stage control in a drainage ditch or irrigation canal and the flashboards will be removed to provide design discharge capacity, the pipe may be designed as a culvert with a riser width equal to or greater than the culvert diameter. If the boards are to remain in place during the design discharge, the structure will be designed to pass the design discharge with all the boards in place and will be designed as a drop inlet.

When used for reservoir or lake level control, this structure shall be designed as a drop inlet.

Structures used to protect grade shall meet the requirements of NRCS conservation practice standard Grade Stabilization Structure, Code 410. The portion of the flashboard riser opening below grade of the upstream channel bottom will be

permanently closed with a headwall of steel across the bottom of the semi-circular riser.

**Earth embankment.** The minimum top width for an embankment shall be 6 feet. If the embankment top is to be used as a public road, the minimum width shall be 16 feet for one-way traffic and 26 feet for two-way traffic. Guardrails or other safety measures shall be used where necessary and shall meet the requirements of the responsible road authority.

**Freeboard.** The minimum elevation of the top of the settled embankment shall be 1 foot above the design water surface or natural ground, whichever is higher.

**Side slopes.** The combined side slopes of the settled embankment shall be not less than 5 horizontal to 1 vertical (5:1), and neither slope shall be steeper than 2 horizontal to 1 vertical (2:1). All slopes must be designed to be stable. Where embankments are to be mowed or used by the public for recreation; 3 horizontal to 1 vertical (3:1) or flatter slopes are recommended.

**Compaction.** The embankment fill material shall be compacted in accordance with the specified design requirements for compaction and moisture content. Maximum thickness of earthfill layers will be 9 inches. If for any reason the designer is of the opinion that more stringent compaction requirements are necessary, percent of standard proctor and moisture limits may be specified. The design height of the embankment shall be increased by the amount needed to ensure that after settlement has taken place, the constructed height of embankment will equal or exceed the design height. This settlement shall not be less than 3 percent for rubber tired pans and scrapers and 5 percent for track type equipment such as bulldozers, except

where detailed soil testing and laboratory analysis shows a lesser amount is adequate or field observations indicate a greater amount is needed to obtain the required level of compaction.

**Materials.** Structures installed under this standard shall be constructed of durable material with a life expectancy equal to the planned life of the structure.

Pipe conduits used shall meet the requirements as stated in NRCS Florida conservation practice standard for Pond, Code 378.

Polyethylene, Type III, Class C, Category 4 or 5 conforming to ASTM and D 3350 and AASHTO M 252 or M 294, Type S, may be used for water control structures with a hydraulic head of 10 feet or less. Pipe connections must be water tight.

Concrete appurtenances used shall be designed for the anticipated loading and shall meet the requirements of National Engineering Handbook, Part 642, Specifications for Construction Contracting, Structure Concrete.

**Seepage control.** Seepage control is to be included if (1) seepage will create unstable conditions downstream, (2) it is needed to ensure a stable embankment or (3) special circumstances require drainage for a stable structure. Seepage may be controlled by foundation, abutment or embankment drains.

Seepage along pipes extending through the embankment may be controlled by use of a filter and drainage diaphragm, unless it is determined that antiseep collars will adequately serve the purpose. Anti-seep collars and drainage diaphragms shall meet the requirements of NRCS Florida conservation practice standard for Pond, Code 378.

**Antivortex devices.** Closed conduit

spillways designed for pressure flow must have adequate antivortex devices. Antivortex devices shall be designed in accordance with ARS-NC-33, Hydraulics of Closed Conduit Spillways, Part XIV.

**Trash guard.** Where necessary to prevent clogging of the conduit, an appropriate trash guard shall be installed at the inlet or riser. The trash guard shall be designed and constructed in such a manner that flow to the inlet will not be adversely affected.

**Protection.** A protective cover of vegetation shall be established on all disturbed earth surfaces. Where necessary, temporary vegetation will be used until permanent vegetation can be established. Vegetative measures including seedbed preparation, seeding, fertilizing, and mulching shall comply with NRCS conservation practice standard Critical Area Planting, Code 342.

Where needed to protect the outlet from erosion, it shall be protected with riprap or other means.

#### CONSIDERATIONS

When planning, designing, and installing this practice, the following items should be considered:

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.

Existence of cultural resources in the project area and any project impacts on such resources.

#### PLANS AND SPECIFICATIONS

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Care must be used to protect the surrounding visual resources.

As a minimum, the plans and specifications shall include:

Location of the structure(s),

Typical cross section of structure(s) including grades, elevations, and dimensions of individual structure(s),

Compaction requirements of all earth fills,

Type and quality of materials,

Hydraulic and structural requirements for individual structure(s), and

Vegetative requirements.

#### OPERATION AND MAINTENANCE

Operation and maintenance shall be in accordance with the requirements of this standard and in keeping in conformance with all local, state, and federal laws and regulations. Structures for water control must be adequately maintained if their purposes are to be realized through the expected life. Special considerations shall be given for maintenance needs during the planning, design, and construction of the structure. An operation and maintenance plan shall be prepared for each structure site and provided to the landuser. The water control structure should be inspected periodically to ensure that the structure functions as planned.

Water level and timing shall be adequately described wherever applicable.

Vegetation on all earthfills shall be inspected regularly. Mow when vegetative growth becomes excessive. Damaged vegetation shall be replaced in accordance with NRCS FL conservation practice standard Critical Area Planting, Code 342.

Structures shall be inspected for deterioration and capacity. Any blockage of trash and debris that could affect flows through the structure shall be removed. Materials that have deteriorated, including rock used for outlet protection shall be replaced.

The structure shall be inspected for safety of people or animals using the area near the structure.

Periodically remove sediment that accumulates during the design life.

#### REFERENCES

AASHTO M 252 and M 294

ARS-NC-33, Hydraulics of Closed Conduit Spillways, Part XIV.

ASTM D 3350

WMD Chapters 40-4, 40-40, 40-41, 40-42,

40-44 F.A.C.

Florida Department of Transportation,  
Specifications for Road and Bridge Design  
National Engineering Field Handbook, Part  
650

Chapter 6, Structures

Chapter 14, Drainage

Chapter 15, Irrigation

National Engineering Handbook

Part 623, Irrigation

Part 624, Drainage

Part 642, Specifications for Construction  
Contracting, Structure Concrete

NRCS Florida Conservation Practice  
Standards:

Critical Area Planting, Code 342

Grade Stabilization Structure, Code 410

Pond, Code 378

NATURAL RESOURCES CONSERVATION SERVICE  
 CONSERVATION PRACTICE STANDARD  
 CHANNEL STABILIZATION  
 (FT.)  
 CODE 584

**DEFINITION**

Measure(s) used to stabilize the bed or bottom of a channel

**PURPOSE**

This practice may be applied as part of a conservation management system to support one or more of the following:

Maintain or alter channel bed elevation or gradient

Modify sediment transport or deposition

Manage surface water and ground water levels in floodplains, riparian areas, and wetlands.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to the beds of existing or newly constructed channels, alluvial or non-alluvial, undergoing damaging aggradation or degradation that cannot be feasibly controlled by clearing or snagging, by the establishment of vegetative protection, by the installation of bank protection, or by the installation of upstream water control measures.

**CRITERIA**

Measures shall be designed and installed according to a site-specific plan.

Measures to be applied shall be compatible with improvements planned or being carried out by others.

Sufficient depth shall be maintained to provide adequate outlets for subsurface drains, tributary streams or ditches, or other channels.

Effect of channel work on existing structures such as culverts, bridges, buried cables, pipelines, and irrigation flumes shall be evaluated to determine impact on their intended functions.

Measures shall be designed for flow duration, depth of inundation, buoyancy, uplift, scour, angle of attack, and stream velocity.

Measures shall be compatible with the bank or shoreline materials, water chemistry, channel hydraulics, and slope characteristics, both above and below the water line.

Measures shall be designed for anticipated ice action, debris impact and fluctuating water levels.

Spoil material from clearing, grubbing, and channel excavation shall be disposed of in a manner that will not interfere with the function of the channel and in accordance with all local, state, and federal laws and regulations.

All disturbed areas around measures shall be protected from erosion. Vegetation shall be selected that is best suited for the anticipated site conditions.

Measures applied shall seek to avoid adverse effects to endangered, threatened, and candidate species and their habitats, whenever possible.

Measures applied shall seek to avoid adverse effects to archaeological, historic, structural, and traditional cultural properties, whenever possible.

Channel clearing to remove stumps, fallen trees, debris, and bars shall only be done when they are causing or could cause detrimental bank erosion or structural failure. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to

the extent possible.

Measures shall be functional for the design flow and sustainable for higher flow conditions based on acceptable risk.

Measures shall be designed to maintain the appropriate sediment transport regime in order to avoid detrimental erosion or sedimentation upstream and downstream.

Measures shall not impair the floodplain function.

Measures shall not result in adverse affects on the function of the stream or the stream corridor. When water surface elevations are a concern, the effects of protective measures shall not cause detrimental changes in water surface elevations.

The quantity and character of the sediments entering the reach of channel under consideration shall be analyzed on the basis of both present conditions and projected conditions caused by changes in land use or land treatment and upstream improvements or structural measures.

#### CONSIDERATIONS

Consider areawide planning for proper design, function and management of protective measures where the design reach involves by multiple stakeholders.

An assessment of channel stabilization needs should be considered in sufficient detail to identify the causes contributing to the instability (e.g. watershed alterations resulting in significant modifications of discharge or sediment production). Due to the complexity of such an assessment, use of an interdisciplinary team should be considered.

When designing protective measures, consider the changes that may occur in the watershed hydrology and sedimentation over the design life of the measure.

Consider utilizing woody debris removed during construction in the overall practice design.

Measures should consider habitat and migration needs of aquatic species.

Consider maintaining or improving the habitat

value for fish and wildlife, which includes lowering or moderating water temperature, and improving water quality.

Consider opportunities to improve habitat for threatened, endangered, and other species of concern, where applicable.

Consider maximizing adjacent wetland functions and values with the project design and minimizing adverse effects to existing wetland functions and values.

Consider protecting side channel inlets and outlets from erosion or sedimentation.

Consider the type of human use and the social and safety aspects when designing the protective measures. Use construction materials, grading practices, vegetation, and other site development elements that enhance aesthetics, recreational use, and maintain or complement existing landscape uses such as pedestrian paths, climate controls, and buffers. Avoid excessive disturbance and compaction of the site during installation.

Measures should be designed to minimize safety hazards to boaters, swimmers, or people using the channel.

#### PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for specific channel reaches and field sites and shall describe the requirements for applying the practice to achieve its intended purpose(s).

#### OPERATION AND MAINTENANCE

The owner or others responsible for operating and maintaining the system shall prepare an operation and maintenance plan. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components.

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
GRADE STABILIZATION STRUCTURE

(No.)  
Code 410



**DEFINITION**

A structure used to control the grade and head cutting in natural or artificial channels.

**PURPOSE**

This practice may be applied as part of a resource management system to support one or more of the following purposes:

- to stabilize the grade and control erosion in natural or artificial channels,
- to prevent the formation or advance of gullies, or
- to enhance environmental quality and reduce pollution hazards.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion.

**CRITERIA APPLICABLE TO ALL PURPOSES**

**General Criteria.** All planned work shall comply with Federal, state, and local laws, rules, and regulations. Grade stabilization structures may need to be approved or

permitted by the appropriate water management district (WMD) or the Florida Department of Environmental Protection (FDEP). Refer to Chapter 373 Florida Statutes (F.S.) and WMD Chapter 40-4 Florida Administrative Code (F.A.C.) for permitting requirements.

Special attention shall be given to maintaining or improving habitat for fish and wildlife where applicable.

The structure must be designed for stability after installation. The crest of the inlet must be set at an elevation that stabilizes upstream head cutting.

**Earth Embankments.** Earth embankments shall meet the requirements of Florida NRCS Florida conservation practice standard Pond, Code 378.

Earth embankment and emergency spillways of structures for which criteria are not provided in Florida conservation practice standard Pond, Code 378 or in TR-60, must be stable for all anticipated conditions. If earth spillways are used, they must be designed to handle the required total capacity without overtopping the embankment. The foundation preparation, compaction, top width, and side slopes must ensure a stable embankment for anticipated flow conditions. Discharge from the structure shall be sufficient that no crop damage results from flow detention.

The minimum capacity of the principal spillway shall be that required to pass the peak flow expected from a 24-hour duration design storm of the frequency shown in

Table 1 less any reduction because of detention storage. If criteria values exceed those shown in Table 1, or the storage capacity is more than 50 acre-ft, the peak flow from a 10-year frequency, 24-hour duration storm less any reduction from detention storage must be used as the minimum principal spillway capacity.

The peak flow from a 25-year frequency, 24-hour duration storm, less any reduction creditable to principal spillway discharge and detention storage, must be used as the minimum emergency spillway design storm. Grade stabilization structures with a settled fill height of less than 15 feet and 10-year frequency, 24-hour storm runoff less than 10 acre-ft, may be designed to control the 10-year frequency storm without overtopping. The mechanical spillway, regardless of size, may be considered in the design and an emergency spillway is not required if the combination of storage and mechanical spillway discharge will handle the design storm.

The combined side slopes of the settled embankment shall be not less than 5 horizontal to 1 vertical (5:1), and neither slope shall be steeper than 2 horizontal to 1

Table 1. Design criteria for establishing minimum capacity of the principal spillway and emergency spillway for dams with storage capacity of less than 50 ac-ft.

Drainage Area	Effective Height of Dam	Principal Minimum Duration Design Storm <sup>1/</sup>	Spillway - 24-Hour Frequency	Emergency Spillway - Minimum 24-Hour Duration Frequency Design Storm <sup>1/</sup>
acres	feet	year		year
≤ 100	35 or less	2		25
> 100 ≤ 200	35 or less	5		25

<sup>1/</sup>Grade stabilization structures with a settled fill height of less than 15 feet and 10-year frequency, 24-hour storm runoff less than 10 acre-ft, shall be designed to control the 10-year frequency storm without overtopping. The mechanical spillway, regardless of size, may be considered in the design and an emergency spillway is not required if the combination of storage and mechanical spillway discharge will handle the design storm.

**Full Flow Open Structures.** Straight drop spillways, drop boxes, chute spillways, and

vertical (2:1). All slopes must be designed to be stable. Where embankments are to be mowed; 3 horizontal to 1 vertical (3:1) or flatter slopes are recommended.

Compaction of the embankment fill material shall be in accordance with the specified design requirements for compaction and moisture content. Maximum thickness of earthfill layers will be 9 inches. If for any reason the designer is of the opinion that more stringent compaction requirements are necessary, percent of standard proctor and moisture limits may be specified. The design height of the embankment shall be increased by the amount needed to ensure that after settlement has taken place, the constructed height of embankment will equal or exceed the design height. This settlement shall not be less than 3 percent for rubber tired pans and scrapers and 5 percent for track type equipment such as bulldozers, except where detailed soil testing and laboratory analysis shows a lesser amount is adequate or field observations indicate a greater amount is needed to obtain the needed level of compaction.

box inlet drop spillways shall be designed according to the principles set forth in the

NRCS National Engineering Field Handbook Part 650, the National Engineering Handbook Series and other applicable NRCS publications and reports. The minimum capacity shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in Table 2, less any reduction because of detention storage. If site conditions exceed those shown in Table 2, the minimum design 24-hour storm frequency is 25 years for the principal spillway less any reduction from detention storage and 100 years less any reduction creditable to principal spillway discharge and detention storage for the total capacity. Structures must not create unstable conditions upstream or downstream. Provisions must be made to ensure safe reentry of bypassed flows.

Toe wall drop structures can be used if the vertical drop is 4 ft or less, flows are intermittent, downstream grades are stable, and tailwater depth at design flow is equal to or greater than one-third of the height of the overfall.

Table 2 - Design criteria for establishing minimum capacity of full-flow open structures.

		Frequency of Minimum Design, 24-Hour Duration Storm	
Maximum Drainage Area	Vertical Drop	Principal Spillway Capacity	Total Capacity
acres	feet	year	year
250	≤ 5	5	10
500	≤ 10	10	25

The ratio of the capacity of drop boxes to road culverts shall be as required by the responsible road authority or the capacity specified in Table 2 less any reduction because of detention storage, whichever is

greater. The drop box capacity (attached to a new or existing culvert) must equal or exceed the culvert capacity at design flow. Structures with flashboard risers shall be designed to handle the design discharge with the water surface below the crest of emergency spillway with all the flashboards in place.

If the mechanical spillway is designed as an island-type structure, its minimum capacity shall be equal to or greater than the capacity of the downstream channel. For channels with drainage areas of 40 acres or less, the mechanical spillway shall have the minimum capacity of removing the runoff from a 2-year, 24-hour storm in 24 hours or the design drainage curve runoff. The minimum emergency spillway capacity shall be that required to pass the peak flow expected from a design storm of the frequency and duration for total capacity shown in Table 2, less any reduction creditable to principal spillway discharge and detention storage without overtopping the headwall extensions of the mechanical spillway. Provisions must be made for safe reentry of bypassed flow as necessary.

**Side-inlet Drainage Structures.** The design criteria for minimum capacity of open-weir or pipe drop drainage structures used to lower surface water from field elevations or lateral channels into deeper open channels are shown in Table 3. For all conditions shown in Table 3, the minimum principal spillway capacity shall be equal to or greater than the design drainage curve runoff. If site condition values exceed those shown in Table 3, the 50 year frequency storm shall be used for minimum design of total capacity less any reduction creditable to principal spillway discharge and detention storage. Provisions must be made to prevent damage from overtopping

the structure and to divert excess flows away from the structure. On structures with drainage areas of 3 acres or less, overtopping of the structure is permitted only if damage will be minor and island type construction will interfere with normal farming operations.

Table 3 - Design criteria for establishing minimum capacity of side-inlet (open-weir or pipe drop) drainage structures.

		Frequency of Minimum Design, 24-Hour Duration Storm	
Maximum Drainage Area acres	Vertical Drop feet	Receiving Channel Depth feet	Total Capacity year
250	0 - 5	0 - 10	1/
250	>5 - 10	>10 - 20	10
500	0 - 10	0 - 20	25

<sup>1/</sup> Total capacity shall be equal to or greater than the design drainage curve runoff.

Side-inlet structures with flashboard risers shall be designed to handle the design discharge with the water surface below the crest of the emergency spillway with all the flashboards in place.

Earth embankment side slopes may be as steep as 1.5 horizontal to 1 vertical (1.5:1) on pipe island-type or side-inlet drainage structures where the effective height is less than 10 feet and the vertical drop is less than 10 feet from natural ground to channel bottom or normal downstream water level.

**Seepage Control.** Seepage control is to be included if (1) seepage will create unstable conditions downstream, (2) it is needed to ensure a stable embankment or (3) special circumstances require drainage for a stable structure. Seepage may be controlled by foundation, abutment or embankment

drains.

Seepage along pipes extending through the embankment may be controlled by use of a filter and drainage diaphragm, unless it is determined that anti-seep collars will adequately serve the purpose. Anti-seep collars and drainage diaphragms shall meet the requirements of NRCS Florida conservation practice standard for Pond, Code 378.

**Trash Guards.** Where needed to prevent clogging of the conduit, an approved type of trash rack shall be installed on the riser of drop inlets. Openings for trash racks shall be no larger than one-half of the barrel conduit diameter, but in no case less than 6 inches. The total cross sectional area of the trash rack openings shall be equal to or greater than the area of the box or riser being protected.

**Antivortex Device.** Drop inlet pipe spillways shall be installed with an antivortex device where needed to prevent the formation of vortices. Antivortex devices shall be designed in accordance with ARS-NC-33, Hydraulics of Closed Conduit Spillways, Part XIV.

**Materials.** Structures installed under this standard shall be constructed of durable material with a life expectancy equal to the planned life of the structure. Pipe conduits used in grade stabilization structures shall meet the requirements as stated in NRCS Florida conservation practice standard for Pond, Code 378.

Polyethylene, Type III, Class C, Category 4 or 5 conforming to ASTM D1248 and D3350 and AASHTO M252 or M294, Type S may be used for grade stabilization structures with a hydraulic head of 10 feet or less. Pipe connections must be watertight.

Concrete appurtenances used shall be designed for the anticipated loading and

shall meet the requirements of NRCS Construction Specification 32, Concrete for Minor Structures.

**Sediment Storage.** Necessary sediment storage capacity must equal the expected life of the structure, unless a provision is made for periodic cleanout.

**Safety.** Earth embankment pond structures are potentially hazardous and precautions must be taken to prevent serious injury or loss of life. Protective guardrails, warning signs, fences, or lifesaving equipment shall be added as needed.

**Protection.** The exposed surfaces of the embankment, earth spillway, borrow area, and other areas disturbed during construction shall be seeded or sodded as necessary to prevent erosion. Areas shall be vegetative in accordance with NRCS Florida conservation practice standard Critical Area Planting, Code 342.

#### CONSIDERATIONS

Structures located in areas used for livestock or in urban areas should be fenced as necessary to control access and exclude traffic to prevent damage to the structure from vandalism, as well as preventing serious injury to trespassers.

Where conditions preclude or make it difficult to establish vegetative cover, consider using non-vegetative coverings such as gravel, geoweb, gabions, interlocking blocks or other type of protection.

Grade stabilization structures with detention storage may affect the volume and rates of runoff, evaporation, deep percolation and ground water recharge.

Grade stabilization structures may trap sediment and sediment attached substances carried by runoff. Consideration should be given to the amount of sediment that will be deposited and allowances made

for removal.

In highly visible public areas and those associated with recreation, careful considerations should be given to landscape resources. Landforms, structural materials, water elements, and plant materials should visually and functionally complement their surroundings. Excavated material and cut slopes should be shaped to blend with the natural topography. Shorelines can be shaped and islands created to add visual interest and valuable wildlife habitat. Exposed concrete surfaces may be formed to add texture or finished to reduce reflection and to alter color contrast. Site selection can be used to reduce adverse impacts or create desirable focal points.

The susceptibility of downstream stream banks and streambeds to erosion should be considered in selecting the type of outlet and in determining the final grade of the outlet channel.

#### PLANS AND SPECIFICATIONS

Plans and specifications for installing grade stabilization structures shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

#### OPERATION AND MAINTENANCE

Operation and maintenance shall be in accordance with the requirements of this standard and in keeping in conformance with all local, state, and federal laws and regulations.

The grade stabilization structure should be inspected periodically to ensure that the structure functions as planned.

Inspect vegetation on all earthfills. Mow when vegetative growth becomes excessive. Repair and/or fertilize damaged vegetation in accordance with NRCS FL conservation practice standard Critical Area

Planting, Code 342.

Inspect structures for deterioration and capacity. Remove any blockage of trash and debris that could affect flows through the structure. Repair or replace materials that have deteriorated, including rock used for outlet protection.

Inspect for safety of people or animals using the area near the structure.

Periodically remove sediment if storage is less than the expected accumulation during the design life.

#### REFERENCES

AASHTO M252, M294

ARS-NC-33

ASTM D1248, D3350

Chapter 40-4 F.A.C

Chapter 373 F.S.

National Engineering Handbook, Part 650,  
Engineering Field Handbook

NRCS Construction Specification 32,  
Concrete for Minor Structures

NRCS Florida Conservation Practice  
Standards:

Critical Area Planting, Code 342

Pond, Code 378

Technical Release No. 60

NATURAL RESOURCES CONSERVATION  
SERVICE  
CONSERVATION PRACTICE STANDARD  
DRAINAGE WATER MANAGEMENT  
(AC.)  
CODE 554



**Definition**

Control of water surface elevations and discharge from surface and subsurface drainage systems.

**Purposes**

This practice may be applied as part of a resource management system to support one or more of the following purposes:

Improve water quality.

Improve the soil environment for vegetative growth.

Reduce the rate of oxidation of organic soils.

Aid in the control of nematode and other pest populations.

Prevent wind erosion.

Enable seasonal shallow flooding.

**Conditions where practice applies**

This practice applies to areas where:

The topography is relatively smooth, uniform and flat to gently sloping.

A water table may be maintained without excessive seepage and without having an adverse impact on adjoining properties.

**General Criteria Applicable To All Purposes**

All planned work shall comply with all Federal, state, and local laws and regulations. Plans for water control structures may need to be permitted by the appropriate Water Management District (WMD) and comply with the appropriate WMD rules contained in Chapter 40-4 Florida Administrative Code (F.A.C.), Environmental Resource Permits: Surface Water Management Systems; Chapter 40-40 F.A.C., Standard General Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-41 F.A.C., Environmental Resource Permits: Surface Water Management Basin Criteria; Chapter 40-42 F.A.C., Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-44 F.A.C., Environmental Resource Permits: Regulation of Agricultural Surface Water Management Systems.

The system shall be designed to remove the water required for adequate drainage. The rate of outflow and the level of the water table shall be controlled by structures or pumps. Water velocities in the soil near the drain shall be kept slow enough to prevent soil particles from entering the drainage system. Structures and pumps shall be located where they are accessible and subject to convenient control. Designs of critical components shall be in accordance with pertinent NRCS conservation practice standards.

For crops that are highly sensitive to excessive or inadequate soil water conditions, the field surface must be smooth, and the distance between the soil water level and the ground surface must be as uniform

as practical. Fields shall be smoothed or graded in accordance with NRCS conservation practice standard Land Smoothing, Code 466, Irrigation Land Leveling, Code 464, or Precision Land Forming, Code 462, as required, to achieve this uniformity.

#### Additional Criteria to Improve Water Quality

The system shall prevent automatic discharge of storm water during minor rainfall events. The controlled discharge of excess water shall account for water not otherwise removed by evapotranspiration and seepage. The uniformity of storm water draw down shall be improved throughout the areas influenced by the designed system. The distance the water must travel in surface ditches before it reaches the main discharge point shall be maximized when practical.

#### Additional Criteria to Improve Soil Environment for Vegetative Growth

The combined capacity of the surface and subsurface facilities shall satisfy the appropriate drainage coefficient for the crops to be grown. The water table shall be held between predetermined elevations at all points in the design area when the system is being used for sub-irrigation. See NRCS conservation practice standard Irrigation System, Surface and Subsurface, Code 443.

#### Additional Criteria to Reduce the Rate of Oxidation of Organic Soils

Drainage beyond that necessary to provide an adequate root zone for a crop shall be kept to a minimum. When practicable, the water table shall be raised to the surface, or to a designated maximum elevation, for a sufficient time to return the saturated zone to anaerobic conditions. The implementation of this practice must result in a reduced average annual thickness of the aerated layer of the soil.

#### Additional Criteria to Prevent Wind Erosion

The system shall provide sufficient moisture to the soil surface, either by ponding or capillary action, to prevent wind erosion when there is insufficient organic residue or plant material on the surface.

#### Additional Criteria to Enable Seasonal Soil Saturation or Shallow Flooding

The system shall provide saturation to the surface or shallow flooding for a sufficient time to accomplish the desired pest control, provide wildlife habitat, or reduce the rate of oxidation of organic soils.

Flooding used to aid in the control of nematode and other pest populations may be accomplished through the use of dikes, water control structures and/or low head lift pumps. Water control structures and pumps shall be located where they are easily accessible for operation and maintenance. Water control structures shall meet NRCS conservation practice standard, Structure for Water Control, Code 587. Pumps shall meet NRCS conservation practice standard, Pumping Plants for Water Control, Code 533. Additional criteria for the use of flooding to aid in the control of nematode is as follows.

Capacity. The water delivery system shall have the capacity to provide a minimum of 10 gpm per acre for the area to be flooded.

Duration. Flooding (complete soil saturation) shall be maintained for a minimum of 30 continuous days with the design water level at an elevation that will ensure a minimum of 90 percent of the design land surface area is at or below the design water level.

If pumping is intermittent, additional water depth shall be added to account for seepage and evaporative losses during non-pumping periods.

Drainage. Release of water at the end of the flooding period must be controlled at a discharge rate that will not result in erosion damages.

Embankments. Dikes used to contain the flooding shall be designed and constructed in accordance with NRCS conservation practice standard, Dike, Code 356 if the possibility of a breach of the constructed dike could cause off-site damages.

If a breach of the dike poses no potential damage, the dike may be temporary in nature with little or no shaping of the cross-section. Minimum height of temporary dikes shall be 0.5 feet above the planned water level with a minimum top width of 2.0 feet. Existing roads or spoil banks of adequate height (minimum of 0.5 feet above planned water level) are acceptable for temporary dikes.

#### Considerations

An adequate water supply should be available when it is necessary to raise the water.

The effect of drainage systems on wetlands should be evaluated.

To further reduce subsidence of organic soils, the water management infrastructure should be designed for temporary flooding of fallow fields.

#### PLANS AND SPECIFICATIONS

Plans and specifications for regulating water in drainage systems shall be in keeping with this standard and shall describe the requirements for properly installing and operating the practice to achieve its intended

purpose. Plans and specifications shall include construction plans, drawings, job sheets or other similar documents. These documents are to specify the requirements for installing the practice such as the kind, amount, or quality of materials to be used or the timing or sequence of installation activities.

#### OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that will identify the intended purposes of this practice and that will identify critical dates and target elevations of the water level necessary to accomplish the intended purposes.

The plan shall also include the operation and maintenance of critical components of the infrastructure used to manage the drainage water.

#### REFERENCES

WMD Rules Chapter 40-4, 40-40, 40-41, 40-42, 40-44 F.A.C.

NRCS Conservation Practice Standards:

Irrigation Land Leveling, Code 464

Irrigation System, Surface and Subsurface, Code 443

Land Smoothing, Code 466

Precision Land Forming, Code 462

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
SEDIMENT BASIN  
(NO.)  
CODE 350



**Definition**

A basin constructed to collect and store debris or sediment.

**Purpose**

Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams,  
Prevent undesirable deposition on bottom lands and developed areas,  
Trap sediment originating from construction sites, and/or  
Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

**Conditions where practice applies**

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

**criteria**

Planned work shall comply with all federal, state, and local laws, rules, and regulations.

**Capacity.** The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the

planned useful life of the basin or the improvements it is designed to protect. The sediment storage volume may be determined by using the Revised Universal Soil Loss Equation (RUSLE) and gully erosion rates with an appropriate delivery ratio or by using other accepted sediment predictive procedures. Where it is determined that periodic removal of debris will be practicable, the capacity may be proportionally reduced.

The design sediment yield to the basin shall be at least that required by the applicable local, state and federal law, rule or regulation. As a minimum, sufficient capacity to store 67 cu. yd. for each disturbed contributing acre should be provided.

The capacity of the sediment basin shall be measured to the elevation of the crest of the principal spillway or auxiliary spillway if there is no principal spillway.

**Principal spillway.** The minimum capacity of the principal spillway will be sufficient to discharge the temporary water storage in 72 hours or less.

A principal spillway consisting of a vertical pipe or box type "riser" joined watertight to a pipe "barrel" which will extend through the embankment and outlet beyond the downstream toe of the fill, shall be provided. The upper half of the riser will be perforated, with 1/2" diameter holes spaced 8 inches vertically and 10 - 12 inches horizontally, to provide for a gradual drawdown after each storm event.

Comparable alternative drawdown (or dewatering) methods may be used provided they serve the above intended purpose which

is to trap sediment and provide protection against overtopping from subsequent runoff.

**Embankment.** The design of dams, spillways, and drainage facilities shall be according to Florida NRCS conservation practice standards Pond, Code 378 and Grade Stabilization Structure, Code 410 or according to the requirements in NRCS Technical Release (TR)-60 Earth Dams and Reservoirs, as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 feet or less may be designed according to Florida NRCS conservation practice standard Water and Sediment Control Basin, Code 638.

**Safety.** Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment.

**Protection.** Disturbed areas shall be established to suitable erosion-resistant vegetation as soon as practical after construction. Seedbed preparation, fertilizing, seeding and mulching shall be in accordance with Florida NRCS conservation practice standard Critical Area Planting, Code 342. Where it is necessary, topsoil may be stockpiled and spread over disturbed areas to facilitate restoration of productivity.

considerations

Large sediment basins may have an effect on the peak discharge rate from a watershed. Planners should consider this, and take steps to mitigate any potential negative effects this may have on riparian habitat downstream from the structure.

Visual aesthetics may be a concern, especially in urban or suburban areas. To address these concerns, the basin should be

designed to blend with the surrounding topography, or plantings could be proposed to screen the view from surrounding homes or buildings.

Sediment basins should be part of a resource management plan including such practices as terraces, grassed waterways, contouring, conservation cropping system, conservation tillage, and crop residue management.

Where possible, the basin should be configured to enhance sediment deposition. This can be accomplished by using flow deflectors, inlet and outlet selection, and by adjusting the length to width ratio.

Make traps readily accessible for periodic sediment removal and other necessary maintenance. Plan locations for sediment disposal as part of trap site selection. Clearly designate all disposal areas on the plans.

In preparing plans for sediment traps, it is important to consider provisions to protect the embankment from failure from storm runoff that exceeds the design capacity. Consider nonerosive auxiliary spillway bypass areas, particularly if there could be severe consequences from failure. If a bypass is not possible and failure would have severe consequences, consider alternative sites.

Sediment trapping is achieved primarily by settling within a pool formed by an embankment. The sediment pool may also be formed by excavation, or by a combination of excavation and embankment. Sediment-trapping efficiency is a function of surface area and inflow rate. Installations that provide pools with large length to width ratios reduce short circuiting and allow more of the pool surface area for settling. This optimizes efficiency.

To improve the effectiveness of the basin, it should be located to intercept the largest possible amount of runoff from the disturbed area.

The minimum length of flow through the trap should be 10 feet and the minimum length to width ratio should be 2:1. If site conditions permit a greater travel distance through the basin and greater length to width ratio the water quality benefit provided by the sediment trap will be enhanced. The average trap storage depth should be a minimum of 2 feet to prevent resuspension of sediments.

For cropped fields, embankment orientation and crop row direction should be approximately perpendicular to the land slope to support contour farming. The design should support farmability by limiting short point rows or sharp curves. Field boundaries and row lengths should also be considered in planning basin location and row direction.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

Due consideration shall be given to good visual resource management.

Operation safety of vehicle and farming equipment should be considered when selecting cut and fill slopes.

The nesting success and survival rate of ground-nesting species will increase if mowing is delayed until after the nesting season.

Using native species for revegetation will increase habitat diversity.

This practice may adversely affect cultural resources. Planning, installation and maintenance must comply with GM 420, Part 401.

Plans and specifications

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans shall include as a minimum:

Location of the sediment traps.

Size of basin including width, length and depth.

Cross section of the embankment.

Profile through the spillway(s).

Location of auxiliary spillway, if used.

Graduation and quality of rock.

Vegetative requirements.

Type of outlet structure.

The installation, inspection and maintenance schedules with the responsible party identified.

**OPERATION and Maintenance**

A site specific operation and maintenance (O&M) plan shall be provided to the landowner. The O&M plan shall include a provision that the sediment basin will be inspected after each significant rainfall and needed maintenance performed. The O&M plan shall include maintenance requirements for the embankment, checking capacity, sediment removal, vegetative cover, and maintenance of inlets and outlets.

When sediment storage is full, accumulated sediment must be removed or the basin must be redesigned and modified to restore capacity.

Vegetation shall be maintained to prevent sheet and rill erosion or gulying of the embankment. Trees and woody cover generally create problems on embankments and should be controlled.

**REFERENCES**

Florida NRCS Conservation Practice Standards

Critical Area Planting, Code 342

Grade Stabilization Structure, Code 410

Pond, Code 378

Water and Sediment Control Basin, Code 638

NRCS GM 420, Part 401

NRCS TR-60 Earth Dams and Reservoirs

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