



**State of Louisiana
Department of Natural Resources
Coastal Engineering Division**

**2005/2006 Annual Inspection
Report**

for

**HWY. 384 HYDROLOGIC
RESTORATION PROJECT
(CS-21)**

State Project Number CS-21
Priority Project List 2

October 24, 2005
Cameron Parish

Prepared by:

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I. Introduction

The Hwy. 384 Hydrologic Restoration project (State Project No. CS-21) is located in the Calcasieu-Sabine Basin on the northeast side of Calcasieu Lake in Cameron Parish. The 1,125 acre project area extends from the northeast shore of Calcasieu Lake in a southeasterly direction to the Gulf Intracoastal Waterway and generally parallels LA Hwy. 384 in the vicinity of the Grand Lake community. The area is bounded on the north and south by higher elevation prairie formations. (See Appendix A).

The Hwy. 38 Hydrologic Restoration Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended and approved on the second Priority Project List. The Hwy. 384 Project has a twenty –year (20 year) economic life, which began in March 2003.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan, 2003). The annual inspection report also contains a summary of maintenance projects, if any, which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C.

In 2003, the CWPPRA Task Force determined, due to the fact that LDNR was responsible for the operation and maintenance phase of the vast majority of CWPPRA projects, that LDNR would be the responsible party for all Post Storm/Hurricane Assessments. After Hurricanes Katrina and Rita, every project appeared to have been impacted by the storms; therefore, LDNR determined that all projects should be assessed for damages (Broussard, 2006). With concurrence from the federal sponsor, LDNR has decided to use the information obtained during this post hurricane assessment in this Annual Maintenance Inspection.

An inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) was held on October 24, 2005 under sunny skies. The temperature was approximately 60 degrees. In attendance were Stan Aucoin, Dewey Billodeau, Herb Juneau, Darrell Pontiff, and Beau Tate of LDNR. Representatives of NRCS were invited but were unable to attend. Parties left the Lafayette Field Office of CED, and proceeded to the CS-21 project area in the community of Grand Lake, LA. The annual inspection began at approximately 2:00 p.m. at Structure #1, the Fresh Water Introduction Structure, on the Gulf Intracoastal Waterway.

The field inspection included a complete visual inspection of all features. Staff gauge readings were used to determine approximate elevations of water, rock weirs, earthen embankments, steel bulkhead structures and other project features. Photographs were taken at each project feature (see Appendix B) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix D).

III. Project Description and History

Historically, the western portion of the project area was intermediate marsh with slightly brackish marsh immediately adjacent to Calcasieu Lake (U. S. Department of Agriculture, Natural Resources Conservation Service [USDA/NRCS] 1995, 1996a, 1996b). The eastern portion of the project area was fresh marsh up to the GIWW. In the late 1980's, Chabreck and Linscombe (1988) characterized the La. Highway 384 wetlands as brackish and intermediate.

Increased tidal volumes, enlargement of tidal exchange routes, and salt water intrusion resulting from human-induced changes to the area's hydrology are the primary causes of wetland loss in the project area (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] 1993). The Calcasieu Ship Channel was constructed in 1941 and redredged to its current depth of 40 ft (12.2 m) and bottom width of 400 ft (122 m) in 1968 (Good et al. 1995). This channel radically altered the area's hydrology by increasing the height and duration of tidal fluctuations, which in turn increased water levels and saltwater intrusion into the low salinity marshes surrounding Calcasieu Lake (Suhayda et al. 1988). Spoil banks along the GIWW, which was constructed in the 1940's, have effectively blocked the project area's historical connection to the Mermentau River Basin, and now block off the major source of freshwater for the project area, the GIWW east of Calcasieu Lock. Construction of a drainage canal through the project area prior to 1940, and construction of an oil field road before 1963 both provided hydrologic exchange points connecting the fragile interior marsh soils of the project area to Calcasieu Lake (USDA/NRCS 1995, 1996a, 1996b).

Hydrologic exchange between the project area and Calcasieu Lake allowed salt water to eradicate much of the non-salt tolerant emergent vegetation, exposing the fragile organic surface layer of the marsh soil to erosion and tidal scour. As a result, the organic surface layer has been largely transported out of the project area and into Calcasieu Lake. The loss in elevation of the soil surface provided by the organic surface layer of the soil has led to prolonged inundation of the emergent vegetation, which causes die-back of many wetland plant species (Mendelssohn and McKee 1988), and finally, the conversion of emergent marsh to open water (Gosselink et al. 1979).

Construction of the Hwy. 384 Hydrologic Restoration Project was completed in January 2000. Maintenance was performed on the road between La. Hwy. 384 and Calcasieu Lake in November 2000. Another maintenance project was done in May 2002. Site 8 was covered with dirt to seal off leakage from Calcasieu Lake into the project area. Also, rock was placed around Structure #1 to prevent further erosion around the structure and a hyacinth barrier was constructed between the Gulf Intracoastal Waterway and the structure. The project has a 20-year economic life which began in January 2000.

The principal project features include:

- Structure #1/Freshwater Introduction Structure - 3-24" Aluminum culverts with Interior 24" Flapgates and Exterior 24" Sluice Gates.
- Structure #12/Salinity Control Structure - 2-48" Aluminum culverts, each w/ an Interior 10' Variable-Crested Weir Inlet with a 4" vertical slot and an Exterior 48" Flapgate.
- Site #8 - Approximately 100 linear feet of earth fill and rock plug on the eastern shore of Calcasieu Lake.
- An existing access road, approximately 6,000 linear feet in length, which serves as a hydrologic boundary on the southeastern edge of the project boundary between La. Hwy. 384 and the Gulf Intracoastal Waterway.
- An existing access road, approximately 4,000 linear feet in length, which serves as a hydrologic boundary on the northwestern edge of the project boundary between La. Hwy 384 and Calcasieu Lake.

IV. Summary of Past Operation and Maintenance Projects

General Maintenance: Three separate maintenance projects have been completed since the original project's construction completion. Engineering and design as well as construction oversight on both of these maintenance projects were provided by Abbeville/Lafayette field office personnel so no exact costs related to these activities are available. The maintenance projects that were performed were as follows:

Nov. 2000- Glenn Lege Construction

- placed 40.32 cy. of #610 limestone on the road near Structure #12 due to some overtopping of the road during high tidal events
- placed 12 cy. of man size rip-rap on the inlet side of Structure #12 due to some scouring of the bankline around the structure

TOTAL CONSTRUCTION COST- \$3,461.14

June 2002- Glenn Lege Construction

- provided labor and materials to construct a "hyacinth fence" on the inlet side of Structure #1. The fence is constructed of galvanized woven wire and CCA treated timber piles and whalers.
- provided labor and materials to reinforce the existing levee around Structure #1 with graded crushed stone.
- provided labor and materials to repair an existing rock plug that had been leaking and also had been vandalized. The plug was repaired by hauling in earth fill from an off-site location and pushing it over the

existing rock plug with a bulldozer. The earthen plug was then planted under separate contract by DNR plantings group.

TOTAL CONSTRUCTION COST- \$14,386.87

May 2005- Bertucci Construction

Provided labor, material and equipment to repair thirteen linear feet of the rock plug at site #8. The rock was removed by vandals. 39.9 tons of 1200# rip rap stone was used to repair the thirteen foot gap. A four foot thick layer of 150# stone was applied to the marsh side slope of the plug to prevent water flow through the plug. This required 343.4 tons of rock. Completion and final acceptance was on May 15, 2005.

TOTAL CONSTRUCTION COST- \$45,090.00

Structure Operations: In accordance with the operation schedule outlined in the Operation and Maintenance Plan and USACE Permit, structures were manipulated as required by Simon & DeLany, Resource Management personnel who are under contract with DNR. Copies of the quarterly reports that are provided as well as a copy of the operations contract between DNR and Simon & DeLany are attached in the “Structure Operations” section of the CS-21 Hwy. 384 Operation & Maintenance Plan.

V. Inspection Results

Structure #1

The structure is in good condition. Water levels could not be determined because the staff gages are missing. Rock placed on the bank during the maintenance event of June 2002 is stable and in no need of repair. The hyacinth fence is in good condition; however there is trash from Hurricane Rita that is between the fence and the sluice gates. The bearings on the sluice gate lifting device went under the storm surge waters and will need to be changed. The road/levee leading up to the structure shows areas where scouring is occurring from water over topping the roadway. A maintenance event is required at this site. (Photos: Appendix B, Photos 1-3)

Structure #12

The structure is in good shape. Water levels could not be determined because the staff gages are missing. There are slight depressions in the road approximately 200 feet east of the structure. These depressions are the result of water flow over the road. Pile caps on the inlet side and the padlocks on the stop log locking devices have rusted and will eventually need to be replaced. Rock that was placed during the maintenance of Nov. 2000 is stable. A maintenance event is required at this time. (Photos: Appendix B, Photos 4-6).

Site #8

Water levels could not be determined because the staff gages are missing. The rock plug is in good condition and no damage was noted from Hurricane Rita at this structure. The recently completed maintenance work to repair the plug from vandalism held up well under the high storm surge waters. (Photos: Appendix B, Photo7)

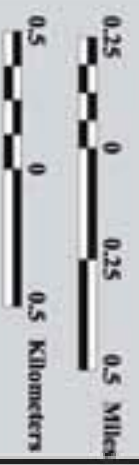
VI. Conclusions and Recommendations

Overall, the Hwy. 384 Hydrologic Restoration Project is in good condition and functioning as designed with only minor problems noted. The hyacinth fence that was installed during the maintenance project of June 2002 as well as the rock reinforcement of the bankline is performing well and should be incorporated into all structures of this type in the future. A maintenance event is planned for spring of 2006 to raise the road to original constructed elevations.

Appendix A
Project Features Map

Highway 384 Hydrologic Restoration (CS-21)

-  3 - 24" Freshwater Introduction Structure
-  3 - 48" Freshwater Introduction Structure
-  45' Rock Plug
-  Project Boundary



Appendix B
Photographs



Photo 1, View showing hyacinth fence and sluice gate at structure No.1

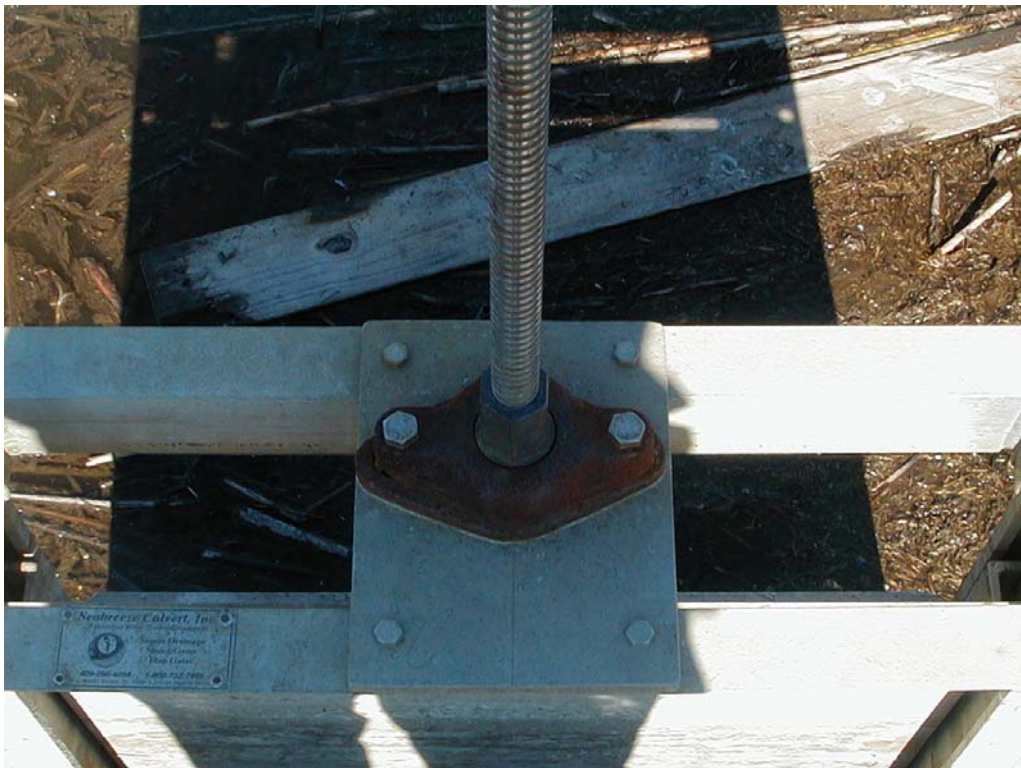


Photo 2, View showing lifting device and stem at structure No. 1.



Photo 3, View of roadway approaching structure No. 1.



Photo 4, Inlet side of structure No. 12.



Photo 5, Outlet side of structure No. 12.



Photo 6, View of access road just east of structure No. 12 showing washout of roadway.



Photo 7, Rock plug at structure No. 8, view looking south.

Appendix C

Three Year Budget Projection

HWY 384/ CS-21 / PPL 2
Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/08

<u>Project Manager</u> Pat Landry	<u>O & M Manager</u> Dewey Billodeau	<u>Federal Sponsor</u> NRCS	<u>Prepared By</u> Dewey Billodeau
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	2005/2006	2006/2007	2007/2008
Maintenance Inspection	\$ 4,955.00	\$ 5,250.00	\$ 5,407.00
Structure Operation	\$ 6,000.00	\$ 6,000.00	\$ 6,000.00
Administration	\$ 5,000.00	\$ -	\$ -

Maintenance/Rehabilitation

05/06 Description: Restore Access Road to Constructed Elevation

E&D	\$20,000.00
Construction	\$155,000.00
Construction Oversight	\$5,000.00
Sub Total - Maint. And Rehab.	\$ 180,000.00

06/07 Description

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

07/08 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2005/2006	2006/2007	2007/2008
Total O&M Budgets	\$ 195,955.00	\$ 11,250.00	\$ 11,407.00

O & M Budget (3 yr Total)	\$ 218,612.00
Existing O & M Budget	\$ 120,943.00
Remaining O & M Budget (Projected)	\$ 97,669.00

Note: Maintenance Project for 2005/2006 completed, therefore these funds already expended

Appendix D

Field Inspection Form

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: October 24, 2005

Time: 2:00 pm

Structure No. 1

Inspector(s): Stan Aucoin, Dewey Billodeau, Herb Juneau
Darrell Pontiff, Beau Tate

Structure Description: 3-24" Culverts

Water Level: Inside Outside

Type of Inspection: Annual

Weather Conditions: Sunny and cool

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware/Sluiceways	Fair			2	Lifting device went under storm surge waters.
Hyacinth Fence	Good			1	Trash within fence area from Hurricane Rita.
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage /Supports	N/A				
Staff Gages	Poor				Both staff gages are missing.
Rip Rap (fill)	Good				
Earthen Embankment Access Roadway	Poor			3	Roadway is washing out from water overtopping.

- What are the conditions of the existing levees?
- Are there any noticeable breaches?
- Settlement of rock plugs and rock weirs?
- Position of stoplogs at the time of the inspection?
- Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: October 24, 2005

Time: 2:00 pm

Structure No. 12

Inspector(s): Stan Aucoin, Dewey Billodeau, Herb Juneau

Darrell Pontiff, Beau Tate

Structure Description: 2-48" Culverts

Water Level: Inside Outside

Type of Inspection: Annual

Weather Conditions: Sunny and cool

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			4	
Stop Logs	Good				
Hardware/Flapgates	Good			5	
Timber Piles	Good				
Timber Wales	N/A				
Galv. Pile Caps	Good				
Cables	N/A				
Signage /Supports	N/A				
Staff Gages	Poor				Both staff gages are missing.
Rip Rap (fill)	Good				
Earthen Embankment Access Roadway	Poor			6	Roadway is washing out from water overtopping.

- What are the conditions of the existing levees?
- Are there any noticeable breaches?
- Settlement of rock plugs and rock weirs?
- Position of stoplogs at the time of the inspection?
- Are there any signs of vandalism?

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: October 24, 2005

Time: 2:00 pm

Structure No. 8

Inspector(s): Stan Aucoin, Dewey Billodeau, Herb Juneau

Darrell Pontiff, Beau Tate

Structure Description: Rock plug

Water Level: Inside Outside

Type of Inspection: Annual

Weather Conditions: Sunny and cool

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage / Supports	N/A				
Staff Gages	Poor				Both staff gages are missing.
Rip Rap (fill) (foreshore dike)	Good			7	The plug appears to be in good shape.
Earthen Embankment					The earthen levee that was rebuilt as part of the May '02 maintenance is in excellent condition beyond the limits of the channel.

- What are the conditions of the existing levees?
- Are there any noticeable breaches?
- Settlement of rock plugs and rock weirs?
- Position of stoplogs at the time of the inspection?
- Are there any signs of vandalism?

Appendix E

Locations to be Monitored