

Water Preserve Areas Feasibility Study  
Selected Plan  
straz design region (Strazzulla Wetlands)

Levee, Canals, Earth and Sitework  
Submission to EN-C  
Original Submission: 5 March 2001

1. Cost estimates are needed for design features associated with the Strazzulla Wetlands within the Water Preserve Areas (WPA) Feasibility Study. This cost estimate will be used as the Selected Plan in the study.
2. The point of contact for this request is Mr. Keith Jones, at extension 1127. Let me know if I can be of more assistance.

Attachments Provided:

1. Spreadsheet Analysis Report - 1 pages
2. Geotechnical Data and Assumptions - 3 pages
3. 11" x 17" Layout Drawings - 4 pages
  - Site Layout (levee.dgn) - 2 pages - shows design
  - Alignments/Locations (levee.dgn) - 2 pages - shows levee and canal centerlines, and distances used for calculation
4. Strazzulla Design Region Scope - 1 page
  - Contains a comprehensive list of design and cost feature

**Water Preserve Areas Feasibility Study  
Levees and Canals Summary of Material Quantities  
Strazzulla Wetlands and Design Region**

		Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds	InRoads Volume cu-yds
<b>Excavated Materials</b>	Conveyance or Seepage Canals	101321	0	101321	
	<b>Totals</b>	<b>101321</b>	<b>0</b>	<b>101321</b>	
	Amount reusable=	<b>90%</b>	<b>0</b>	<b>91189</b>	
	Amount spoil=	<b>10%</b>	<b>0</b>	<b>10132</b>	
<b>Quality Construction Material Required</b>	Fill Material Requirements	<b>74022</b>			

Notes:

**Excavation Requirements**

Rock at Elevation = **-22.0** ft-NGVD and below

Conveyance or Seepage Canals	Length feet	Inside Slope 1V on ?H	Outside Slope 1V on ?H	Bottom Width feet	Average Ground ft-NGVD	Canal Invert ft-NGVD	Canal Cut Depth feet	Cross Section Area sqft	Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds	
												LWDD C9 Canal Extension
	North/South Reach	2665	2.0	2.0	10.0	16.0	4.0	12.0	408	40271	0	40271
	<b>Totals</b>	<b>5965</b>								<b>101321</b>	<b>0</b>	<b>101321</b>

**Fill Material Requirements**

Levees	Length feet	Inside Slope 1V on ?H	Outside Slope 1V on ?H	Top Width feet	Average Ground ft-NGVD	Top of Levee ft-NGVD	Levee Height feet	Cross Section Area sqft	Gross Volume cu-yds	InRoads Length cu-yds	InRoads Volume cu-yds
	reach 2	5380	3.0	3.0	12	16.4	19.0	2.6	51.5	10258	
	reach 3	5355	3.0	3.0	12	17.0	19.0	2.0	36.0	7140	
	reach 4	2805	3.0	3.0	12	17.6	19.0	1.4	22.7	2356	
	reach 5	5110	3.0	3.0	12	15.4	19.0	3.6	82.1	15534	
	reach 6	6210	3.0	3.0	12	17.6	19.0	1.4	22.7	5216	
	reach 7	1925	3.0	3.0	12	16.0	19.0	3.0	63.0	4492	
	reach 8	1690	3.0	3.0	12	15.5	19.0	3.5	78.8	4929	
	reach 9	775	3.0	3.0	12	16.8	19.0	2.2	40.9	1175	
	reach 10	1860	3.0	3.0	12	16.9	19.0	2.1	38.4	2647	
	reach 11	1160	3.0	3.0	12	18.1	19.0	0.9	13.2	568	
	reach 12	1145	3.0	3.0	12	16.6	19.0	2.4	46.1	1954	
	reach 13	945	3.0	3.0	12	18.7	19.0	0.3	3.9	135	
	<b>Totals</b>	<b>41910</b>								<b>74022</b>	
Northern Boundary Slurry Wall L-510C	5555	0.0	0.0	3	16.8	-10.0	-26.8	-80	-16542		

\*\*\* Geotechnical Data and Assumptions to Use for  
Feasibility Level Cost Estimates (Amended 2/28/01)

**Design Region: straz**

Notes:

1. Design region features for this area are mainly a small berm on the eastern boarder, a conveyance canal at the south and a slurry/cut off wall at the northern boundary

Compaction Factor for Sandy Overburden:

Answer: 0.85

Swell Factor for Sandy Overburden:

Answer: 1.10

Compaction Factor for Rock:

Answer: 0.85

Swell Factor for Rock:

Answer: 1.30

Material Makeup of Levee Embankment:

Answer: See below.

Special Levee Construction Design Criteria:

Foundation Treatment:

Answer: None

Seepage Control

Answer: None

Slope Protection:

Answer: Upstream and downstream embankment perimeter will be grassed for erosion protection.

Where the material will come from?

Answer: Material will be obtained from off-site or from excavation of the LWDD S9 conveyance canal extension. **It is estimated that overburden sand and gravel exists from ground surface to elevation -22 feet NGVD.**

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\*\*\* Assumptions based upon limited subsurface information and prior projects, as of 2/28/01

Excavation Procedure/Technique and/or Blasting Requirements  
(at this location only):

Answer: Conventional excavation techniques can be utilized. Blasting is not envisioned at this time. Additional subsurface investigations along the levee center-line are necessary to determine if bedrock stringers exist since they were discovered through subsurface investigations at S-362.

Percentage of Usable Excavated Material: Since the Levee L-510 will be designed as a levee and is not critical with respect to loss of life or much property damage should it fail, the percentage of usable excavated materials can be raised.

**Percentage of Usable Excavated Overburden Soil Material:**

Answer: Assume 90% of the material can be reused. The remaining 10% should be disposed of onsite or at an approved disposal area. The distribution of overburden soil versus rock is detailed above in red.

**Percentage of Usable Excavated Rock Material:**

Answer: Rock is not envisioned to be utilized.

**Other Considerations:**

-- When constructing the levee, the Contractor will be required to utilize 12 inch lifts which then will be compacted down to 10 to 11 inches. Compaction requirements will be to 98% maximum dry density based upon standard proctor compaction tests or a nuclear density meter. Also, control of excessive moisture shall be the responsibility of the Contractor.

Assume overburden soils have a unit weight of 115 pcf while limestone has unit weight of 145 pcf for hauling purposes.

For cut-off wall constructed along the northern edge of Strazzula from WCA-1 to Acme Impoundment, the following items are key to cost estimate:

1. Cut-off wall shall be constructed as a cement-bentonite wall. It is assumed that overburden materials may not

contain 10% fines (material passing the #200 sieve) by weight and available space along the proposed alignment would be limited so that construction of a conventional soil-bentonite wall may be impractical.

2. The width of the cut-off wall will be approximately 3 feet to match the bucket width of conventional hydraulic excavators/large backhoes.
3. The cement-bentonite slurry shall be kept at least 2 feet higher than the expected groundwater elevation of the site. This may require a Contractor to build a raised work earth platform if the water table is very close to ground surface.
4. Since the depth of the wall is less than 70 feet, conventional excavation equipment can be utilized.

Geotechnical Instrumentation:

NOTE: This instrumentation is required for monitoring and operational safety of project features within the design region.

1. Shallow Depth Piezometers ( $\pm$  5.0 feet from natural grade)  
Answer: None

2. Medium Depth Piezometers (greater than 5.0 and less than 50 feet from natural grade) Assume 10 @ 25 feet deep for general water level monitoring purposes along the levee alignment (approx. cost is \$2,500 per piezometer).  
Eliminate if included elsewhere in the cost estimate.

Assume another 10 @ 10 feet deep along the slurry wall on both sides (5 on each side). Assume 4 additional wells @ 25 feet deep (bottom of wall) to monitor groundwater levels at wall boundary.

3. Deep Depth Piezometers (greater than 50 feet from natural grade) None
4. Inclinedometers - None
5. Others

L-510C  
SLURRY WALL DEPTH TO -10.0 FT-NGVD

15' OFF+5'

L-510  
DESIGN ELEVATION (FT-NGVD)  
TOP OF LEVEE = 19.0

L-510  
DESIGN ELEVATION (FT-NGVD)  
TOP OF LEVEE = 19.0

L-510  
DESIGN ELEVATION (FT-NGVD)  
TOP OF LEVEE = 19.0

LWDD S9 EXTENSION  
Q=625 CFS  
INV=4.0 NGVD  
BW=10'  
SS=1 ON 2  
TW=60' EST

WS-16.5

WS-15.7

S-530

S-537A

LWDD L-23W

L-510  
DESIGN ELEVATION (FT-NGVD)  
TOP OF LEVEE = 19.0

5555'

REACH 1  
AVERAGE GROUND = 16.0  
7550'

REACH 2  
AVERAGE GROUND = 16.4  
5380'

REACH 3  
AVERAGE GROUND = 17.0  
5355'

REACH 4  
AVERAGE GROUND = 17.6  
2805'

REACH 5  
AVERAGE GROUND = 15.4  
5110'

REACH 6  
AVERAGE GROUND = 17.6  
6210'

3300'

XSECTION 7  
AVERAGE GROUND = 16.0  
1925'

2665'

XSECTION 8  
AVERAGE GROUND = 15.5  
1690'

XSECTION 9  
AVERAGE GROUND = 16.8  
775'

XSECTION 10  
AVERAGE GROUND = 16.9  
1860'

XSECTION 11  
AVERAGE GROUND = 18.1  
1160'

XSECTION 12  
AVERAGE GROUND = 16.6  
1145'

REACH 13  
AVERAGE GROUND = 18.7  
945'

**Design Region: straz (Strazzulla Wetlands)**

Design:

- a) Design berm along eastern boundary.
- b) Design slurry wall along northern boundary.
- c) Design conveyance canals to connect LWDD S9 canal to LWDD L-23W.
- d) Design gated culvert structure on LWDD L-23W canal and ungated culvert on LWDD S9 canal.
- e) Minor clearing and grubbing along berm alignment.

Gated Culverts:

1. S-530

Un-gated Culverts:

1. S-537A Allow flow from LWDD S9 canal to LWDD L-23W

Berm:

1. L-510 Eastern boundary, design height 19.0' NGVD

Slurry Wall:

1. L-510C Partial northern boundary, design depth to -10.0 ft-NGVD

Canals:

1. S9 Ext. Connects LWDD S9 canal to LWDD L-23W canal

Utilities:

1. High tension FPL power lines
2. Phone and electric

Issues:

Berm construction material will not be obtained by scraping to the east but will be placed from material obtained from off-site.