



## Appendix D

### SCDOT Location and Hydraulic Design of Encroachments of Floodplains Checklist and Coordination

**South Carolina Department of Transportation  
Location and Hydraulic Design of Encroachments on Floodplains Checklist**

23 CFR 650, this regulation shall apply to all encroachments and to all actions which affect base floodplains, except for repairs made with emergency funds. Note: These studies shall be summarized in the environmental review documents prepared pursuant to 23 CFR 771.

I. **Berkeley County proposes to widen Clements Ferry Road from two to five travel lanes from Jack Primus Road to SC, for a total distance of approximately 4.5 miles. The project boundary includes a general corridor of approximately 150 feet from the centerline of Clements Ferry Road. The proposed widening will occur to minimize right-of-way impacts and utilize existing infrastructure as much as possible. Many of the existing intersections will be realigned to create safer alignments with the proposed Clements Ferry Road alignment. PROJECT DESCRIPTION**

- A. Narrative Describing Purpose and Need for Project
  - a. Relevant Project History:
  - b. General Project Description and Nature of Work (attach Location and Project Map):
  - c. Major Issues and Concerns:

The purpose of the project is to increase capacity, improve operational efficiency, improve safety, and provide bicycle and pedestrian accommodations on Clements Ferry Road between Jack Primus Road and SC 41. The proposed facility would include widening Clements Ferry Road for a distance of approximately 4.5 miles from a two-lane roadway to a four-lane roadway with a center two-way left-turn lane or raised landscaped median, constructing intersection improvements within project limits, and providing a shared-use path for bicyclists and pedestrians.

The project extends across Flood Insurance Rate Maps including: 45015C0737D, effective October 16, 2003. FIRM # 45015C0737D documents a special flood hazard area (Zone AE) and (Zone X) associated with a storm surge along the Wando River. Zone AE floodplains are areas within the 100 year floodplain (i.e. have a 1% annual chance of flooding). Zone X are areas that have a 0.2% annual chance of flooding or areas with a 1% annual chance of flooding with depths of less than 1.0 feet. As a result of the widening, approximately 2 acres of fill will be placed in Zone AE areas between Station 188+00 to 191+00 and from Station 245+00 to 256+00. The project is not expected to be a significant or longitudinal encroachment as defined under 23 CFR 650A, nor is it expected to have an appreciable environmental impact on this base floodplain. In addition, the project would be developed in accordance with Executive Order 11988 (Floodplain Management and 23 CFR 650 subpart A), and roadway/bridge design would comply with all appropriate floodplain regulations and guidelines.

- B. Are there any floodplain(s) regulated by FEMA located in the project area?  
Yes  No
- C. Will the placing of fill occur within a 100-year floodplain?  
Yes  No
- D. Will the existing profile grade be raised within the floodplain?

The existing grade will not be raised in the floodplain.

- E. If applicable, please discuss the practicability of alternatives to any longitudinal encroachments.

The floodplain extends on both sides of the roadway and would be impacted by all alternatives.

- F. Please include a discussion of the following: commensurate with the significance of the risk or environmental impact for all alternatives containing encroachments and those actions which would support base floodplain development:

- a. What are the risks associated with implementation of the action?

No base floodplain impacts expected. Not a significant encroachment. The floodplain is based upon storm surge that impacts much of the lowcountry. The additional fill placed in the floodplain from this project will not have an impact on the surge elevations.

- b. What are the impacts on the natural and beneficial floodplain values?

The project is not expected to impact the floodplain as the widening will occur to areas already incorporated as part of a transportation facility. The project is not expected to impact floodplain functions, water storage, or wildlife and fishery habitat.

- c. The support of probable incompatible floodplain development.

Not applicable.

- d. What measures were used to minimize floodplain impacts associated with the action?

The proposed typical section includes curb and gutter to limit the impacts of construction.

- e. Were any measures used to restore and preserve the natural and beneficial floodplain values impacted by the action?

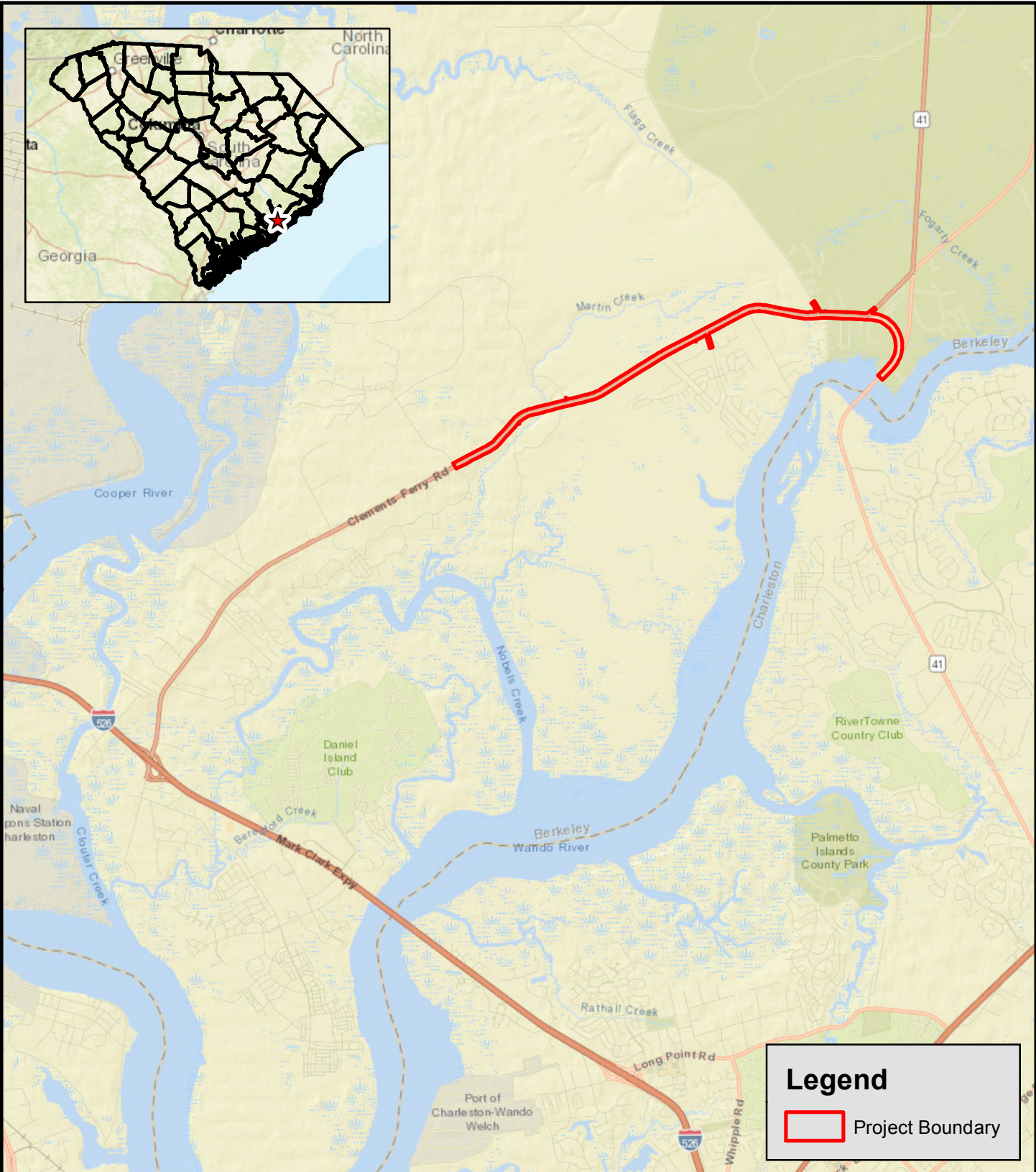
Not applicable.

- G. Please discuss the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.


Not applicable.

- H. Were local, state, and federal water resources and floodplain management agencies consulted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected? Please include agency documentation.

The proposed project will be designed and constructed in accordance with SCDOT Requirements. Zone AE floodplain crossings require a detailed hydraulic analysis to verify the proposed project will not increase base flood elevations more than 1' above natural conditions or unrestricted floodplain. At the completion of the study and prior to construction, the SCDOT will provide a copy of the analysis and a summary letter to the local Floodplain Administrator. No additional coordination should be required for this crossing.



**Legend**

 Project Boundary


Date: 5.23.2017



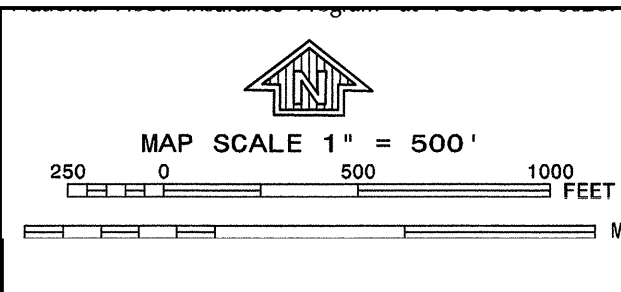
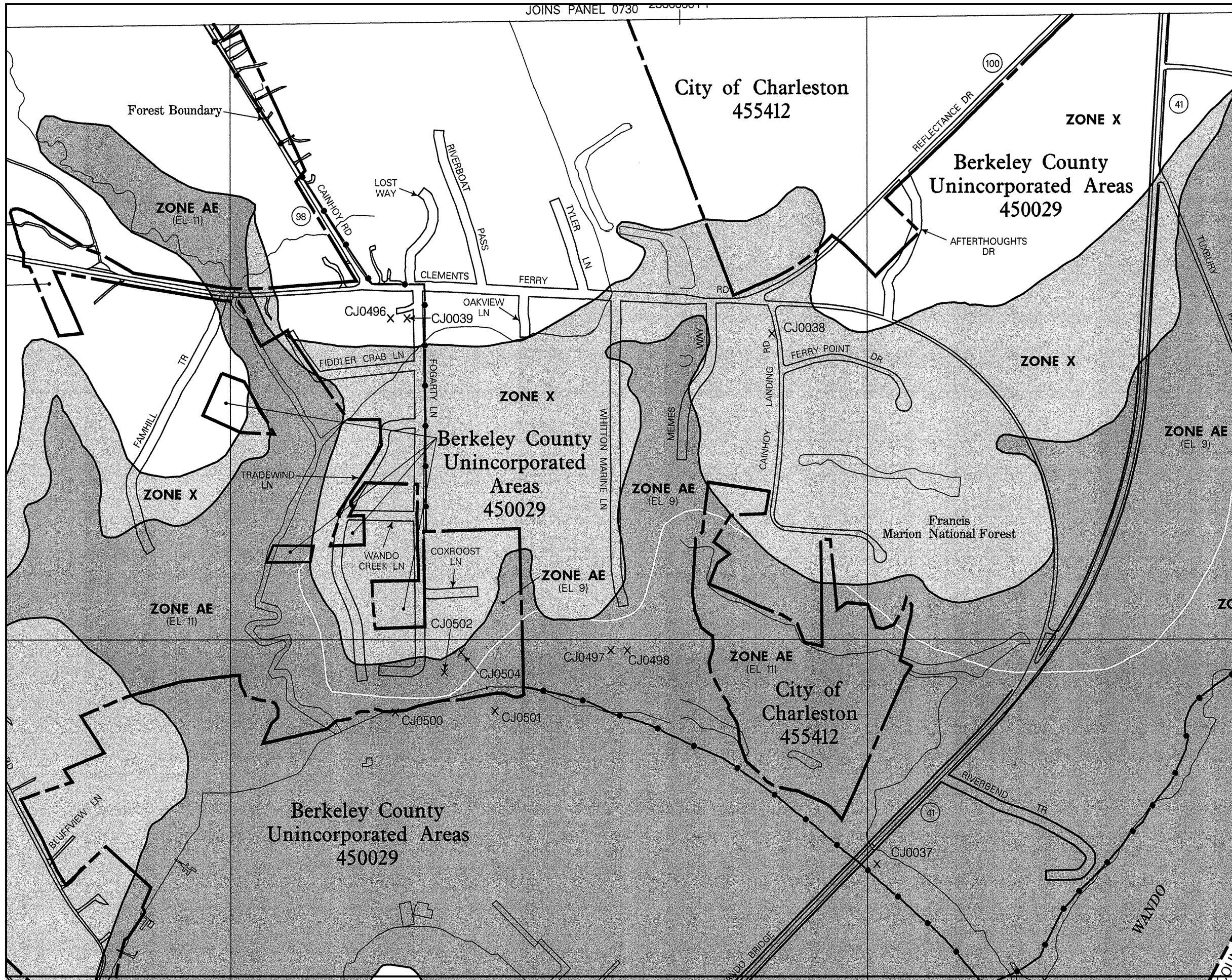
**CLEMENTS FERRY ROAD  
WIDENING PROJECT  
JACK PRIMUS TO SC 41  
BERKELEY COUNTY, SC**

Figure 1:  
Project Location

1  
Miles







PANEL 0737 D

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
 BERKELEY COUNTY,  
 SOUTH CAROLINA  
 AND INCORPORATED AREAS

**PANEL 737 OF 776**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BERKELEY COUNTY	450029	0737	D
CHARLESTON, CITY OF	455412	0737	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
**45015C0737D**

**EFFECTIVE DATE**  
**OCTOBER 16, 2003**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)





**Legend**

- Project Boundary
- Construction Limits

**Flood Zone**

- A
- AE
- VE
- X

Prepared:  
4.24.2017



**CLEMENTS FERRY ROAD WIDENING  
PROJECT: JACK PRIMUS TO SC 41**  
**BERKELEY COUNTY, SC**

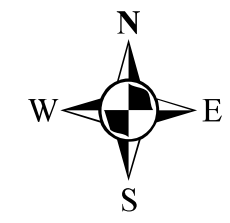
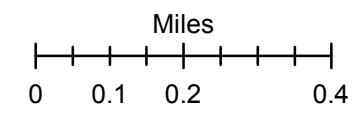


Figure 3:  
Floodplains



**BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM**

COUNTY: \_\_\_\_\_

DATE: \_\_\_\_\_

ROAD #: \_\_\_\_\_

STREAM CROSSING: \_\_\_\_\_

Purpose & Need for the Project:

I. FEMA Acknowledgement

Is this project located in a regulated FEMA Floodway?     Yes     No

Panel Number: \_\_\_\_\_ Effective Date: \_\_\_\_\_ (See Attached)

II. FEMA Floodmap Investigation

Unnamed Creek is classified as Zone AE w/ BFE of 11 (NGVD 1929).  
This area is located within the influences of the 100 year tidal surge.

FEMA Flood Profile Sheet Number \_\_\_\_\_ illustrates the existing 100 year flood:

- Passes under the existing low chord elevation.
- Is in contact with the existing low chord elevation.
- Overtops the existing bridge finished grade elevation.

III. No Rise/CLOMR Preliminary Determination

Preliminary assessment indicates this project may be constructed to meet the "No-Rise" requirements. A detailed hydraulic analysis will be performed to verify this assessment.

Justification:

Preliminary assessment indicates this project may require a CLOMR/LOMR. Impacts will be determined by a detailed hydraulic analysis.

Justification:

**BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM**

**IV. Preliminary Bridge Assessment**

**A. Locate Existing Plans**

a. Bridge Plans  Yes File No. \_\_\_\_\_ Sheet No. \_\_\_\_\_ (See Attached)  
 No

b. Road Plans  Yes File No. \_\_\_\_\_ Sheet No. \_\_\_\_\_ (See Attached)  
 No

**B. Historical Highwater Data**

a. ~~USGS Gage~~  Yes Gage No. \_\_\_\_\_ Results: \_\_\_\_\_  
**NOAA**  No Results: \_\_\_\_\_

b. SCDOT/USGS Documented Highwater Elevations  
 Yes \_\_\_\_\_  
 No

c. Existing Plans  Yes See Above  
 No

**V. Field Review**

**A. Existing Bridge**

Length: \_\_\_\_\_ ft. Width: \_\_\_\_\_ ft. Max. span Length: \_\_\_\_\_ ft.

Alignment:  Tangent  Curved

Bridge Skewed:  Yes  No Angle: \_\_\_\_\_

End Abutment Type: \_\_\_\_\_

Riprap on End Fills:  Yes  No Condition: \_\_\_\_\_

Superstructure Type: \_\_\_\_\_

Substructure Type: \_\_\_\_\_

Utilities Present:  Yes  No  
Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: \_\_\_\_\_ %  
Percent Blocked Vertically: \_\_\_\_\_ %

Hydraulic Problems:  Yes  No  
Describe:

**BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM**

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present:  Yes  No Location: \_\_\_\_\_

b. Distance from F.G. to Normal Water Elevation: \_\_\_\_\_ ft.

c. Distance from Low Steel to Normal Water Elev.: \_\_\_\_\_ ft.

d. Distance from F.G. to High Water Elevation: \_\_\_\_\_ ft.

e. Distance from Low Steel to High Water Elev.: \_\_\_\_\_ ft.

High Water is referenced as the Mean Higher High Water Mark. See page 8.

f. Channel Banks Stable:  Yes  No

Describe:

g. Soil Type: \_\_\_\_\_

h. Exposed Rock:  Yes  No Location: \_\_\_\_\_

i. Give Description and Location of any structures or other property that could be damaged due to additional backwater.

C. Existing Roadway Geometry

a. Can the existing roadway be closed for an On-Alignment Bridge Replacement

Yes  No

Describe:

If "yes", does the existing vertical and horizontal curves meet the proposed design speed criteria?

If "No", will the proposed bridge be:

Staged Constructed

Replaced on New Alignment



# BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

## VI. Field Review (cont.)

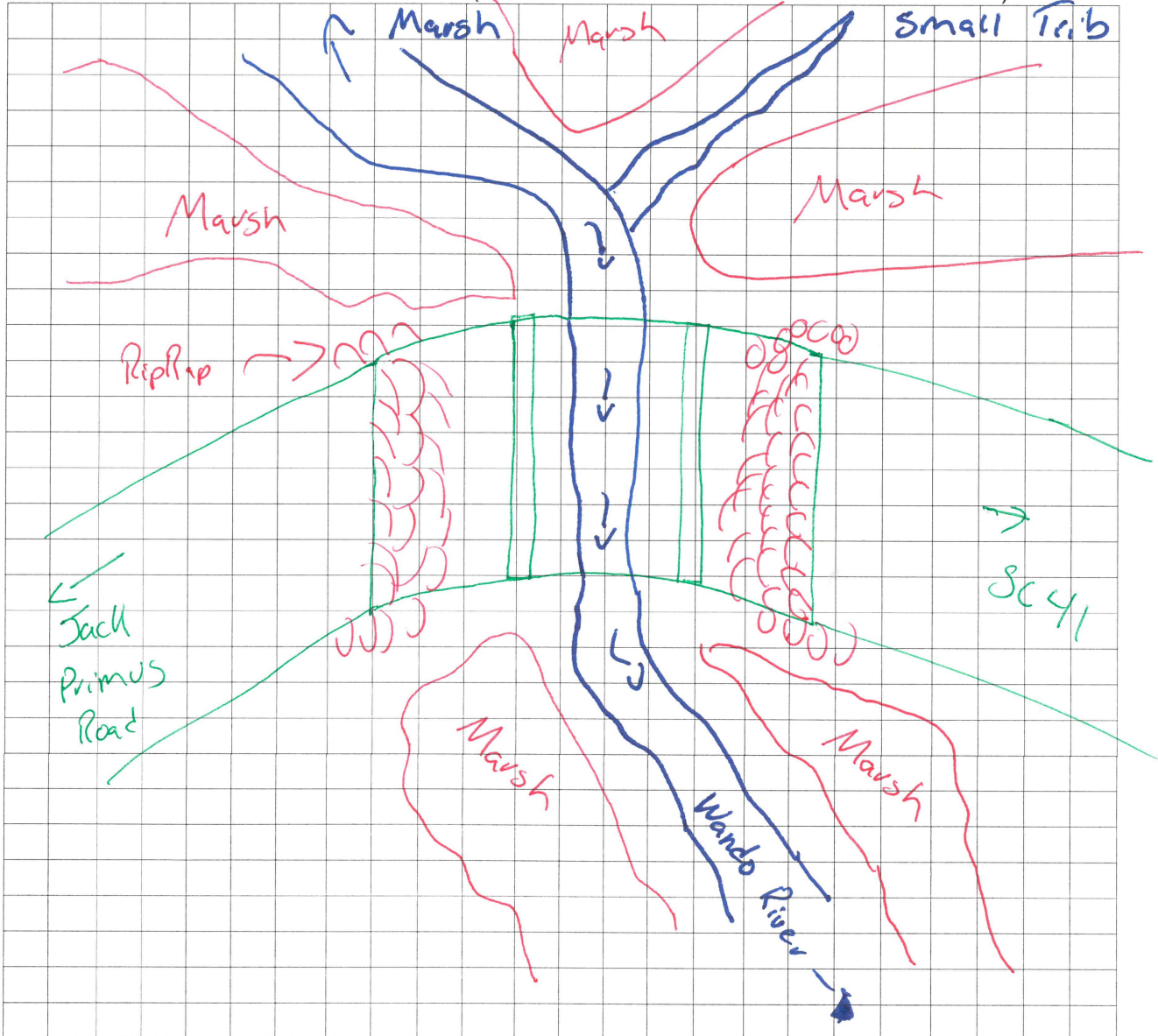
### A. Proposed Bridge Recommendation:

Length: \_\_\_\_\_ ft.    Width: \_\_\_\_\_ ft.    Elevation: \_\_\_\_\_ ft.

Span Arrangement: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

BRIDGE SITE DIAGRAM: (Show North Arrow and Direction of Flow)



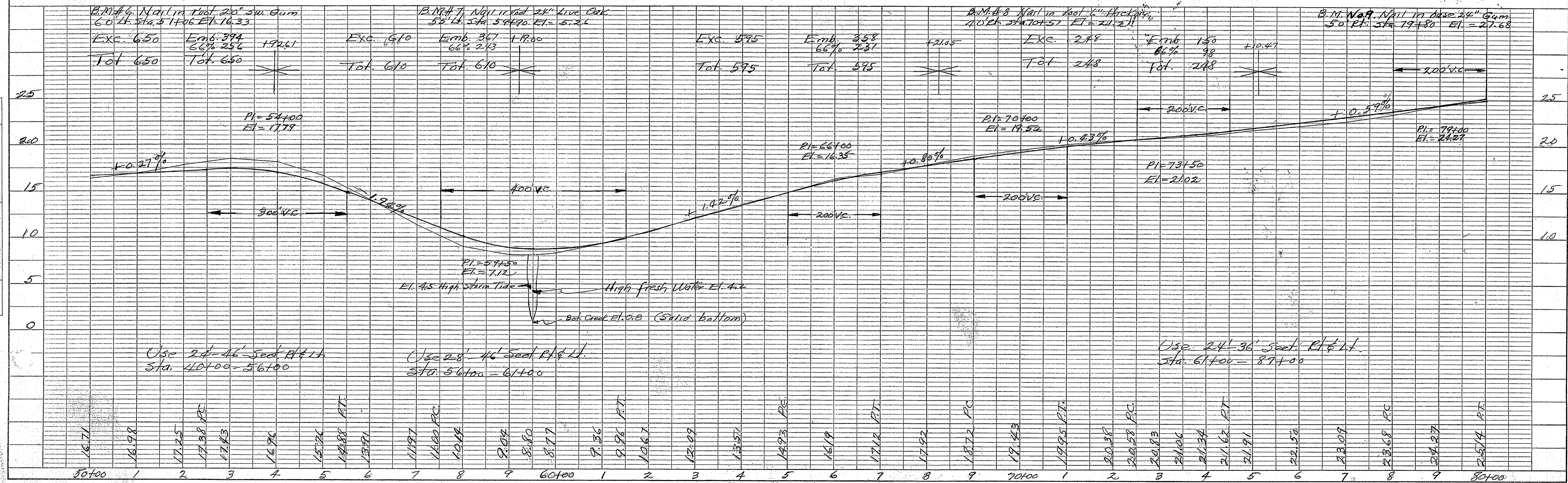
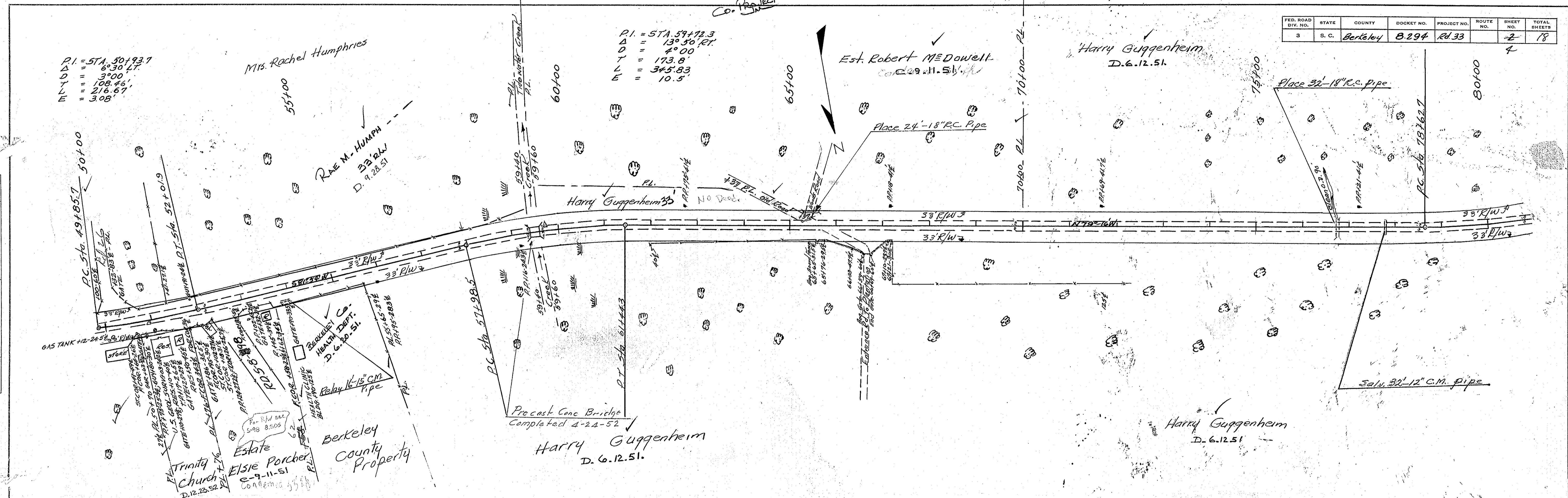
Performed By: Stuart Timmons  
Title: Hydraulic Engineer



FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	Berkeley	B.294	Rd 33		2	18

PLAN	DATE	BY
SURVEYED		
PLOTTED		
ALIGNED		
CHECKED		
NO. OF PAIR CHECKED		

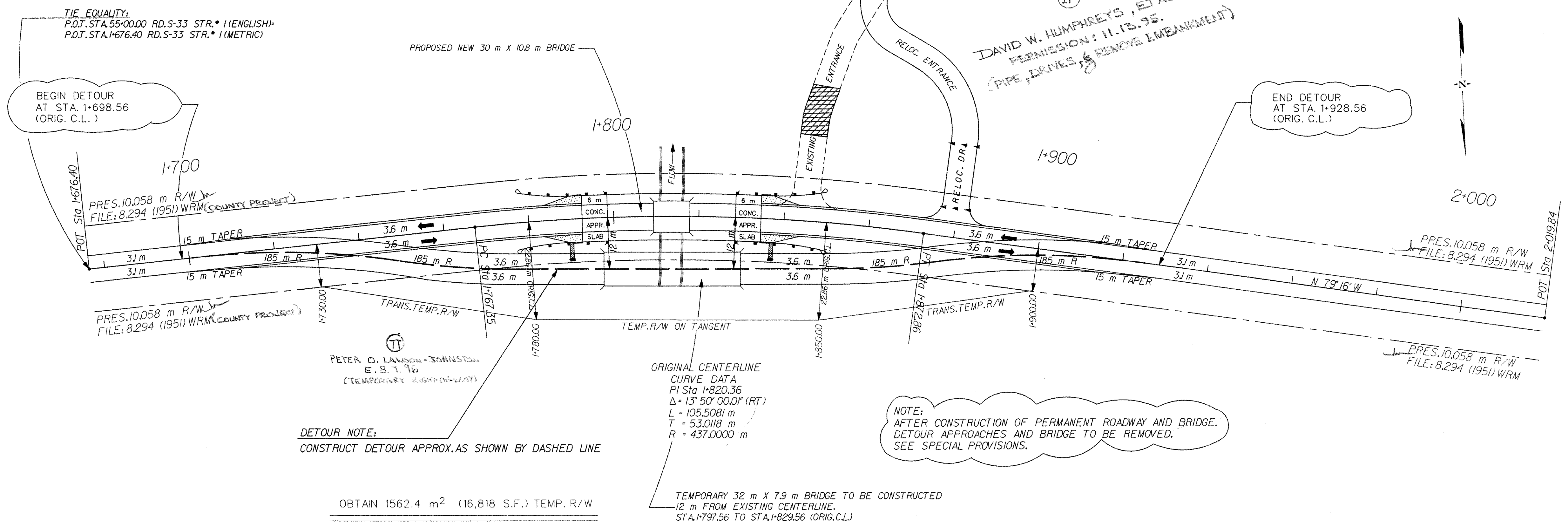
PROFILE	DATE	BY
SURVEYED		
PLOTTED		
GRADES CHECKED		
STRUCTURE NOTATIONS CHD.		





BRIDGE OVER UNNAMED CREEK  
DETOUR BRIDGE

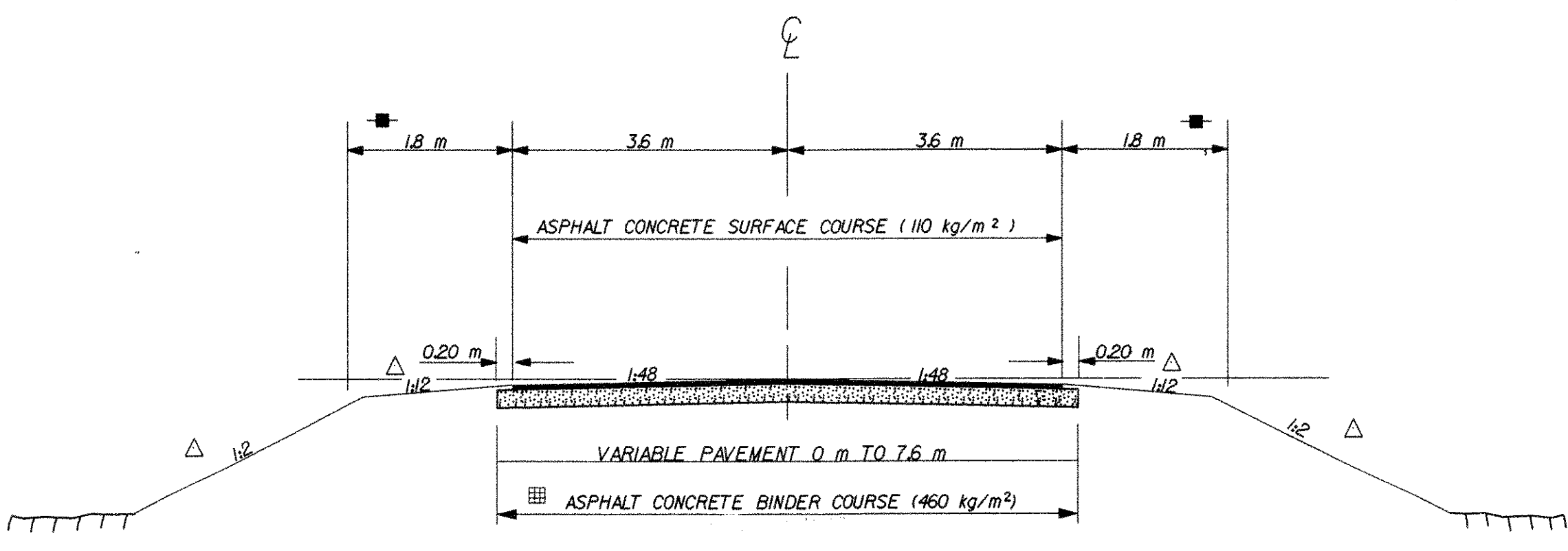
NOTE:  
FOR CONSTRUCTION OF DETOUR BRIDGE USE  
EXISTING PROFILE AS SHOWN ON ORIG. FILE # 8.294  
SEE SHEET NO. 3



DETOUR NOTE:  
CONSTRUCT DETOUR APPROX. AS SHOWN BY DASHED LINE

OBTAIN 1562.4 m<sup>2</sup> (16,818 S.F.) TEMP. R/W

TEMPORARY 32 m X 7.9 m BRIDGE TO BE CONSTRUCTED  
12 m FROM EXISTING CENTERLINE,  
STA. 1+797.56 TO STA. 1+829.56 (ORIG. C.L.)



NOTE:  
SHOULDERS AND SLOPES TO BE VARIABLE  
WHERE DIRECTED BY THE ENGINEER

USE THIS SECTION FOR DETOUR FROM STA. 1+698.56 TO STA. 1+928.56 (ORIG. C.L.)

SECTION	DETOUR QUANTITY ITEM	QUANTITY	UNIT
2025000	REM. AND DISP. OF EXISTING ASPH. PAVMENT	954	m <sup>2</sup>
4011000	ASPH. CEMENT IN PAVING MIXTURE	32	ton
4023000	HOT LAID ASPH. CONC. BINDER COURSE TYPE 2	440	ton
4033000	HOT LAID ASPH. CONC. SURFACE COURSE TYPE 3	154	ton
8041100	HAND PLACED RIPRAP	223	ton
8042150	GEOTEXTILE/EROSION CONTROL UNDER RIPRAP (FAB. UNPRO.) CL-2 TYPE D	441	m <sup>2</sup>
8103000	TEMPORARY SEEDING	1663	m <sup>2</sup>
8104100	FERTILIZER (10-10-10)	0.23	ton
8105000	LIME	0.37	ton
8106000	NITROGEN	9	kg
8152000	BALED STRAW	25	BALE
8153000	SILT FENCE	440	m

**SCDOT**  
South Carolina Department of Transportation

**Metric**  
ROAD DESIGN

PLAN SCALE 1:500

5			
4			
3			
2			
1			

REV. NO.	MADE BY	AUTH. BY	DATE	DESCRIPTION

DIRECTORY MAINSERY : BRM/33M / S-33M.DGN  
SERVER SUB DIR. FILE NAME  
SQUAD NUMBER 6 INITIALS C.A.G.  
TOPO BY NAME WRM DATE 2/20/96  
PIN NUMBER 19189 metbor.dgn

rdsqd6g  
 /usr/rdsqd6g/brm/08m/s33det.dgn  
 11-APR-1996





# 8664545 Cainhoy, Wando River, SC



Home (/) / Products (products.html) / Datums (stations.html?type=Datums) / 8664545 Cainhoy, Wando River, SC

Station Info

Tides/Water Levels

Meteorological Obs.

Phys. Oceanography

## Datums for 8664545, Cainhoy, Wando River SC

### Elevations on Station Datum

**Station:** 8664545, Cainhoy, Wando River, SC

**Status:** Accepted (Jan 21 2010)

**Units:** Feet

**T.M.:** 75

**Epoch:** (/datum\_options.html#NTDE) 1983-2001

**Datum:** STND

Datum	Value	Description
MHHW (/datum_options.html#MHHW)	7.45	Mean Higher-High Water
MHW (/datum_options.html#MHW)	7.11	Mean High Water
MTL (/datum_options.html#MTL)	4.10	Mean Tide Level
MSL (/datum_options.html#MSL)	4.44	Mean Sea Level
DTL (/datum_options.html#DTL)	4.17	Mean Diurnal Tide Level
MLW (/datum_options.html#MLW)	1.09	Mean Low Water
MLLW (/datum_options.html#MLLW)	0.90	Mean Lower-Low Water
NAVD88 (/datum_options.html)	4.48	North American Vertical Datum of 1988
STND (/datum_options.html#STND)	0.00	Station Datum
GT (/datum_options.html#GT)	6.55	Great Diurnal Range
MN (/datum_options.html#MN)	6.02	Mean Range of Tide
DHQ (/datum_options.html#DHQ)	0.34	Mean Diurnal High Water Inequality
DLQ (/datum_options.html#DLQ)	0.19	Mean Diurnal Low Water Inequality
HWI (/datum_options.html#HWI)	1.23	Greenwich High Water Interval (in hours)
LWI (/datum_options.html#LWI)	7.15	Greenwich Low Water Interval (in hours)
Maximum	9.18	Highest Observed Water Level



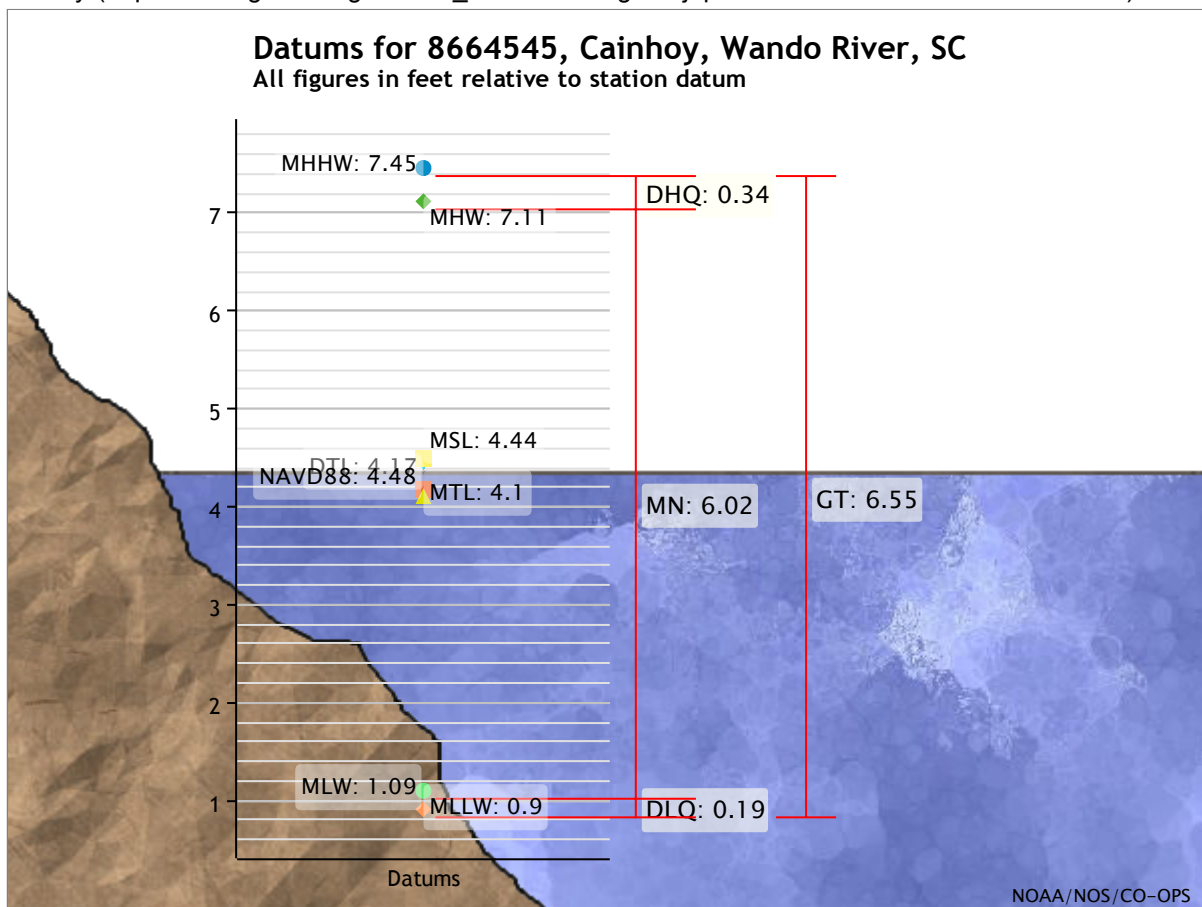
Max Date & Time	02/27/1998 14:42	Highest Observed Water Level Date and Time
Minimum	-1.96	Lowest Observed Water Level
Min Date & Time	04/07/1989 15:48	Lowest Observed Water Level Date and Time
HAT (/datum_options.html#HAT)		Highest Astronomical Tide
HAT Date & Time		HAT Date and Time
LAT (/datum_options.html#LAT)		Lowest Astronomical Tide
LAT Date & Time		LAT Date and Time

### Tidal Datum Analysis Periods

05/01/1988 - 04/30/1989

05/01/1997 - 04/30/1998

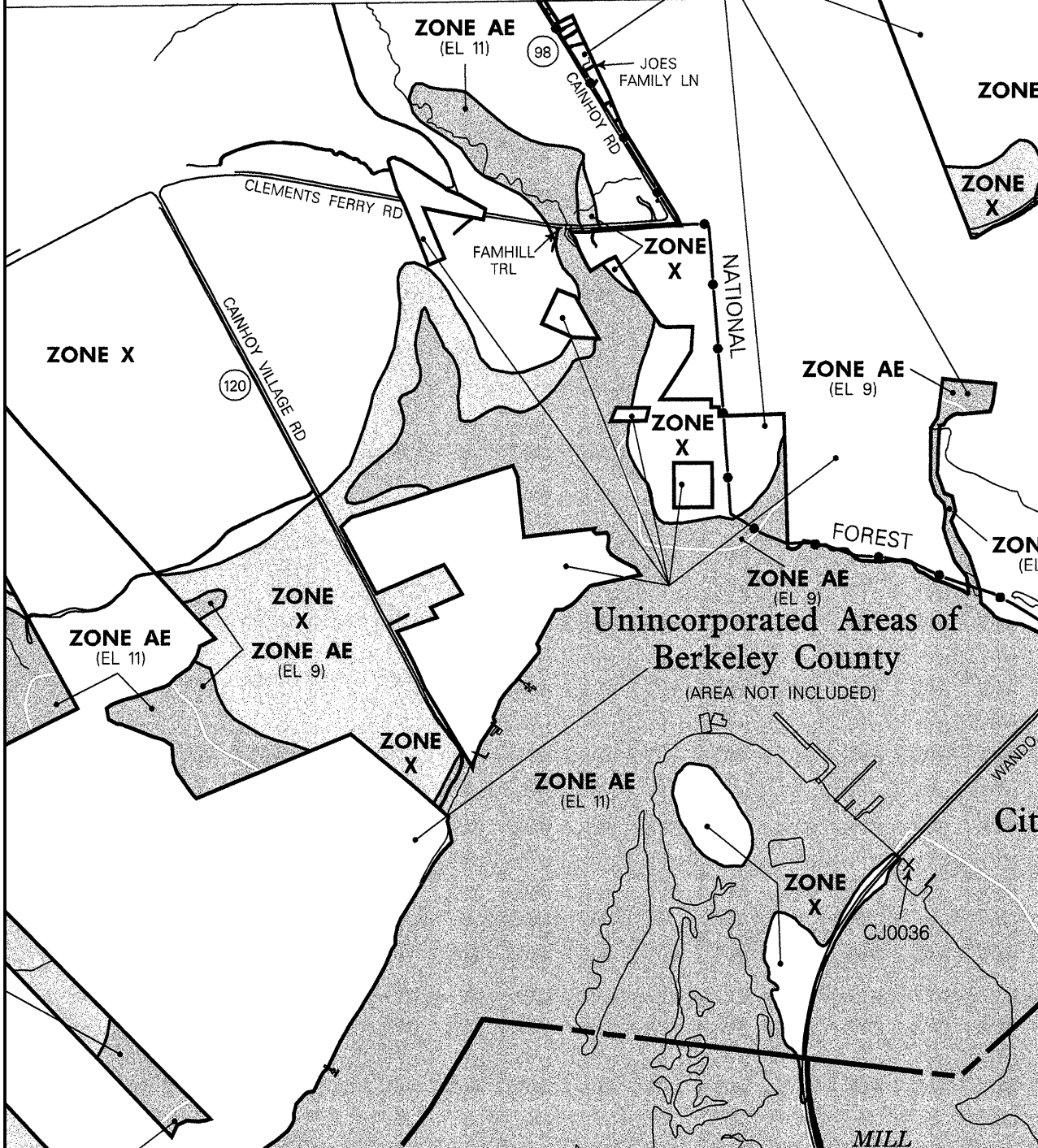
To refer water level heights to NAVD88 (North American Vertical Datum of 1988), apply the values located at National Geodetic Survey ([http://www.ngs.noaa.gov/Tidal\\_Elevation/diagram.jsp?PID=CJ0501&EPOCH=1983-2001](http://www.ngs.noaa.gov/Tidal_Elevation/diagram.jsp?PID=CJ0501&EPOCH=1983-2001)).



Showing datums for

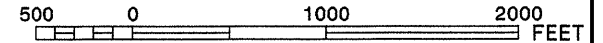
8664545 Cainhoy, Wando Riv...

Data Units  Feet  
 Meters



APPROXIMATE SCALE

MAP SCALE 1" = 1000'



**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM  
FLOOD INSURANCE RATE MAP  
CHARLESTON COUNTY,  
SOUTH CAROLINA  
AND INCORPORATED AREAS**

**PANEL 340 OF 855**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHARLESTON COUNTY	485413	0340	J
CHARLESTON, CITY OF	485412	0340	J
MOUNT PLEASANT, TOWN OF	485417	0340	J

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

**MAP NUMBER  
45019C0340J**

**EFFECTIVE DATE:  
NOVEMBER 17, 2004**



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)