Appendix E: Floodplain Risk Assessment

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Berkeley DATE: 07/18/2019

ROAD #: I-26 STREAM CROSSING: Cypress Swamp

Purpose & Need for the Project:

Widening of I-26 from Mile Marker 187 to Mile Marker 194.
Bridge crossing consists of dual bridges.

I. FEMA Acknowledgement

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

Panel Number: 45015C0555D Effective Date: 10/16/2003 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number 19P 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 assessmnet indicates this project may require a CLOMR/LOMR. Impacts will be determined by a detailed hydraulic analysis.

Justification: Proposed replacement bridge will likely be longer, resulting in a decrease in 100-year base flood profile.

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☑ Yes ☐ No File No. 8.355.2 Sheet No. 8 (See Attached)

b. Road Plans ☑ Yes ☐ No File No. 8.353 Sheet No. 19 (See Attached)

B. Historical Highwater Data

a. USGS Gage ☐ Yes ☑ No Gage No. 02172076 Results: N/A - only 2 years records available.

b. SCDOT/USGS Documented Highwater Elevations ☑ Yes ☐ No Results: 32.0 (approx. 30.5 NAVD 88 project datum)

c. Existing Plans ☑ Yes ☐ No See Above

V. Field Review

A. Existing Bridge

Length: 210 ft. Width: 44 ft. Max. span Length: 30 ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: _____

End Abutment Type: Spill-through

Riprap on End Fills: ☑ Yes ☐ No Condition: Good

Superstructure Type: Concrete tee beams

Substructure Type: Concrete piles

Utilities Present: ☐ Yes ☑ No

Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: 0 %

Percent Blocked Vertically: 0 %

Hydraulic Problems: ☐ Yes ☑ No

Describe:

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present: ☑ Yes ☐ No Location: Bridge main channel (clearwater)

b. Distance from F.G. to Normal Water Elevation: 14.8 ft.
c. Distance from Low Steel to Normal Water Elev.: 12.0 ft.
d. Distance from F.G. to High Water Elevation: 4.8 ft.
e. Distance from Low Steel to High Water Elev.: 2.0 ft.

f. Channel Banks Stable: ☑ Yes ☐ No
Describe: Swampy - no defined channel banks. Clearwater contraction scour present in main channel.

g. Soil Type: Sandy Loam

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.

None.

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

VI. Field Review (cont.)

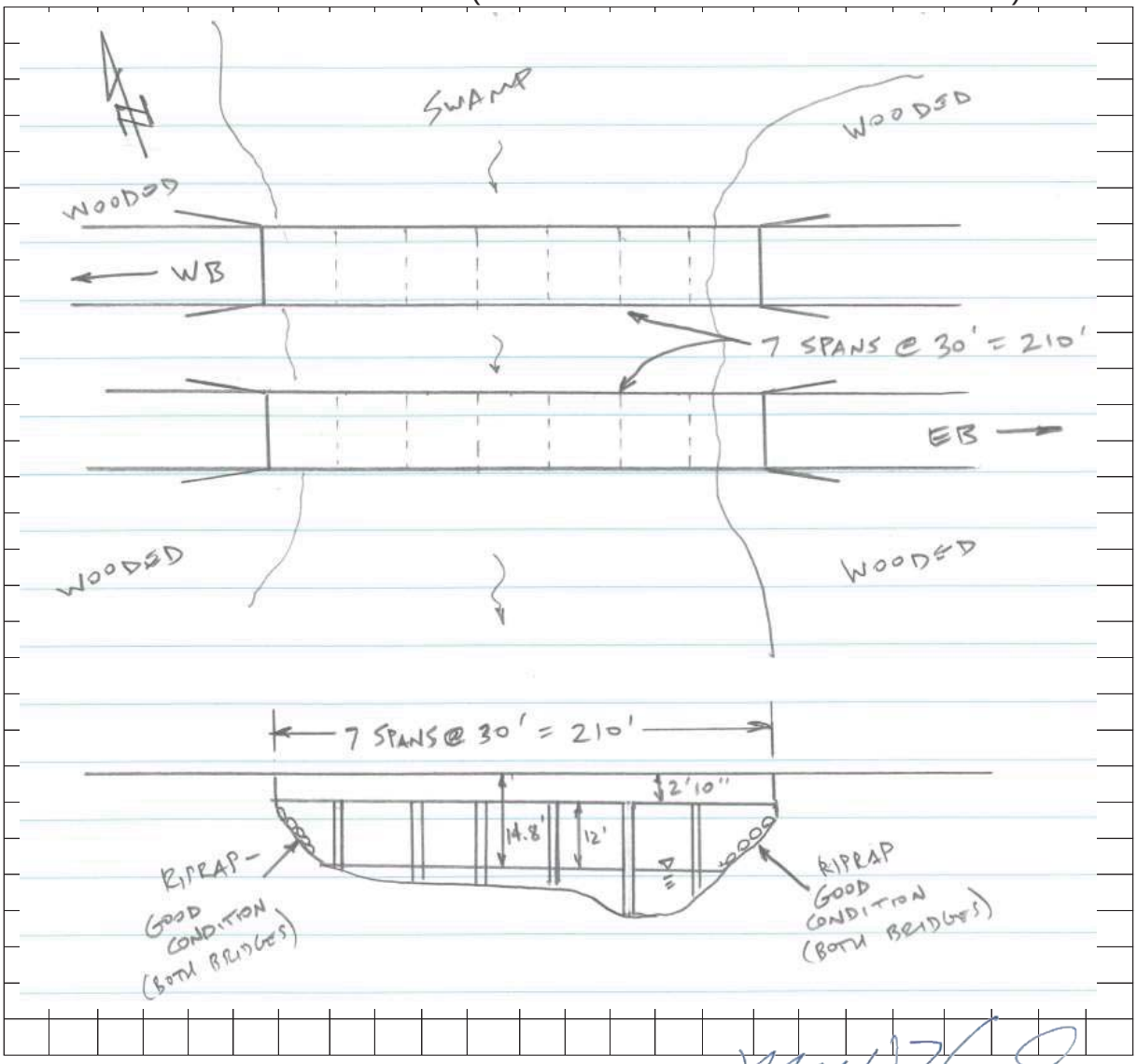
A. Proposed Bridge Recommendation:

Length: 320 ft. Width: 44 ft. Elevation: 34.5 ft.

Span Arangement: 4 RC beam spans @ 80'

Notes: Dual bridges. Recommendations apply to both eastbound and westbound bridges.

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

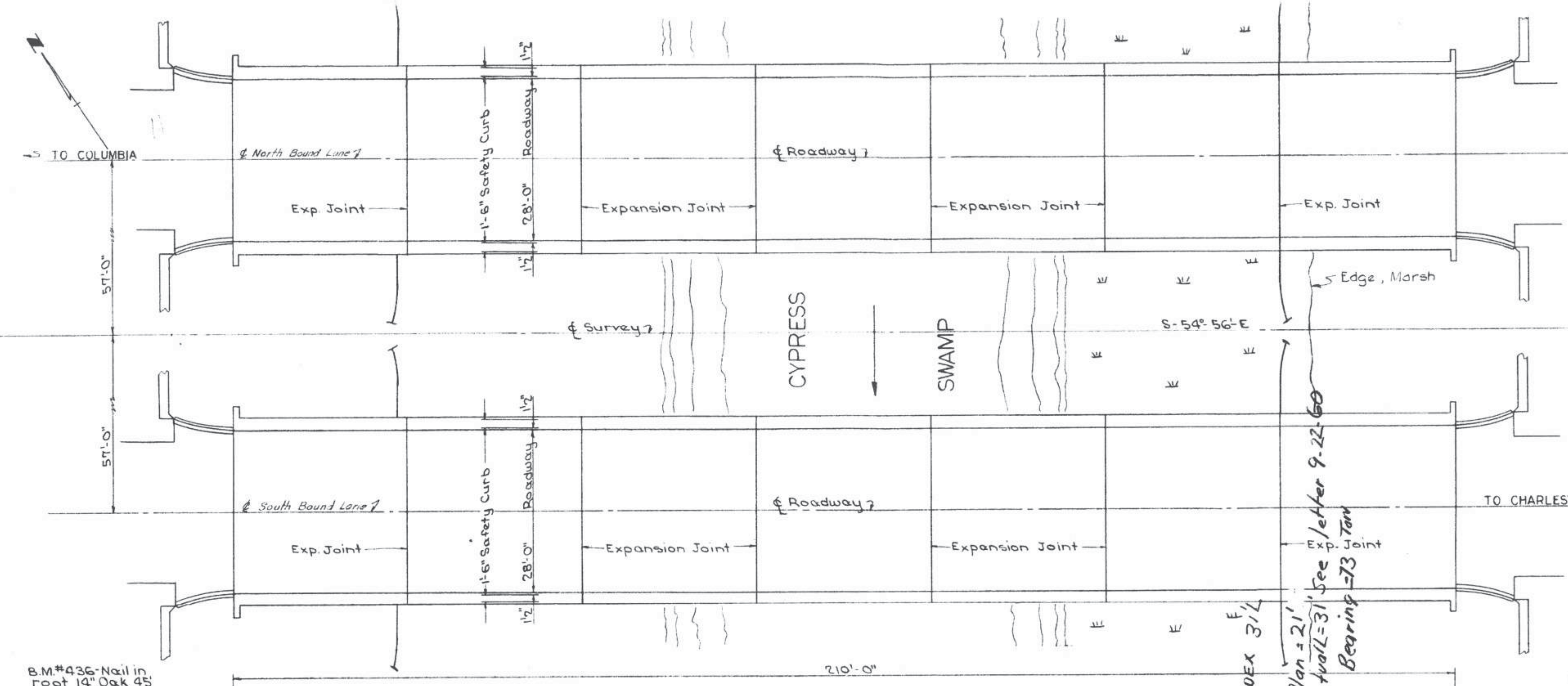


Performed By: Mark W. Hammond

Title: Hydraulic Engineer

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	Berkeley	8.353	I-26-4(1)	I-26	19	~~283~~ 616

FED. RD. DIV. NO.	STATE	COUNTY	DOCKET NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	BERKELEY	8,355.2	I-26	8	11

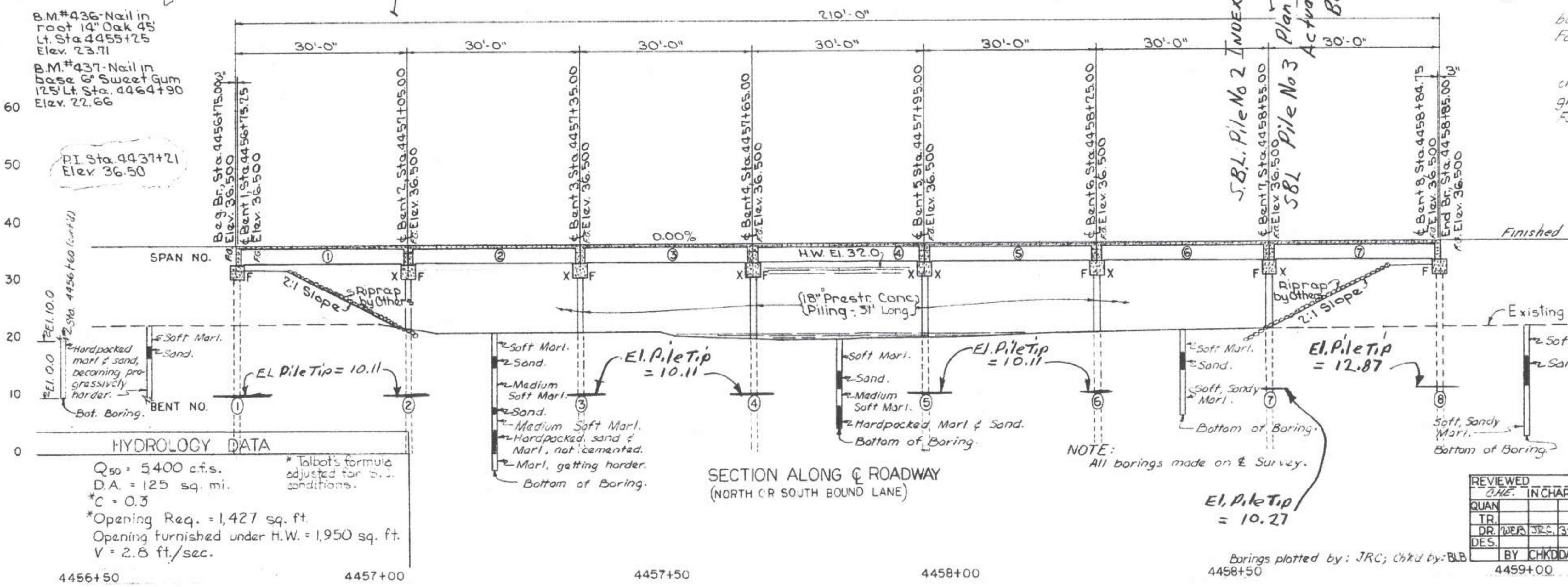


①One 31' index pile to be driven at location of an interior pile of Bent No. 5 on either bridge and to remain as part of the bent.
Proper lengths of piles to be determined after driving index pile.

Note:
See Sheet No.7 for Summary of Est. Quantities

Construct Flared Curb and Gutter on both sides of r/w'y at both ends of bridges. For details see Sheet No. 3.

Construct concrete block slope drains on both sides of roadway at the beginnings and ends of both bridges. For details, see Sheet No. 4.



HYDROLOGY DATA

Q_{50} = 5,400 c.f.s.
D.A. = 125 sq. mi.
*C = 0.3
*Opening Req. = 1,427 sq. ft.
Opening furnished under H.W. = 1,950 sq. ft.
V = 2.8 ft./sec.

* Talbot's formula adjusted for S.C. conditions.

S.C. STATE HIGHWAY DEPARTMENT
BRIDGE DIVISION
COLUMBIA S.C.

PLAN & PROFILE
FOR BRIDGES OVER
CYPRESS SWAMP

REVIEWED			
	CHE.	IN CHARGE	
QUAN.			
TR.			
DR.	WEB	JRC	3-59
DES.			
	BY	CHKD	DATE

DOCKET NO.	COUNTY	ROUTE NO.	DATE
8,355.2	BERKELEY	I-26	

APPROVED BY W.E. Crum — BR. DESIGN & PLANS ENG.
APPROVED BY [illegible] — BRIDGE ENGINEER

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

COUNTY: Dorchester DATE: 07/19/2019

ROAD #: I-26 STREAM CROSSING: Timothy Creek

Purpose & Need for the Project:

Widening of I-26 from Mile Marker 187 to Mile Marker 194.
Dual 6'x10' Culvert crossing FEMA Limited Detail Zone AE.

I. FEMA Acknowledgement

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

Panel Number: 45035C0220E Effective Date: 07/18/2017 (See Attached)

II. FEMA Floodmap Investigation

FEMA Flood Profile Sheet Number N/A 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 assessmnet indicates this project may require a CLOMR/LOMR. Impacts will be determined by a detailed hydraulic analysis.

Justification: Additional culvert will be placed to reduce headwater.

BRIDGE REPLACEMENT SCOPING TRIP RISK ASSESSMENT FORM

IV. Preliminary Bridge Assessment

A. Locate Existing Plans

a. Bridge Plans ☐ Yes ☑ No File No. _____ Sheet No. _____ (See Attached)

b. Road Plans ☑ Yes ☐ No File No. 8.350 Sheet No. 45 (See Attached)

B. Historical Highwater Data

a. USGS Gage ☐ Yes ☑ No Gage No. _____ Results: _____

b. SCDOT/USGS Documented Highwater Elevations ☐ Yes ☑ No Results: _____

c. Existing Plans ☐ Yes ☑ No See Above

V. Field Review

A. Existing Bridge

Length: (2)6'x10' Box ft. Width: _____ ft. Max. span Length: _____ ft.

Alignment: ☑ Tangent ☐ Curved

Bridge Skewed: ☐ Yes ☑ No Angle: 90

End Abutment Type: N/A

Riprap on End Fills: ☑ Yes ☐ No Condition: _____

Superstructure Type: N/A

Substructure Type: _____

Utilities Present: ☐ Yes ☑ No

Describe:

Debris Accumulation on Bridge: Percent Blocked Horizontally: 0 %

Percent Blocked Vertically: 0 %

Hydraulic Problems: ☐ Yes ☑ No

Describe:

V. Field Review (cont.)

B. Hydraulic Features

a. Scour Present: ☑ Yes ☐ No Location: Outlet of box

b. Distance from F.G. to Normal Water Elevation: 10 ft.

c. Distance from Low Steel to Normal Water Elev.: 5 ft.

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

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

f. Channel Banks Stable: ☑ Yes ☐ No

Describe:

g. Soil Type: Sandy Loam

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.

None

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.)

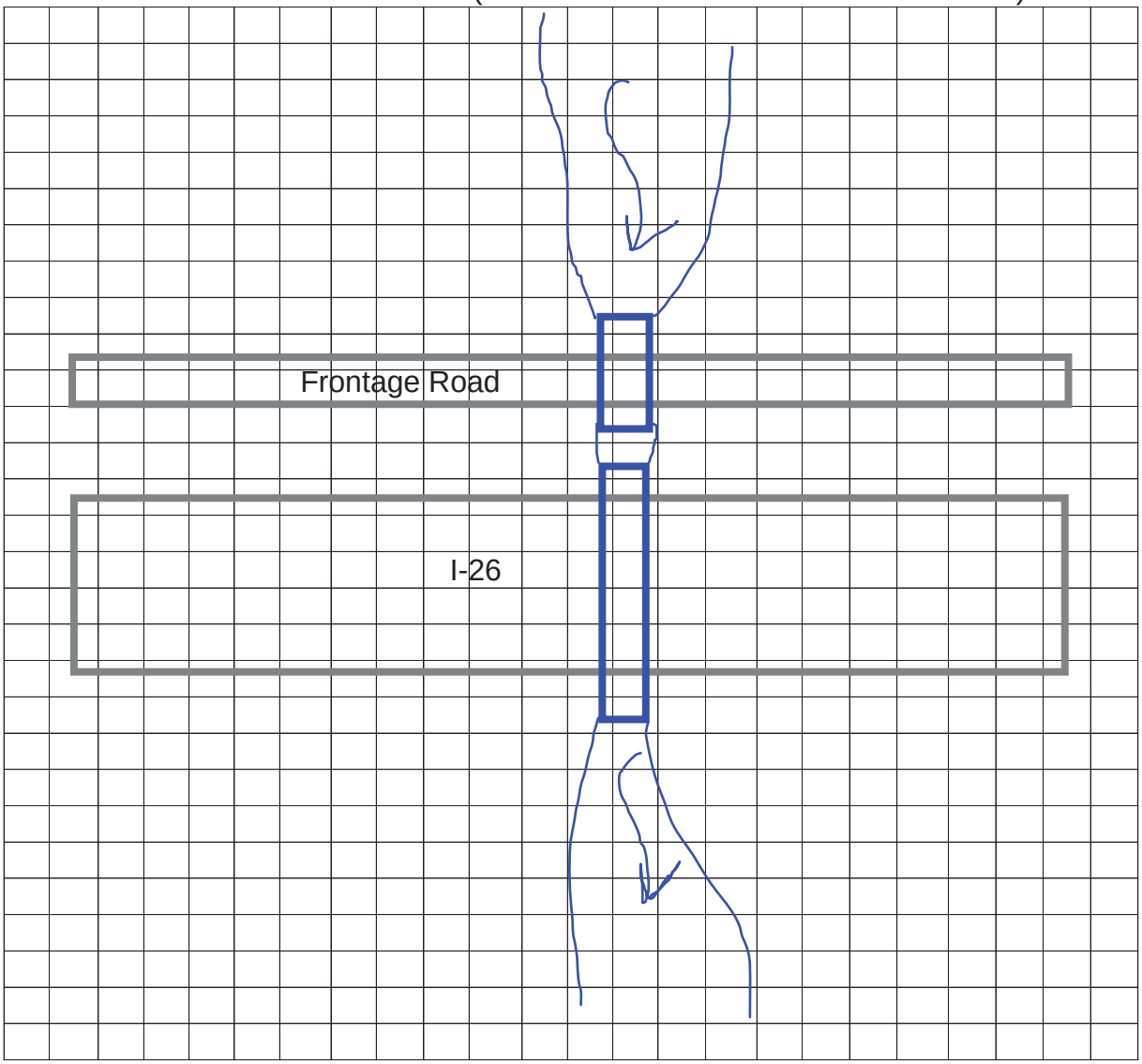
A. Proposed Bridge Recommendation:

Length: SeeBelow ft. Width: _____ ft. Elevation: _____ ft.

Span Arangement: _____

Notes: Retain Dual 6'x10' Box Culverts and place an additional 6'x6' culvert

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



Performed By: Lauren Warmuth

Title: Hydraulic Engineer

NOTES TO USERS

ap is for use in administering the National Flood Insurance Program. It t necessarily identify all areas subject to flooding, particularly from local e sources of small size. The **community map repository** should be ed for possible updated or additional flood hazard information.

ain more detailed information in areas where **Base Flood Elevations** and/or **floodways** have been determined, users are encouraged to the Flood Profiles and Floodway Data and/or Summary of Stillwater nis tables contained within the Flood Insurance Study (FIS) report that aries this FIRM. Users should be aware that BFEs shown on the esent rounded whole-foot elevations. These BFEs are intended for surance rating purposes only and should not be used as the sole of flood elevation information. Accordingly, flood elevation data ed in the FIS report should be utilized in conjunction with the FIRM oses of construction and/or floodplain management.

Base Flood Elevations shown on this map apply only landward North American Vertical Datum of 1988 (NAVD 88). Users of M should be aware that coastal flood elevations are also provided in mary of Stillwater Elevations table in the Flood Insurance Study report jurisdiction. Elevations shown in the Summary of Stillwater Elevations ould be used for construction, and/or floodplain management purposes ey are higher than the elevations shown on this FIRM.

ries of the **floodways** were computed at cross sections and interpolated n cross sections. The floodways were based on hydraulic considerations ard to requirements of the National Flood Insurance Program. Floodway nd other pertinent floodway data are provided in the Flood Insurance eport for this jurisdiction.

areas not in Special Flood Hazard Areas may be protected by **flood structures**. Refer to Section 2.4 "Flood Protection Measures" of od Insurance Study report for information on flood control structures urisdiction.

ojection used in the preparation of this map was State Plane South FIPS 3900. The **horizontal datum** was NAD 83, GRS1980 spheroid. ces in datum, spheroid, projection or State Plane zones used in uction of FIRMs for adjacent jurisdictions may result in slight positional ces in map features across jurisdiction boundaries. These differences ffect the accuracy of this FIRM.

elevations on this map are referenced to the North American Vertical of 1988. These flood elevations must be compared to structure and elevations referenced to the same **vertical datum**. For information ng conversion between the National Geodetic Vertical Datum of 1929 North American Vertical Datum of 1988, visit the National Geodetic website at http://www.ngs.noaa.gov/ or contact the National Geodetic at the following address:

formation Services
NNGS12
al Geodetic Survey
3, #9202
st-West Highway
pring, MD 20910-3282

in current elevation, description, and/or location information for **bench** shown on this map, please contact the Information Services Branch National Geodetic Survey at (301) 713-3242, or visit its website at ww.ngs.noaa.gov/.

ap information shown on this FIRM was provided in digital format by ster County, South Carolina.

p may reflect more detailed or up to date stream channel configurations ose shown on the previous FIRM. The floodplains and floodways that nsferred from the previous FIRM may have been adjusted to conform to ew stream channel configurations and improved topographic data. The aselines depicted on this map represent the hydraulic modeling baselines tch the flood profiles and Floodway Data Tables if applicable, in the FIS As a result, the profile baselines may deviate significantly from the new ap channel representation and may appear outside of the floodplain.

ate limits shown on this map are based on the best data available the time of publication. Because changes due to annexations or deannexations ve occurred after this map was published, map users should contact iate community officials to verify current corporate limit locations.

refer to the separately printed **Map Index** for an overview map of the showing the layout of map panels; community map repository addresses; isting of Communities table containing National Flood Insurance Program for each community as well as a listing of the panels on which each nity is located.

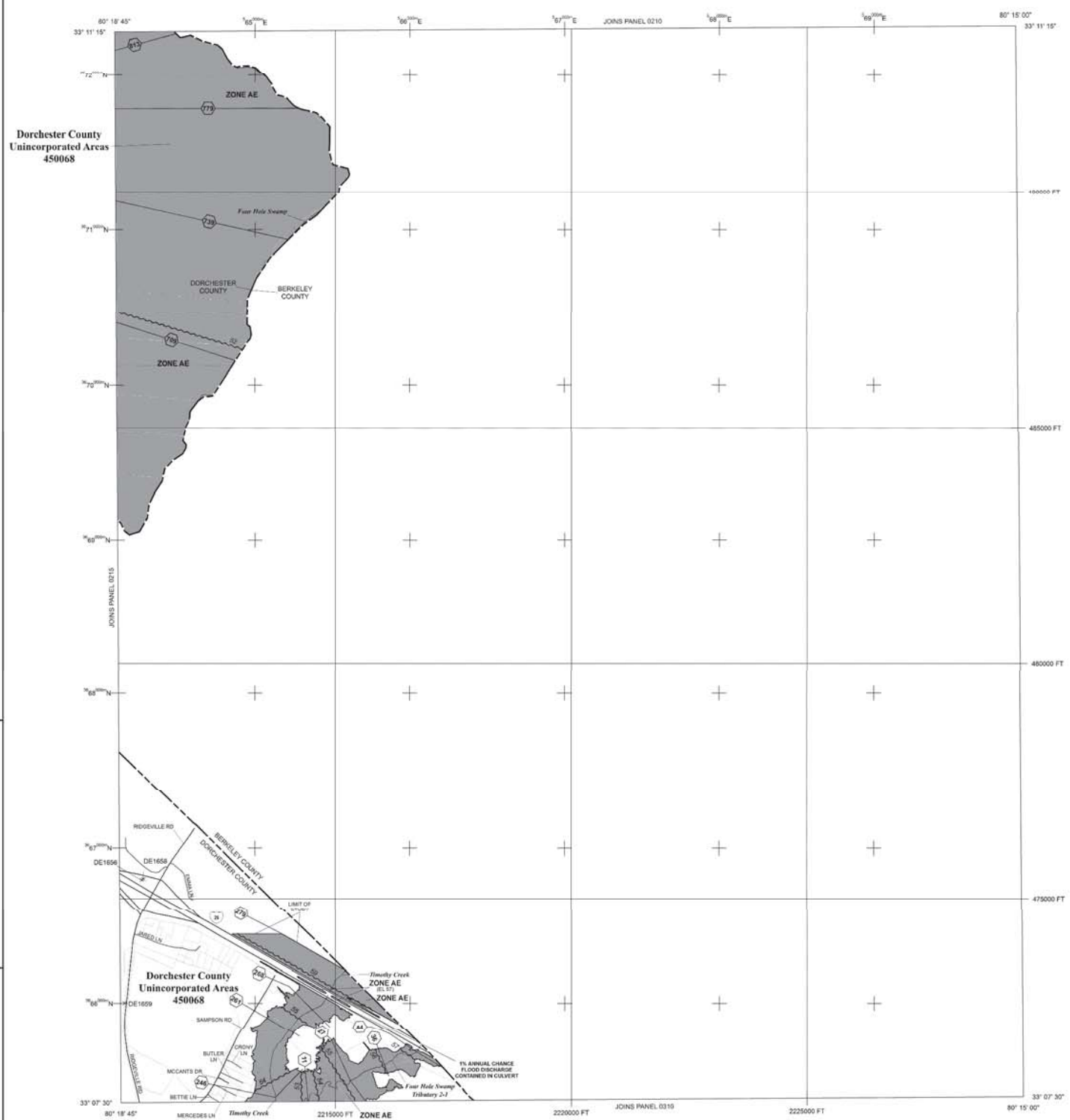
the **FEMA Map Information eXchange (FMIX)** at 1-877-336-2627 for tion on available products associated with this FIRM. Available products lude previously issued Letters of Map Change, a Flood Insurance Study and/or digital versions of this map. The FMIX may also be reached by 1-800-358-9620 and their website at http://www.msc.fema.gov/.

have **questions about this map** or questions concerning the National surance Program in general, please call **1-877- FEMA MAP** (1-877-336-2627) the FEMA website at http://www.fema.gov/national-flood-insurance-program.

DNR

digital Flood Insurance Rate Map (FIRM) was produced through a unique rative partnership between the State of South Carolina and the Federal ency Management Agency (FEMA). The State of South Carolina has mented a long-term approach of floodplain management to decrease the associated with flooding. This is demonstrated by the State's commitment o floodplain areas at the local level. As a part of this effort, the State of Carolina has joined in a Cooperating Technical State agreement with to produce and maintain this digital FIRM.

http://www.dnr.state.sc.us/



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is th that has a 1% chance of being equaled or exceeded in any given year. The Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. Th Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping average depths determined. For areas of alluvial fan flooding, also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% chance flood by a flood control system that was subs decertified. Zone AR indicates that the former flood control sy being restored to provide protection from the 1% annual cha greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a flood protection system under construction; no Base Flood El determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood El determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that kept free of encroachment so that the 1% annual chance flood can be carried substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chanc with average depths of less than 1 foot or with drainage areas l 1 square mile; and areas protected by levees from 1% annual flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA Boundary
Boundary dividing Special Flood Hazard Area Zones Base Flood Elevations, flood depths or flood vel
513 Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*
*Referenced to the North American Vertical Datum of 1988
A A Cross section line
23 23 Transect line
97° 07' 30", 32° 22' 30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
1000-meter Universal Transverse Mercator grid values, zone
900000 FT 5000-foot grid ticks: South Carolina State Plane coordinate s zone 17 (FIPSZONE 3900), Lambert Projection
DX5510 Bench mark (see explanation in Notes to Users section of thi FIRM panel)
River Mile

MAP REPOSITORIES
Refer to Listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
JULY 18, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

(For description of revisions listed above, see Notice to Users page in the Flood In Study report.)

For community map revision history prior to countywide mapping, refer to the Com Map History table located in the Flood Insurance Study report for this juris

To determine if flood insurance is available in this community, contact your in agent or call the National Flood Insurance Program at 1-800-61

MAP SCALE 1" = 1000'
800 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0220E

FIRM

FLOOD INSURANCE RATE MA

DORCHESTER COUN
SOUTH CAROLINA
AND INCORPORATED ARE

PANEL 220 OF 510

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL
DORCHESTER COUNTY	450068	0220

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

MAP NU
450350

EFFECTIVE
JULY 18

Federal Emergency Management

S. Joe Sampson
106 A
Begin Frontage Road on Lt. Sta. 4232+50
180' R/W
4230
4235
4240
4245
P.O.T. 4237+21.7
Frontage Rd
J. T. RILEY
300 Ac.
See Sheet No. 171 for R/W & Channel Change
Construct Double 10'x6'x40' R.C. Box Culvert as shown on Sheet No. 155
Construct Double 10'x6'x68' R.C. Box Culvert as shown on Sheet No. 156
Construct Double 10'x6'x68' R.C. Box Culvert as shown on Sheet No. 157
Moving Item No. 5
12' wide Ent.
Fowl House
60' Chicken Wire
Chicken Yard
CO. ROAD
To Rt. 78
Place 58' - 18" R.C. Pipe
2 STRAND BARB WIRE
PLAN
PROFILE
B.M. # 413 - NAIL IN BASE OF GUY POLE 405' Lt. STA. 4232+25 El. = 60.01
B.M. # 414 - NAIL IN BASE 10" PINE 160' Lt. STA. 4243+15 El. = 57.05
-0.10%
High Water 57.00
Finished Grade
SECTION 3 SWALE DITCH GRADE ON LEFT & RIGHT
Strip 6"
SWALE DITCH ELEVATIONS ON LEFT & RIGHT
+0.14% SWALE DITCH GRADE LT. & RT.
SWALE DITCH ELEV.'S LT. & RT.
Overhaul
Remove Unstable Material and Backfill with Suitable Material from Sta. 4220+00 to 4234+50
Remove Unstable Material and Backfill with Suitable Material from Sta. 4243+00 to 4257+00
Place 140 Tons of Rip Rap on Slopes of Fill at ends of Culverts
50
4230
4231
4232
4233
4234
4235
4236
7
8
9
4240
1
2
3
4
4245
BERKELEY
45