Appendix E
Bayou Lafourche Alignment Conveyance
Alternative Matrix/Water Level Profiles
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<th>Dredging&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Maximum Water Surface Limit&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Mississippi River Resultant Quantity&lt;sup&gt;e&lt;/sup&gt;</th>
<th>Palo Alto Bridge Resultant Quantity&lt;sup&gt;f&lt;/sup&gt;</th>
<th>Donaldsonville WSE&lt;sup&gt;g&lt;/sup&gt; (feet)</th>
<th>Confluence WSE (feet)</th>
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Notes:

a. NM = No modification to existing railroad bridge culverts
M = Modification to existing railroad bridge culverts
b. Y = Check structure in-place
N = No check structure
NA = Not applicable for BL alignment

Check structure assumptions:
- Location: Immediately upstream of confluence
- Flow input upstream of check structure = 100 cfs
c. ND = No dredging
RM = River Mile
2 = Dredge template characteristics:
Depth = 2 feet below existing bottom for 56 miles
Side slopes = 2.5:1 (horizontal:vertical)
Channel bottom width = variable over 17 subreaches
8 = Dredge template characteristics:
Depth = 8 feet below existing bottom for 56 miles
Side slopes = 2.5:1 (horizontal:vertical)
Channel bottom width = variable over 18 subreaches
8-2@RM3.4 = Combined dredging template characteristics:
Dredge 8 feet upstream of Palo Alto Bridge (RM 3.4) and 2 feet downstream
8-0@RM29 = Combined dredging template characteristics:
Dredge 8 feet upstream of RM 29.0 near Thibodaux and 2 feet downstream
8-2@RM29 = Combined dredging template characteristics:
Dredge 2 feet upstream of RM 29.0 near Thibodaux and 0 feet downstream
8-0@RM29 = Combined dredging template characteristics:
Dredge 8 feet downstream of RM 29.0 near Thibodaux and 0 feet downstream

- E = Existing water level
MLW = Mean low water level
MW = Mean water level
e. cfs = cubic feet per second
f. WSE = water surface elevation
g. cy = cubic yard
### TABLE E-2
Smoke Bend Alignment Conveyance Alternatives Matrix

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<td>12.3 11.2 1,305,250</td>
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<tr>
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<td>NM</td>
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<td>8-2@RM29</td>
<td>E</td>
<td>NA</td>
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<td>7.4 5.5 834,412</td>
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<td>8-2@RM29</td>
<td>MLW</td>
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<td>9.8 8.6 1,032,782</td>
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<td>8-2@RM29</td>
<td>MW</td>
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<td>2-0@RM29</td>
<td>E</td>
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<td></td>
<td></td>
<td>8.4 5.4 564,555</td>
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<td>2-0@RM29</td>
<td>MLW</td>
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<td>8.5 2,780 5.8 11.2</td>
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<tr>
<td>69</td>
<td>NM</td>
<td>Y</td>
<td>2-0@RM29</td>
<td>MW</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td>12.3 11.2 944,618</td>
</tr>
</tbody>
</table>
# TABLE E-2
Smoke Bend Alignment Conveyance Alternatives Matrix

| Profile No. | Railroad\(^a\) | Check Structure\(^b\) | Dredging\(^c\) | Maximum Water Surface Limit\(^d\) | Mississippi River Resultant Quantity (cfs)\(^e\) RS 226 | Palo Alto Bridge Resultant Quantity (cfs) RS 211 | Confluence WSE\(^f\) (feet) | Bayou Lafourche Dredging (cy)\(^g\) | Smoke Bend Excavation
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<table>
<thead>
<tr>
<th>Deep Channel</th>
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<th>Shallow Channel</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Upstream</td>
<td>Downstream</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U/S(^h)</td>
<td>D/S(^i)</td>
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</tbody>
</table>

Notes:

a. NM = No modification to existing railroad bridge culverts
M = Modification to existing railroad bridge culverts

b. Y = Check structure in-place
N = No check structure
NA = Not applicable for BL alignment

Check structure assumptions:

- Location: Immediately upstream of confluence
- Flow input upstream of check structure = 100 cfs

c. ND = No dredging
RM = River Mile
2 = Dredge template characteristics:
   - Depth = 2 feet below existing bottom for 56 miles
   - Side slopes = 2.5:1 (horizontal:vertical)
   - Channel bottom width = variable over 17 subreaches
8 = Dredge template characteristics:
   - Depth = 8 feet below existing bottom for 56 miles
   - Side slopes = 2.5:1 (horizontal:vertical)
   - Channel bottom width = variable over 18 subreaches
8-2@RM3.4 = Combined dredging template characteristics:
   - Dredge 8 feet upstream of Palo Alto Bridge (RM 3.4) and 2 feet downstream
2-0@RM3.4 = Combined dredging template characteristics:
   - Dredge 2 feet upstream of Palo Alto Bridge (RM 3.4) and 0 feet downstream
8-2@RM29 = Combined dredging template characteristics:
   - Dredge 8 feet upstream of RM 29.0 near Thibodaux and 2 feet downstream
2-0@RM29 = Combined dredging template characteristics:
   - Dredge 2 feet upstream of RM 29.0 near Thibodaux and 0 feet downstream
8-0@RM29 = Combined dredging template characteristics:
   - Dredge 8 feet upstream of RM 29.0 near Thibodaux and 0 feet downstream

- E = Existing water level
MLW = Mean low water level
MW = Mean water level

e. Flow diverted from Donaldsonville pump station
cfs = cubic feet per second

f. Water surface elevations (WSE) upstream and downstream of check structure

g. Excavation quantity, cubic yards (cy) for Smoke Bend bypass

h. Water surface upstream (U/S) in the Smoke Bend bypass channel

i. Water surface downstream (D/S) in the Smoke Bend bypass channel

j. WSE in Bayou Lafourche D/S of confluence with Smoke Bend bypass

k. Difference in water surface between Smoke Bend bypass (D/S) and Bayou Lafourche (confluence)
FIGURE E-1 (PROFILE FOR ALTS. 1-3)
BAYOU LAFOURCHE NO DREDGE
EXISTING CONDITION –
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-2 (PROFILE FOR ALTS. 4-6)
BAYOU LAFOURCHE 2-FOOT DREDGE – NO MODIFICATION TO RAILROAD CULVERT
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FIGURE E-3 (PROFILE FOR ALTS. 7-9)
BAYOU LAFOURCHE 8-FOOT DREDGE –
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
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FIGURE E-6 (PROFILE ALT. NO. 16-18)
BAYOU LAFOURCHE NO DREDGE EXISTING
CONDITION – MODIFIED RAILROAD CULVERT
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STAGE (FEET NAVD88)

RIVER MILE

LEGEND

MW MODELED (833 CFS), ALT. 18
MLW MODELED (315 CFS), ALT. 17
EX MODELED (234 CFS), ALT. 16
MW TARGET
MLW TARGET
EX TARGET
BRIDGE LOCATIONS
EX CHANNEL INVERT
FIGURE E-7 (PROFILE ALTS. 19-21)
BAYOU LAFOURCHE 2-FOOT DREDGE – MODIFIED RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
PHASE 1 DESIGN REPORT
FIGURE E-8 (PROFILE ALTS. 22-24)
BAYOU LAFOURCHE 8-FOOT DREDGE – MODIFIED RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-10 (PROFILE ALT. NO. 28-30)
BAYOU LAFOURCHE 8- TO 0-FOOT DREDGE
AT RM 3.4 – MODIFIED RAILROAD CULVERT
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LEGEND
- MW MODELED (970 CFS), ALT. 30
- MLW MODELED (420 CFS), ALT. 29
- EX MODELED (220 CFS), ALT. 28
- MW TARGET
- MLW TARGET
- EX TARGET

- BRIDGE LOCATIONS
- EX CHANNEL INVERT
- DREDGED CHANNEL INVERT
FIGURE E-11 (PROFILE ALT. NO. 31-33)
BAYOU LAFOURCHE 8- TO 2-FOOT DREDGE
AT RM 29 – MODIFIED RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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LEGEND
- MW MODELED (2,340 CFS), ALT. 33
- MLW MODELED (1,530 CFS), ALT. 32
- EX MODELED (1,100 CFS), ALT. 31
- MW TARGET
- MLW TARGET
- EX TARGET
- BRIDGE LOCATIONS
- EX CHANNEL INVERT
- DREDGED CHANNEL INVERT

STAGE (FEET NAVD88)
0 10 20
RIVER MILE
0 10
20 30
30 40
40 50
50 60

Railroad Bridge
Palo Alto Bridge
Thibodaux Weir
Lockport
FIGURE E-13 (PROFILE ALT. NO. 37-39)
BAYOU LAFOURCHE 2- TO 0-FOOT DREDGE
AT RM 29 – MODIFIED RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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LEGEND
MW MODELED (1,650 CFS), ALT. 39
MLW MODELED (970 CFS), ALT. 38
EX MODELED (580 CFS), ALT. 37
MW TARGET
MLW TARGET
EX TARGET
BRIDGE LOCATIONS
EX CHANNEL INVERT
DREDGED CHANNEL INVERT
FIGURE E-14 (PROFILE ALT. NO. 40-42)
SMOKE BEND NO DREDGE –
NO CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-15 (PROFILE ALT. NO. 43-45)
SMOKE BEND 2-FOOT DREDGE –
NO CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-16 (PROFILE ALT. NO. 46-48)
SMOKE BEND 8-FOOT DREDGE – NO CONTROL STRUCTURE AND NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
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FIGURE E-17 (PROFILE ALT. NO. 49-51)
SMOKE BEND 8- TO 2-FOOT DREDGE AT RM 29 –
NO CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-19 (PROFILE ALT. NO. 55-57)
SMOKE BEND NO DREDGE
WITH CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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FIGURE E-20 (PROFILE ALT. NO. 58-60)
SMOKE BEND 2-FOOT DREDGE
WITH CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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LEGEND
- MW MODELED (2,290 CFS), ALT. 60
- MLW MODELED (1,390 CFS), ALT. 59
- EX MODELED (830 CFS), ALT. 58
- MW TARGET
- MLW TARGET
- EX TARGET
- BRIDGE LOCATIONS
- EX CHANNEL INVERT
- DREDGED CHANNEL INVERT
FIGURE E-21 (PROFILE ALT. NO. 61-63)
SMOKE BEND 8-FOOT DREDGE
WITH CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
PHASE 1 DESIGN REPORT
FIGURE E-22 (PROFILE ALT. NO. 64-66)
SMOKE BEND 8- TO 2-FOOT DREDGE
AT RM 29 WITH CONTROL AND NO MODIFICATION
TO RAILROAD CULVERT
MISSISSIPPI RIVER INTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
PHASE 1 DESIGN REPORT
FIGURE E-23 (PROFILE ALT. NO. 67-69)
SMOKE BEND 2- TO 0-FOOT DREDGE
AT RM 29 WITH CONTROL STRUCTURE AND
NO MODIFICATION TO RAILROAD CULVERT
MISSISSIPPI RIVER REINTRODUCTION INTO BAYOU LAFOURCHE
LOUISIANA DEPARTMENT OF NATURAL RESOURCES
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