DEPARTMENT OF THE ARMY PERMIT

Permittee: **Mississippi Department of Environmental Quality**

Permit No.: **SAM-2019-00360-JRO**

Issuing Office: **MOBILE DISTRICT**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The permittee is authorized to place approximately 10,500 cubic yards of fill in waters of the U.S. to create approximately 6.5 acres of subtidal reef and 3.0 acres of intertidal reef in Jackson County, Mississippi. The fill material will consist of granite, graded limestone, processed concrete aggregates, and/or oyster shell. The subtidal fill material will be placed in a manner to provide substrate 0.2-3.0 feet above the existing bed elevation in an undulating pattern, while maintaining a minimum depth of 2.0 feet below Mean Lower Low Water. The intertidal fill will be placed in a manner to provide substrate 0.5 feet below Mean Lower Low Water to 0.0 Mean Lower Low Water. The intertidal fill will consist of a combination of oyster bags filled with whole oyster shell and fill consisting of granite, graded limestone, or processed concrete aggregates.

ATTACHED:
1. **Locations and Plan Drawings**
2. **Mississippi Department of Marine Resources (DMR) Coastal Program Consistency dated November 1, 2019 (DMR-190242).**
3. **Mississippi Department of Environmental Quality (DEQ) Section 401 Certification dated August 19, 2019 (WQC2019037).**

Project Location: The project is located in Bangs Bayou & Point Aux Chenes Bay, Section 14, Township 8 South, Range 5 West, Jackson County, Mississippi. The area is depicted on the Grand Bay SW Quadrangle, United States Geological Survey Topographic Map, Hydrologic Unit Code 03170009. The coordinates of 10 separate reef polygons are provided in Appendix A of the permit attachments. The polygons and corresponding coordinates are identified as BB19(1-16), BB2(1-8), BB3(1-14), BB4(1-6), BB5(1-14), BB6(1-12), PAC1(1-18), PAC2(1-17), PAC3(1-16), and PAC(1-16). The coordinates are referenced to Mississippi State Plane East Zone, NAD83, in U.S. Survey Feet.

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on **30 April 2025**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 1 month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided

and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

a. Only suitable material free of waste, metal, organic trash, unsightly debris, etc., may be used as fill, and material discharged must be free from toxic pollutants in toxic amounts.

b. The permittee shall comply with all requirements of the Mississippi Department of Environmental Quality 401 Water Quality Certification (WQC2019037) dated August 19, 2019.

c. All conditions of the Coastal Zone Consistency Determination issued by the Department of Marine Resources are incorporated as conditions of this DA permit.

d. It is the permittee's responsibility to ensure that the contractors working on this project are aware of all General and Special permit conditions.

e. Best management practices shall be implemented to minimize turbidity, siltation damage to adjacent wetlands and waters of the United States, and submerged aquatic vegetation. All in-water project work will be conducted during daylight hours, and noise will be kept to the minimum feasible level. All vessels/barges will travel at slow speed in and around construction zones (5 knots or less).

f. The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

g. Prior to bringing any equipment (including personal gear, machinery, vehicles or vessels) to the work site, each item shall be inspected for mud or soil, seeds, and vegetation. If present, the equipment, vehicles, or personal gear shall be cleaned until they are free from mud, soil, seeds, and vegetation. This inspection will occur each time equipment, vehicles, and personal gear are being prepared to go to a site or prior to transferring between sites to avoid spreading exotic, nuisance species.

h. The National Ocean Service (NOS) has been notified of this authorization. You must notify NOS and this office, in writing, at least 2 weeks before you begin work and upon completion of the activity authorized by the permit. Your notification of completion must include the drawing which certifies the location and configuration of the completed activity (a certified permit drawing(s) may be used). Notification to NOS will be sent to ocs.ndb@noaa.gov or the following address: National Ocean Service, Office of Coast Survey, N/CS26, 1315 East West Highway, Silver Springs, Maryland 20910-3282.

i. The permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

j. The permittee must install and maintain, at the permittee's expense, any safety lights, signs, and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on the permittee's authorized facilities.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
(X) Section 10 of the Rivers and Harbors Act 1899 (33 U.S.C. 403).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.
Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_____ 5/2/2020

(PERMITTEE) **CHRIS WELLS** (DATE)
INTERIM EXECUTIVE DIRECTOR
MS DEPT OF ENVIRONMENTAL QUALITY
P.O. BOX 2261
JACKSON, MISSISSIPPI 39225

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

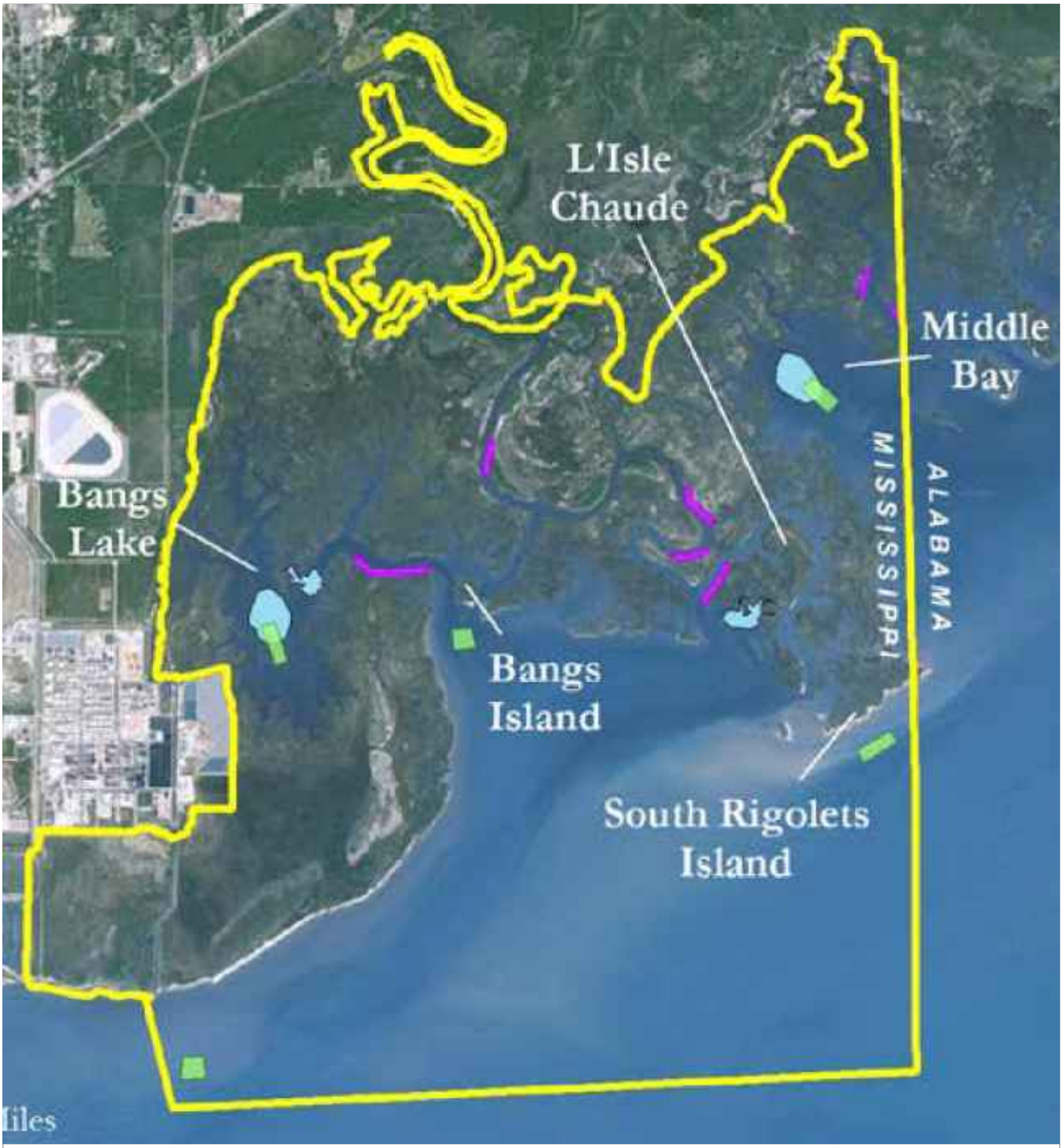
MONROE.ALLISON.F.1264363965 Digitally signed by MONROE.ALLISON.F.1264363965 Date: 2020.05.05 21:10:33 -05'00'

SEVASTIEN P. JOLY
COLONEL, U.S. ARMY
DISTRICT COMMANDER

BY: _____
ALLISON F MONROE **(DATE)**
TEAM LEADER, SOUTH MISSISSIPPI BRANCH
REGULATORY DIVISION

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____
(TRANSFEREE) (DATE)



SOURCE: Deepwater Horizon Oil Spill: Final Phase IV Early Restoration Plan and Environmental Assessment September 2015.

NOTES:

1. Conceptual project design features represent generalized areas and are subject to refinement.
2. (*) Enhanced width for map display.

LEGEND:

- Project Area
- Historic Oyster Reef
- Proposed Phase IV Subtidal Reef
- Proposed Phase IV Intertidal Reef*

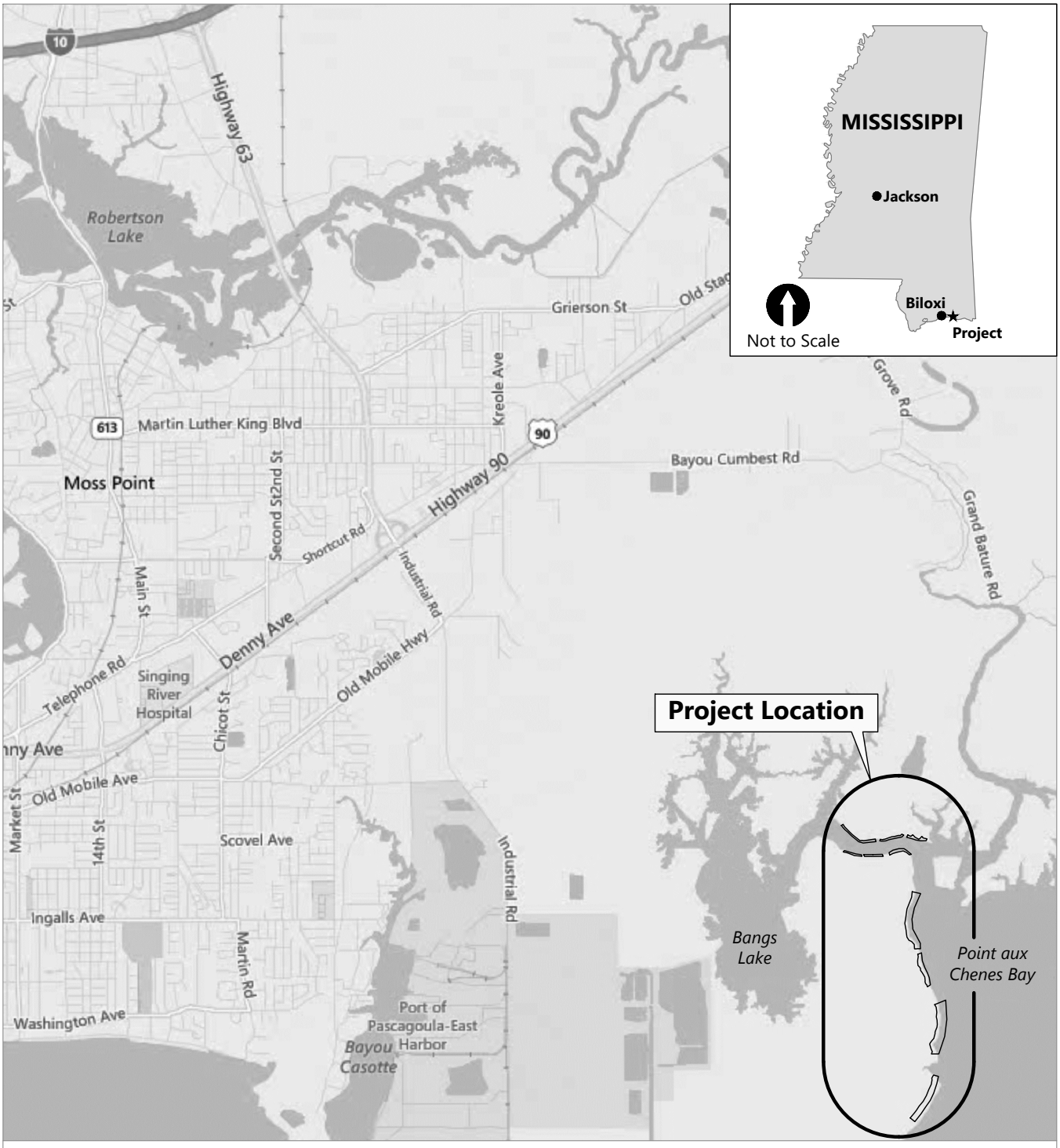
0 1
Miles

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-002 (Grand Bay-Plan).dwg Figure 1

ANCHOR QEA

Figure 1
Grand Bay NERR Subtidal and Intertidal Reefs

Basis of Design Report
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project
Mississippi Department of Environmental Quality



SOURCE: 2010 NAVTEC © and 2017 Microsoft Corporation.
HORIZONTAL DATUM: Mississippi State Plane East, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-001 (Grand Bay-VMap).dwg Figure 2

ANCHOR QEA

Figure 2
Grand Bay NERR Subtidal and Intertidal Reefs Vicinity Map

Basis of Design Report
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project
Mississippi Department of Environmental Quality

SOURCE: ©2018 Microsoft Corporation ©2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
HORIZONTAL DATUM: Mississippi State Plane East, NAD83, U.S. Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:
Proposed Subtidal Reef

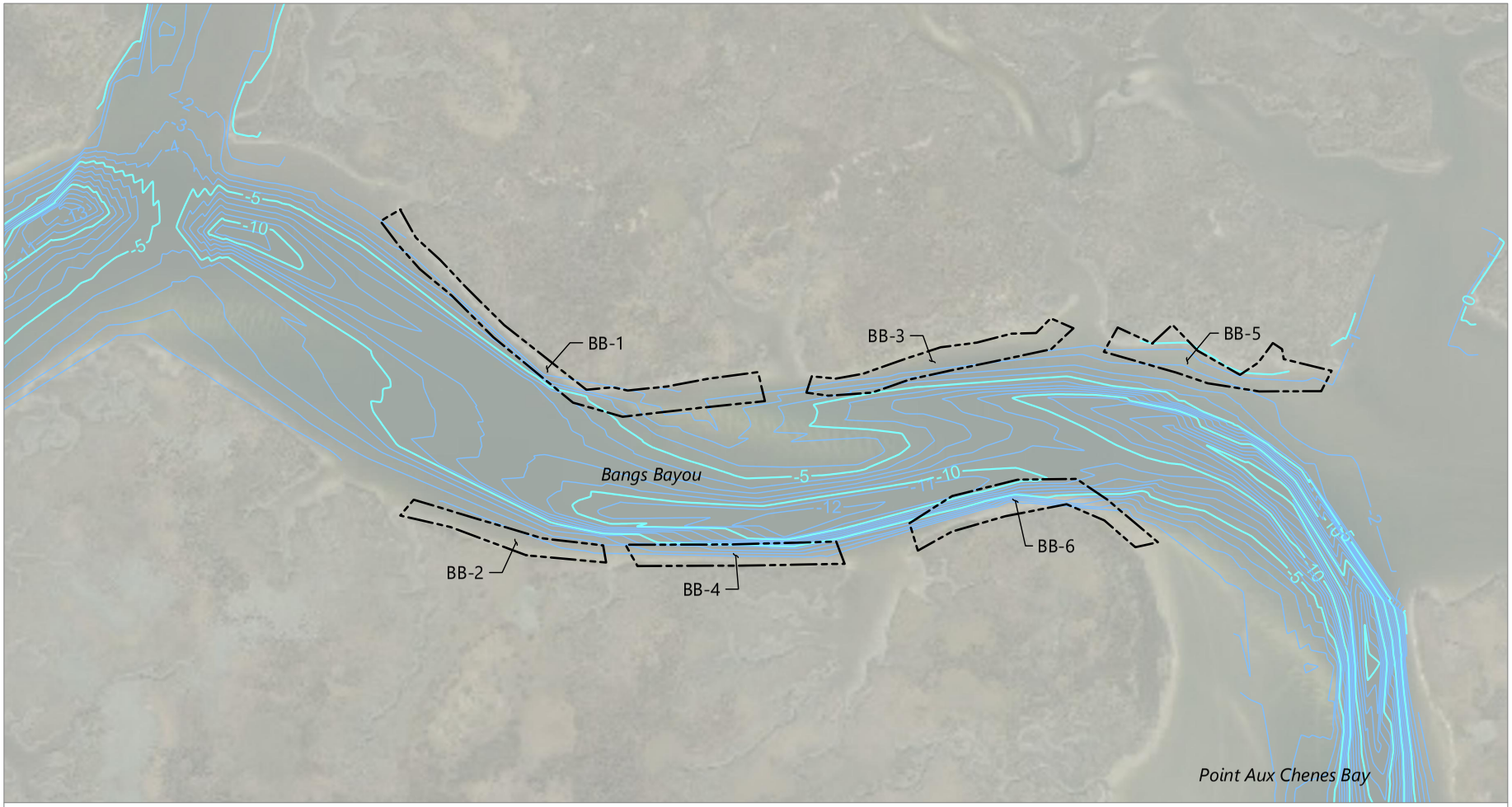
0 1200
Feet

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-002 (Grand Bay-Plan).dwg Figure 3

ANCHOR QEA

Figure 3
Point Aux Chenes Bay Subtidal Reefs

Basis of Design Report
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project
Mississippi Department of Environmental Quality



AERIAL SOURCE: ©2018 Microsoft Corporation ©2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
SURVEY SOURCE: DIMCO drawing titled "Hydrographic Survey and Push Sampling Grids" dated July 12, 2016.
HORIZONTAL DATUM: Mississippi State Plane East, NAD83, U.S. Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

Proposed Intertidal Reef

-5 Existing Bathymetric Contours (1' Interval)

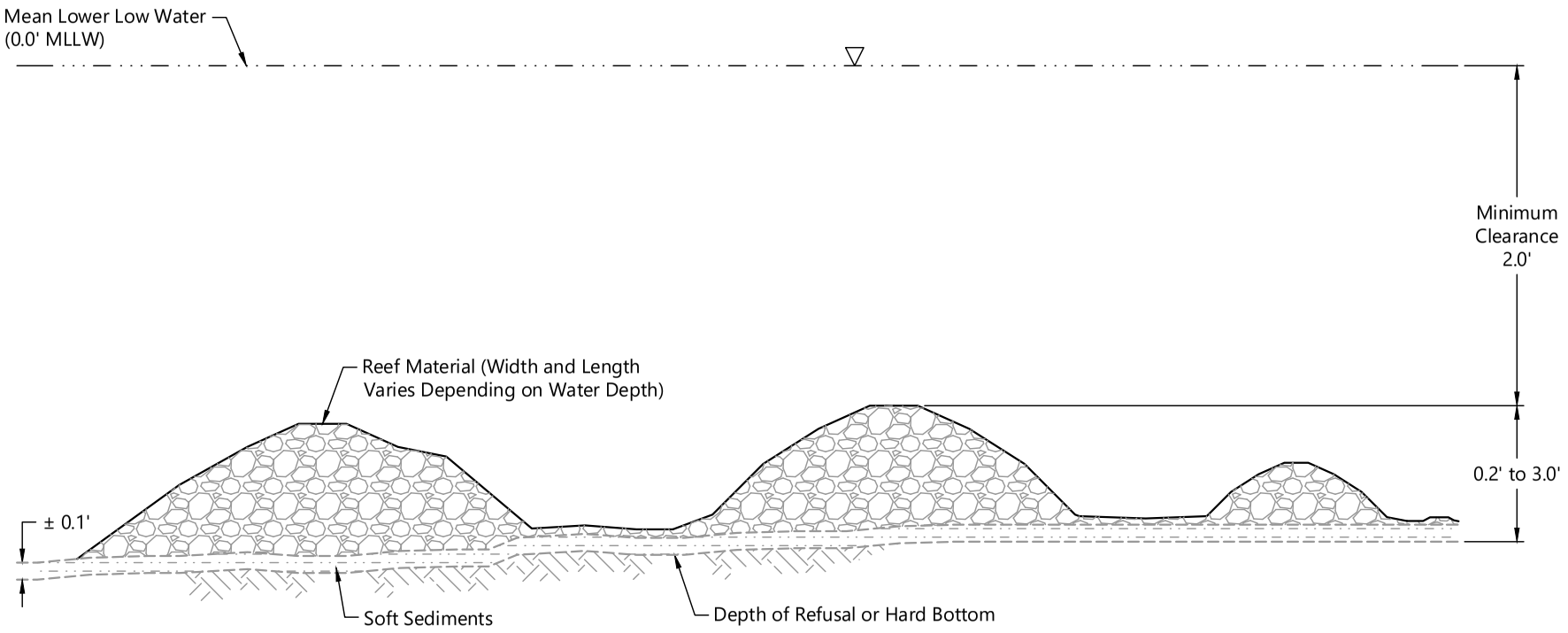
0 500
Feet

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-002 (Grand Bay-Plan).dwg Figure 4

ANCHOR QEA

Figure 4
Bangs Bayou Intertidal Reefs

Basis of Design Report
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project
Mississippi Department of Environmental Quality

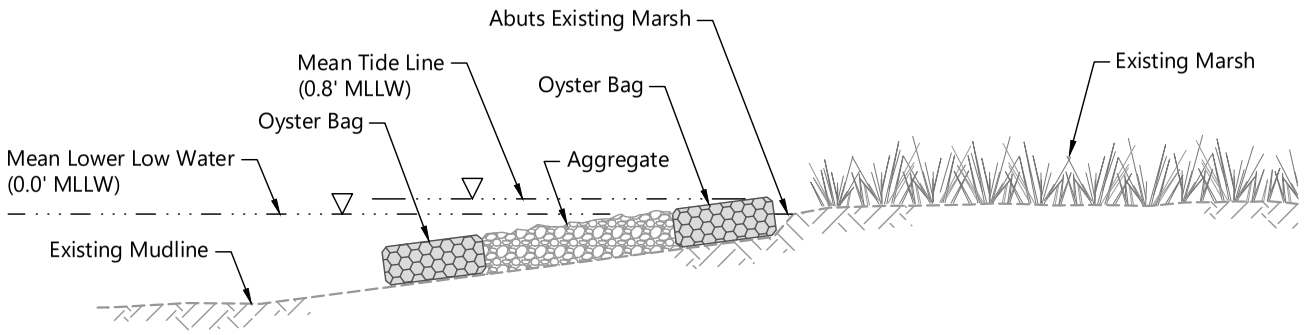


Typical Subtidal Reef Detail
Not to Scale

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-003 (Typical Sections).dwg Figure 5

ANCHOR QEA

Figure 5
Point Aux Chenes Bay Subtidal Reef Typical Ridged Section



Typical Intertidal Reef Detail
Not to Scale

Publish Date: 2020/04/29 3:01 PM | User: dholmer
Filepath: K:\Projects\1232-Mississippi Department of Environmental Quality\Geotechnical, Engineering, Design & Permitting\1232-RP-003 (Typical Sections).dwg Figure 6

ANCHOR QEA

Figure 6
Bangs Bayou Intertidal Reef Typical Section

Basis of Design Report
Restoring Living Shorelines and Reefs in Mississippi Estuaries Project
Mississippi Department of Environmental Quality

Appendix A: Project Bounding Coordinates

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB1-1	101.258'	S37° 14' 22.18"E	0+00.00'	1+01.26'	1102973.92	314339.01	1103035.19	314258.39	30.36381857	88.45688577	30.36359634	88.45669235
BB1-2	94.734'	S41° 39' 50.39"E	1+01.26'	1+95.99'	1103035.19	314258.39	1103098.17	314187.62	30.36359634	88.45669235	30.36340118	88.4564934
BB1-3	316.571'	S47° 12' 34.83"E	1+95.99'	5+12.56'	1103098.17	314187.62	1103330.48	313972.57	30.36340118	88.4564934	30.36280777	88.45575908
BB1-4	325.761'	S50° 36' 43.86"E	5+12.56'	8+38.32'	1103330.48	313972.57	1103582.25	313765.85	30.36280777	88.45575908	30.36223708	88.45496299
BB1-5	162.963'	S74° 04' 31.61"E	8+38.32'	10+01.29'	1103582.25	313765.85	1103738.96	313721.14	30.36223708	88.45496299	30.36211271	88.45446659
BB1-6	245.005'	N83° 24' 00.73"E	10+01.29'	12+46.29'	1103738.96	313721.14	1103982.34	313749.30	30.36211271	88.45446659	30.3621879	88.45369461
BB1-7	207.272'	N84° 06' 36.09"E	12+46.29'	14+53.56'	1103982.34	313749.30	1104188.52	313770.57	30.3621879	88.45369461	30.36224448	88.45304065
BB1-8	94.148'	N13° 33' 04.63"W	14+53.56'	15+47.71'	1104188.52	313770.57	1104166.46	313862.10	30.36224448	88.45304065	30.36249635	88.45310963
BB1-9	289.397'	S81° 03' 52.86"W	15+47.71'	18+37.11'	1104166.46	313862.10	1103880.57	313817.15	30.36249635	88.45310963	30.36237539	88.45401657
BB1-10	126.194'	S83° 59' 57.95"W	18+37.11'	19+63.30'	1103880.57	313817.15	1103755.07	313803.96	30.36237539	88.45401657	30.36234028	88.45441463
BB1-11	49.288'	N77° 46' 12.50"W	19+63.30'	20+12.59'	1103755.07	313803.96	1103706.90	313814.40	30.36234028	88.45441463	30.36236942	88.45456725
BB1-12	82.846'	S84° 26' 26.26"W	20+12.59'	20+95.44'	1103706.90	313814.40	1103624.45	313806.37	30.36236942	88.45456725	30.3623481	88.45482876
BB1-13	330.344'	N51° 47' 00.15"W	20+95.44'	24+25.78'	1103624.45	313806.37	1103364.90	314010.73	30.3623481	88.45482876	30.36291238	88.45564955
BB1-14	392.909'	N45° 17' 21.29"W	24+25.78'	28+18.69'	1103364.90	314010.73	1103085.68	314287.16	30.36291238	88.45564955	30.36367499	88.45653195
BB1-15	101.552'	N29° 10' 50.84"W	28+18.69'	29+20.24'	1103085.68	314287.16	1103036.16	314375.82	30.36367499	88.45653195	30.36391921	88.45668803
BB1-16	72.317'	S59° 23' 54.01"W	29+20.24'	0+00.00'	1103036.16	314375.82	1102973.92	314339.01	30.36391921	88.45668803	30.36381857	88.45688577

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB2-1	163.961'	S77° 07' 35.28"E	0+00.00'	1+63.96'	1103036.65	313409.08	1103196.49	313372.55	30.36126112	88.45669667	30.36115922	88.45619026
BB2-2	253.885'	S69° 30' 28.91"E	1+63.96'	4+17.85'	1103196.49	313372.55	1103434.31	313283.67	30.36115922	88.45619026	30.36091267	88.45543715
BB2-3	253.590'	S84° 47' 14.62"E	4+17.85'	6+71.44'	1103434.31	313283.67	1103686.85	313260.63	30.36091267	88.45543715	30.360847	88.45463669
BB2-4	55.077'	N10° 05' 28.17"W	6+71.44'	7+26.51'	1103686.85	313260.63	1103677.20	313314.85	30.360847	88.45463669	30.36099617	88.45466671
BB2-5	190.818'	N83° 21' 53.50"W	7+26.51'	9+17.33'	1103677.20	313314.85	1103487.66	313336.90	30.36099617	88.45466671	30.36105853	88.45526744
BB2-6	210.181'	N73° 26' 05.26"W	9+17.33'	11+27.51'	1103487.66	313336.90	1103286.20	313396.83	30.36105853	88.45526744	30.36122516	88.45590556
BB2-7	216.334'	N73° 13' 05.07"W	11+27.51'	13+43.85'	1103286.20	313396.83	1103079.08	313459.29	30.36122516	88.45590556	30.36139879	88.45656161
BB2-8	65.739'	S40° 12' 04.19"W	13+43.85'	0+00.00'	1103079.08	313459.29	1103036.65	313409.08	30.36139879	88.45656161	30.36126112	88.45669667

No.	Number	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB3-1	1.00	69.965'	S81° 53' 47.03"E	0+00.00'	0+69.96'	1104319.49	313797.60	1104388.76	313787.74	30.36231759	88.4526251	30.36228984	88.45240558
BB3-2	2.00	138.104'	N85° 58' 55.36"E	0+69.96'	2+08.07'	1104388.76	313787.74	1104526.52	313797.41	30.36228984	88.45240558	30.36231515	88.45196868
BB3-3	3.00	130.154'	N70° 54' 36.53"E	2+08.07'	3+38.22'	1104526.52	313797.41	1104649.52	313839.98	30.36231515	88.45196868	30.36243106	88.45157823
BB3-4	4.00	280.187'	N77° 58' 22.53"E	3+38.22'	6+18.41'	1104649.52	313839.98	1104923.56	313898.36	30.36243106	88.45157823	30.36258904	88.45070872
BB3-5	5.00	172.124'	N77° 57' 16.88"E	6+18.41'	7+90.53'	1104923.56	313898.36	1105091.89	313934.28	30.36258904	88.45070872	30.36268624	88.45017461
BB3-6	6.00	97.347'	N46° 50' 58.87"E	7+90.53'	8+87.88'	1105091.89	313934.28	1105162.91	314000.86	30.36268624	88.45017461	30.36286864	88.44994871
BB3-7	7.00	78.278'	N66° 23' 17.08"W	8+87.88'	9+66.16'	1105162.91	314000.86	1105091.19	314032.21	30.36286864	88.44994871	30.36295551	88.45017578
BB3-8	8.00	65.250'	S44° 47' 59.51"W	9+66.16'	10+31.41'	1105091.19	314032.21	1105045.21	313985.91	30.36295551	88.45017578	30.36282863	88.45032207
BB3-9	9.00	78.623'	S88° 27' 27.13"W	10+31.41'	11+10.03'	1105045.21	313985.91	1104966.62	313983.80	30.36282863	88.45032207	30.36282356	88.45057127
BB3-10	10.00	227.280'	S79° 01' 35.54"W	11+10.03'	13+37.31'	1104966.62	313983.80	1104743.49	313940.53	30.36282356	88.45057127	30.36270666	88.45127921
BB3-11	11.00	257.274'	S71° 11' 34.29"W	13+37.31'	15+94.59'	1104743.49	313940.53	1104499.95	313857.59	30.36270666	88.45127921	30.36248087	88.45205228
BB3-12	12.00	89.490'	S79° 38' 46.99"W	15+94.59'	16+84.08'	1104499.95	313857.59	1104411.92	313841.51	30.36248087	88.45205228	30.36243747	88.45233157
BB3-13	13.00	75.974'	N84° 15' 09.88"W	16+84.08'	17+60.05'	1104411.92	313841.51	1104336.33	313849.12	30.36243747	88.45233157	30.36245909	88.45257116
BB3-14	14.00	54.201'	S18° 05' 49.46"W	17+60.05'	0+00.00'	1104336.33	313849.12	1104319.49	313797.60	30.36245909	88.45257116	30.36231759	88.4526251

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB4-1	342.578'	N89° 46' 10.53"E	0+00.00'	3+42.58'	1103785.70	313249.73	1104128.27	313251.11	30.36081612	88.45432339	30.36081676	88.45323721
BB4-2	311.908'	N88° 56' 45.71"E	3+42.58'	6+54.49'	1104128.27	313251.11	1104440.13	313256.84	30.36081676	88.45323721	30.36082964	88.45224836
BB4-3	74.987'	N20° 46' 05.03"W	6+54.49'	7+29.47'	1104440.13	313256.84	1104413.54	313326.96	30.36082964	88.45224836	30.36102268	88.45233192
BB4-4	333.955'	S88° 26' 00.98"W	7+29.47'	10+63.43'	1104413.54	313326.96	1104079.71	313317.83	30.36102268	88.45233192	30.36100066	88.45339047
BB4-5	331.424'	S89° 49' 41.81"W	10+63.43'	13+94.85'	1104079.71	313317.83	1103748.29	313316.84	30.36100066	88.45339047	30.36100099	88.45444129
BB4-6	76.832'	S29° 08' 20.44"E	13+94.85'	0+00.00'	1103748.29	313316.84	1103785.70	313249.73	30.36100099	88.45444129	30.36081612	88.45432339

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB5-1	342.698'	S73° 10' 18.86"E	0+00.00'	3+42.70'	1105258.89	313926.33	1105586.92	313827.12	30.36266283	88.44964519	30.36238699	88.44860618
BB5-2	164.376'	S80° 58' 57.99"E	3+42.70'	5+07.07'	1105586.92	313827.12	1105749.26	313801.36	30.36238699	88.44860618	30.36231465	88.44809173
BB5-3	196.297'	N89° 48' 52.04"	5+07.07'	7+03.37'	1105749.26	313801.36	1105945.56	313801.99	30.36231465	88.44809173	30.36231454	88.44746932
BB5-4	72.408'	N27° 07' 25.98"	7+03.37'	7+75.78'	1105945.56	313801.99	1105978.57	313866.44	30.36231454	88.44746932	30.36249144	88.44736396
BB5-5	155.744'	N76° 17' 13.85"W	7+75.78'	9+31.52'	1105978.57	313866.44	1105827.26	313903.36	30.36249144	88.44736396	30.36259437	88.44784332
BB5-6	31.859'	N10° 10' 57.73"W	9+31.52'	9+63.38'	1105827.26	313903.36	1105821.63	313934.71	30.36259437	88.44784332	30.36268062	88.44786083
BB5-7	34.848'	N56° 19' 46.42"W	9+63.38'	9+98.23'	1105821.63	313934.71	1105792.63	313954.04	30.36268062	88.44786083	30.36273404	88.44795257
BB5-8	77.477'	S36° 31' 10.34"W	9+98.23'	10+75.71'	1105792.63	313954.04	1105746.52	313891.77	30.36273404	88.44795257	30.36256326	88.44809944
BB5-9	69.011'	S56° 33' 19.06"W	10+75.71'	11+44.72'	1105746.52	313891.77	1105688.94	313853.74	30.36256326	88.44809944	30.36245923	88.44828242
BB5-10	153.342'	N60° 27' 01.08"W	11+44.72'	12+98.06'	1105688.94	313853.74	1105555.54	313929.36	30.36245923	88.44828242	30.36266839	88.44870458
BB5-11	115.373'	N44° 17' 22.56"W	12+98.06'	14+13.43'	1105555.54	313929.36	1105474.98	314011.95	30.36266839	88.44870458	30.36289623	88.44895912
BB5-12	86.757'	S47° 06' 44.60"W	14+13.43'	15+00.19'	1105474.98	314011.95	1105411.41	313952.90	30.36289623	88.44895912	30.36273446	88.44916131
BB5-13	119.988'	N65° 13' 10.13"W	15+00.19'	16+20.18'	1105411.41	313952.90	1105302.47	314003.20	30.36273446	88.44916131	30.36287378	88.44950619
BB5-14	88.361'	S29° 33' 10.05"W	16+20.18'	0+00.00'	1105302.47	314003.20	1105258.89	313926.33	30.36287378	88.44950619	30.36266283	88.44964519

No.	Length	Direction	Start Statio	End Statior	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
BB6-1	123.818'	N60° 52' 47.46"E	0+00.00'	1+23.82'	1104671.30	313298.47	1104779.46	313358.73	30.36094196	88.45151496	30.36110665	88.45117138
BB6-2	174.977'	N74° 01' 54.73"E	1+23.82'	2+98.80'	1104779.46	313358.73	1104947.69	313406.87	30.36110665	88.45117138	30.36123745	88.45063747
BB6-3	197.482'	N78° 52' 24.36"E	2+98.80'	4+96.28'	1104947.69	313406.87	1105141.46	313444.97	30.36123745	88.45063747	30.36134041	88.45002269
BB6-4	129.462'	S66° 39' 00.07"E	4+96.28'	6+25.74'	1105141.46	313444.97	1105260.32	313393.66	30.36134041	88.45002269	30.36119822	88.44964637
BB6-5	129.441'	S49° 14' 12.66"E	6+25.74'	7+55.18'	1105260.32	313393.66	1105358.36	313309.15	30.36119822	88.44964637	30.36096495	88.44933643
BB6-6	73.020'	N77° 36' 37.96"E	7+55.18'	8+28.20'	1105358.36	313309.15	1105429.68	313324.81	30.36096495	88.44933643	30.36100734	88.44911014
BB6-7	208.949'	N49° 53' 50.08"W	8+28.20'	10+37.15'	1105429.68	313324.81	1105269.85	313459.41	30.36100734	88.44911014	30.36137891	88.44961545
BB6-8	117.374'	N56° 02' 58.93"W	10+37.15'	11+54.52'	1105269.85	313459.41	1105172.49	313524.96	30.36137891	88.44961545	30.36156005	88.44992344
BB6-9	186.266'	S89° 15' 50.33"W	11+54.52'	13+40.79'	1105172.49	313524.96	1104986.24	313522.57	30.36156005	88.44992344	30.36155521	88.450514
BB6-10	213.071'	S75° 53' 14.07"W	13+40.79'	15+53.86'	1104986.24	313522.57	1104779.60	313470.61	30.36155521	88.450514	30.36141426	88.45116974
BB6-11	159.421'	S57° 35' 24.89"W	15+53.86'	17+13.28'	1104779.60	313470.61	1104645.01	313385.17	30.36141426	88.45116974	30.36118059	88.45159739
BB6-12	90.593'	S16° 51' 59.61"E	17+13.28'	0+00.00'	1104645.01	313385.17	1104671.30	313298.47	30.36118059	88.45159739	30.36094196	88.45151496

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
PAC1-1	202.237'	S06° 24' 46.61"W	0+00.00'	2+02.24'	1105458.71	312016.35	1105436.12	311815.37	30.35740942	88.44903216	30.35685703	88.44910594
PAC1-2	438.139'	S21° 35' 11.28"W	2+02.24'	6+40.38'	1105436.12	311815.37	1105274.92	311407.96	30.35685703	88.44910594	30.35573834	88.44962139
PAC1-3	507.819'	S08° 28' 28.51"W	6+40.38'	11+48.20'	1105274.92	311407.96	1105200.09	310905.69	30.35573834	88.44962139	30.35435803	88.44986403
PAC1-4	246.900'	S10° 14' 27.75"E	11+48.20'	13+95.09'	1105200.09	310905.69	1105243.98	310662.72	30.35435803	88.44986403	30.35368957	88.44972748
PAC1-5	241.217'	S06° 48' 49.93"E	13+95.09'	16+36.31'	1105243.98	310662.72	1105272.60	310423.21	30.35368957	88.44972748	30.35303076	88.44963932
PAC1-6	130.159'	S33° 01' 56.56"E	16+36.31'	17+66.47'	1105272.60	310423.21	1105343.55	310314.09	30.35303076	88.44963932	30.35273007	88.44941555
PAC1-7	105.636'	S63° 15' 09.66"E	17+66.47'	18+72.11'	1105343.55	310314.09	1105437.88	310266.55	30.35273007	88.44941555	30.35259848	88.449117
PAC1-8	135.053'	S41° 20' 48.89"E	18+72.11'	20+07.16'	1105437.88	310266.55	1105527.10	310165.16	30.35259848	88.449117	30.35231887	88.44883523
PAC1-9	151.602'	S03° 27' 20.97"E	20+07.16'	21+58.76'	1105527.10	310165.16	1105536.24	310013.83	30.35231887	88.44883523	30.3519027	88.44880788
PAC1-10	212.460'	S89° 43' 27.38"E	21+58.76'	23+71.22'	1105536.24	310013.83	1105748.70	310012.81	30.3519027	88.44880788	30.35189791	88.44813432
PAC1-11	109.752'	N05° 16' 38.77"W	23+71.22'	24+80.97'	1105748.70	310012.81	1105738.60	310122.10	30.35189791	88.44813432	30.3521985	88.44816516
PAC1-12	79.848'	N05° 18' 13.37"E	24+80.97'	25+60.82'	1105738.60	310122.10	1105745.99	310201.61	30.3521985	88.44816516	30.35241705	88.44814088
PAC1-13	293.481'	N28° 11' 43.31"W	25+60.82'	28+54.30'	1105745.99	310201.61	1105607.32	310460.26	30.35241705	88.44814088	30.35312951	88.44857773
PAC1-14	270.825'	N27° 52' 49.16"W	28+54.30'	31+25.13'	1105607.32	310460.26	1105480.68	310699.65	30.35312951	88.44857773	30.3537889	88.44897665
PAC1-15	356.693'	N05° 15' 35.95"W	31+25.13'	34+81.82'	1105480.68	310699.65	1105447.98	311054.84	30.3537889	88.44897665	30.35476581	88.44907651
PAC1-16	401.783'	N12° 23' 36.17"E	34+81.82'	38+83.60'	1105447.98	311054.84	1105534.21	311447.26	30.35476581	88.44907651	30.35584398	88.4487989
PAC1-17	545.812'	N23° 42' 53.15"E	38+83.60'	44+29.42'	1105534.21	311447.26	1105753.72	311946.99	30.35584398	88.4487989	30.35721596	88.44809757
PAC1-18	303.063'	N76° 46' 11.12"W	44+29.42'	0+00.00'	1105753.72	311946.99	1105458.71	312016.35	30.35721596	88.44809757	30.35740942	88.44903216

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
PAC2-1	82.393'	S12° 39' 09.16"E	0+00.00'	0+82.39'	1105651.80	309820.48	1105669.85	309740.09	30.35137	88.4484436	30.35114879	88.44838724
PAC2-2	173.029'	S07° 51' 21.19"W	0+82.39'	2+55.42'	1105669.85	309740.09	1105646.20	309568.68	30.35114879	88.44838724	30.35067772	88.44846406
PAC2-3	142.809'	S06° 37' 33.62"E	2+55.42'	3+98.23'	1105646.20	309568.68	1105662.68	309426.83	30.35067772	88.44846406	30.35028754	88.44841334
PAC2-4	124.944'	S41° 24' 48.95"E	3+98.23'	5+23.18'	1105662.68	309426.83	1105745.33	309333.13	30.35028754	88.44841334	30.35002914	88.44815233
PAC2-5	81.077'	S06° 36' 18.01"E	5+23.18'	6+04.25'	1105745.33	309333.13	1105754.65	309252.59	30.35002914	88.44815233	30.3498076	88.44812365
PAC2-6	272.289'	S31° 45' 43.14"E	6+04.25'	8+76.54'	1105754.65	309252.59	1105897.98	309021.08	30.3498076	88.44812365	30.34916972	88.44767175
PAC2-7	68.978'	S09° 14' 06.03"E	8+76.54'	9+45.52'	1105897.98	309021.08	1105909.05	308952.99	30.34916972	88.44767175	30.3489824	88.44763739
PAC2-8	99.216'	S00° 01' 40.23"E	9+45.52'	10+44.73'	1105909.05	308952.99	1105909.10	308853.78	30.3489824	88.44763739	30.34870962	88.4476383
PAC2-9	76.781'	S18° 08' 55.98"E	10+44.73'	11+21.52'	1105909.10	308853.78	1105933.02	308780.82	30.34870962	88.4476383	30.34850879	88.44756325
PAC2-10	41.944'	S48° 16' 26.24"E	11+21.52'	11+63.46'	1105933.02	308780.82	1105964.32	308752.90	30.34850879	88.44756325	30.34843173	88.44746433
PAC2-11	76.490'	S19° 16' 24.87"E	11+63.46'	12+39.95'	1105964.32	308752.90	1105989.57	308680.70	30.34843173	88.44746433	30.34823298	88.44738506
PAC2-12	128.263'	N56° 11' 36.10"E	12+39.95'	13+68.21'	1105989.57	308680.70	1106096.14	308752.06	30.34823298	88.44738506	30.34842819	88.44704644
PAC2-13	247.627'	N08° 43' 07.67"W	13+68.21'	16+15.84'	1106096.14	308752.06	1106058.61	308996.83	30.34842819	88.44704644	30.34910154	88.44716277
PAC2-14	386.398'	N23° 47' 09.64"W	16+15.84'	20+02.24'	1106058.61	308996.83	1105902.77	309350.40	30.34910154	88.44716277	30.35007515	88.44765301
PAC2-15	252.679'	N20° 35' 21.93"W	20+02.24'	22+54.92'	1105902.77	309350.40	1105813.91	309586.94	30.35007515	88.44765301	30.35072636	88.44793217
PAC2-16	286.745'	N05° 56' 26.74"W	22+54.92'	25+41.66'	1105813.91	309586.94	1105784.23	309872.15	30.35072636	88.44793217	30.35151083	88.44802319
PAC2-17	142.149'	S68° 41' 14.33"W	25+41.66'	0+00.00'	1105784.23	309872.15	1105651.80	309820.48	30.35151083	88.44802319	30.35137	88.4484436

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
PAC3-1	105.382'	S29° 26' 45.76"E	0+00.00'	1+05.38'	1106245.08	308055.42	1106296.88	307963.66	30.34651135	88.4465818	30.34625857	88.44641857
PAC3-2	177.133'	S08° 21' 09.07"E	1+05.38'	2+82.52'	1106296.88	307963.66	1106322.62	307788.40	30.34625857	88.44641857	30.34577644	88.44633887
PAC3-3	166.092'	S06° 15' 15.44"W	2+82.52'	4+48.61'	1106322.62	307788.40	1106304.52	307623.30	30.34577644	88.44633887	30.34532267	88.44639803
PAC3-4	115.759'	S13° 25' 57.14"E	4+48.61'	5+64.37'	1106304.52	307623.30	1106331.41	307510.71	30.34532267	88.44639803	30.34501284	88.44631401
PAC3-5	155.153'	S01° 57' 31.51"E	5+64.37'	7+19.52'	1106331.41	307510.71	1106336.72	307355.64	30.34501284	88.44631401	30.34458642	88.44629885
PAC3-6	96.372'	S08° 04' 59.47"W	7+19.52'	8+15.89'	1106336.72	307355.64	1106323.16	307260.23	30.34458642	88.44629885	30.34432422	88.44634287
PAC3-7	114.991'	S22° 35' 36.36"W	8+15.89'	9+30.88'	1106323.16	307260.23	1106278.99	307154.06	30.34432422	88.44634287	30.34403271	88.44648404
PAC3-8	291.985'	S12° 47' 21.95"W	9+30.88'	12+22.87'	1106278.99	307154.06	1106214.35	306869.32	30.34403271	88.44648404	30.34325042	88.44669203
PAC3-9	247.491'	S35° 47' 42.83"W	12+22.87'	14+70.36'	1106214.35	306869.32	1106069.59	306668.58	30.34325042	88.44669203	30.34269983	88.4471531
PAC3-10	281.274'	S19° 43' 32.62"E	14+70.36'	17+51.63'	1106069.59	306668.58	1106164.53	306403.81	30.34269983	88.4471531	30.34197095	88.44685499
PAC3-11	85.081'	S21° 15' 31.68"W	17+51.63'	18+36.71'	1106164.53	306403.81	1106133.68	306324.52	30.34197095	88.44685499	30.34175322	88.44695365
PAC3-12	257.900'	N89° 34' 53.18"E	18+36.71'	20+94.61'	1106133.68	306324.52	1106391.57	306326.40	30.34175322	88.44695365	30.34175597	88.44613611
PAC3-13	648.693'	N18° 39' 43.72"E	20+94.61'	27+43.31'	1106391.57	306326.40	1106599.15	306940.99	30.34175597	88.44613611	30.34344386	88.44547142
PAC3-14	600.255'	N07° 05' 05.67"E	27+43.31'	33+43.56'	1106599.15	306940.99	1106673.18	307536.66	30.34344386	88.44547142	30.34508098	88.44523028
PAC3-15	677.239'	N03° 28' 12.47"W	33+43.56'	40+20.80'	1106673.18	307536.66	1106632.19	308212.66	30.34508098	88.44523028	30.34694005	88.44535289
PAC3-16	417.826'	S67° 53' 40.17"W	40+20.80'	0+00.00'	1106632.19	308212.66	1106245.08	308055.42	30.34694005	88.44535289	30.34651135	88.4465818

No.	Length	Direction	Start Station	End Station	Start Point (MS83EF)		End Point (MS83EF)		Start Point (North Lat., West Long.)		End Point (North Lat., West Long.)	
PAC-1	123.462'	S29° 44' 06.18"W	0+00.00'	1+23.46'	1106205.82	305586.11	1106144.58	305478.91	30.33972226	88.44673294	30.33942808	88.44692822
PAC-2	64.914'	S06° 15' 07.08"E	1+23.46'	1+88.38'	1106144.58	305478.91	1106151.65	305414.38	30.33942808	88.44692822	30.33925059	88.44690651
PAC-3	155.619'	S09° 40' 53.75"W	1+88.38'	3+43.99'	1106151.65	305414.38	1106125.48	305260.98	30.33925059	88.44690651	30.33882906	88.44699112
PAC-4	430.476'	S22° 58' 11.72"W	3+43.99'	7+74.47'	1106125.48	305260.98	1105957.49	304864.63	30.33882906	88.44699112	30.33774085	88.44752791
PAC-5	232.416'	S30° 28' 57.94"W	7+74.47'	10+06.89'	1105957.49	304864.63	1105839.59	304664.34	30.33774085	88.44752791	30.33719125	88.4479038
PAC-6	218.004'	S39° 23' 34.45"W	10+06.89'	12+24.89'	1105839.59	304664.34	1105701.23	304495.87	30.33719125	88.4479038	30.33672932	88.44834419
PAC-7	300.941'	S34° 39' 52.74"W	12+24.89'	15+25.83'	1105701.23	304495.87	1105530.07	304248.34	30.33672932	88.44834419	30.33605032	88.4488894
PAC-8	216.941'	S40° 29' 18.37"W	15+25.83'	17+42.77'	1105530.07	304248.34	1105389.21	304083.35	30.33605032	88.4488894	30.33559799	88.44933767
PAC-9	210.254'	S50° 30' 48.10"E	17+42.77'	19+53.03'	1105389.21	304083.35	1105551.48	303949.65	30.33559799	88.44933767	30.33522886	88.44882474
PAC-10	359.127'	N37° 35' 10.43"E	19+53.03'	23+12.15'	1105551.48	303949.65	1105770.53	304234.24	30.33522886	88.44882474	30.33600931	88.44812734
PAC-11	275.172'	N34° 10' 19.47"E	23+12.15'	25+87.32'	1105770.53	304234.24	1105925.09	304461.90	30.33600931	88.44812734	30.33663383	88.44763495
PAC-12	289.009'	N35° 29' 23.99"E	25+87.32'	28+76.33'	1105925.09	304461.90	1106092.87	304697.22	30.33663383	88.44763495	30.33727928	88.44710058
PAC-13	278.488'	N24° 55' 39.39"E	28+76.33'	31+54.82'	1106092.87	304697.22	1106210.25	304949.76	30.33727928	88.44710058	30.33797255	88.44672577
PAC-14	351.268'	N18° 04' 28.27"E	31+54.82'	35+06.09'	1106210.25	304949.76	1106319.23	305283.70	30.33797255	88.44672577	30.33888971	88.44637671
PAC-15	260.410'	N13° 13' 47.98"E	35+06.09'	37+66.50'	1106319.23	305283.70	1106378.83	305537.20	30.33888971	88.44637671	30.33958616	88.44618504
PAC-16	179.795'	N74° 12' 43.45"W	37+66.50'	0+00.00'	1106378.83	305537.20	1106205.82	305586.11	30.33958616	88.44618504	30.33972226	88.44673294