

PCCA – Corpus Christi Ship Channel Deepening Project  
Upland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 73: UD08BPH Bearing: South Date: 10/18/21



Picture 74: UD08BPH Bearing: N/A Date: 10/18/21



Picture 75: UD08BPH Bearing: West Date: 10/18/21



Picture 76: UD08KNT Bearing: Northeast Date: 10/18/21



Picture 77: UD08KNT Bearing: Northwest Date: 10/18/21



Picture 78: UD08KNT Bearing: Southeast Date: 10/18/21



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Picture 79: UD08KNT Bearing: N/A Date: 10/18/21



Picture 80: UD08KNT Bearing: Southwest Date: 10/18/21



Picture 81: UD09BPH Bearing: East Date: 10/18/21



Picture 82: UD09BPH Bearing: North Date: 10/18/21



Picture 83: UD09BPH Bearing: South Date: 10/18/21



Picture 84: UD09BPH Bearing: N/A Date: 10/18/21



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Picture 85: UD09BPH Bearing: West Date: 10/18/21



Picture 86: UD09KNT Bearing: Northeast Date: 10/18/21



Picture 87: UD09KNT Bearing: Northwest Date: 10/18/21



Picture 88: UD09KNT Bearing: Southeast Date: 10/18/21



Picture 89: UD09KNT Bearing: N/A Date: 10/18/21



Picture 90: UD09KNT Bearing: Southwest Date: 10/18/21



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*Picture 91: UD10BPH Bearing: East Date: 10/19/21*



*Picture 92: UD10BPH Bearing: North Date: 10/19/21*



*Picture 93: UD10BPH Bearing: South Date: 10/19/21*



*Picture 94: UD10BPH Bearing: N/A Date: 10/19/21*



*Picture 95: UD10BPH Bearing: West Date: 10/19/21*



*Picture 96: UD10KNT Bearing: Northeast Date: 10/18/21*



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Picture 97: UD10KNT Bearing: Northwest Date: 10/18/21



Picture 98: UD10KNT Bearing: Southeast Date: 10/18/21



Picture 99: UD10KNT Bearing: N/A Date: 10/18/21



Picture 100: UD10KNT Bearing: Southwest Date: 10/18/21



Picture 101: UD11BPH Bearing: East Date: 10/19/21



Picture 102: UD11BPH Bearing: North Date: 10/19/21



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Picture 103: UD11BPH Bearing: South Date: 10/19/21



Picture 104: UD11BPH Bearing: N/A Date: 10/19/21



Picture 105: UD11BPH Bearing: West Date: 10/19/21



Picture 106: UD11KNT Bearing: Northeast Date: 10/18/21



Picture 107: UD11KNT Bearing: Northwest Date: 10/18/21



Picture 108: UD11KNT Bearing: Southeast Date: 10/18/21



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Picture 109: UD11KNT Bearing: N/A Date: 10/18/21



Picture 110: UD11KNT Bearing: Southwest Date: 10/18/21



Picture 111: UD12BPH Bearing: East Date: 10/19/21



Picture 112: UD12BPH Bearing: North Date: 10/19/21



Picture 113: UD12BPH Bearing: South Date: 10/19/21



Picture 114: UD12BPH Bearing: N/A Date: 10/19/21



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Picture 115: UD12BPH Bearing: West Date: 10/19/21



Picture 116: UD12KNT Bearing: Northeast Date: 10/18/21



Picture 117: UD12KNT Bearing: Northwest Date: 10/18/21



Picture 118: UD12KNT Bearing: Southeast Date: 10/18/21



Picture 119: UD12KNT Bearing: N/A Date: 10/18/21



Picture 120: UD12KNT Bearing: Southwest Date: 10/18/21



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Picture 121: UD13BPH Bearing: East Date: 10/20/21



Picture 122: UD13BPH Bearing: North Date: 10/20/21



Picture 123: UD13BPH Bearing: South Date: 10/20/21



Picture 124: UD13BPH Bearing: N/A Date: 10/20/21



Picture 125: UD13BPH Bearing: West Date: 10/20/21



Picture 126: UD13KNT Bearing: Northeast Date: 10/18/21



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Picture 127: UD13KNT Bearing: Northwest Date: 10/18/21



Picture 128: UD13KNT Bearing: Southeast Date: 10/18/21



Picture 129: UD13KNT Bearing: N/A Date: 10/18/21



Picture 130: UD13KNT Bearing: Southwest Date: 10/18/21



Picture 131: UD14BPH Bearing: East Date: 10/20/21



Picture 132: UD14BPH Bearing: North Date: 10/20/21



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Picture 133: UD14BPH Bearing: South Date: 10/20/21



Picture 134: UD14BPH Bearing: N/A Date: 10/20/21



Picture 135: UD14BPH Bearing: West Date: 10/20/21



Picture 136: UD15BPH Bearing: East Date: 10/20/21



Picture 137: UD15BPH Bearing: North Date: 10/20/21



Picture 138: UD15BPH Bearing: South Date: 10/20/21



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Picture 139: UD15BPH Bearing: N/A Date: 10/20/21



Picture 140: UD15BPH Bearing: West Date: 10/20/21



Picture 141: UD16BPH Bearing: East Date: 10/20/21



Picture 142: UD16BPH Bearing: North Date: 10/20/21



Picture 143: UD16BPH Bearing: South Date: 10/20/21



Picture 144: UD16BPH Bearing: N/A Date: 10/20/21



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Picture 145: UD16BPH Bearing: West Date: 10/20/21



Picture 146: UD17BPH Bearing: East Date: 10/20/21



Picture 147: UD17BPH Bearing: North Date: 10/20/21



Picture 148: UD17BPH Bearing: South Date: 10/20/21



Picture 149: UD17BPH Bearing: N/A Date: 10/20/21



Picture 150: UD17BPH Bearing: West Date: 10/20/21



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Picture 151: UD18BPH Bearing: East Date: 10/20/21



Picture 152: UD18BPH Bearing: North Date: 10/20/21



Picture 153: UD18BPH Bearing: South Date: 10/20/21



Picture 154: UD18BPH Bearing: N/A Date: 10/20/21



Picture 155: UD18BPH Bearing: West Date: 10/20/21



Picture 156: UD19BPH Bearing: East Date: 10/20/21



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Picture 157: UD19BPH Bearing: North Date: 10/20/21



Picture 158: UD19BPH Bearing: South Date: 10/20/21



Picture 159: UD19BPH Bearing: N/A Date: 10/20/21



Picture 160: UD19BPH Bearing: West Date: 10/20/21



Picture 161: UD20BPH Bearing: East Date: 10/20/21



Picture 162: UD20BPH Bearing: North Date: 10/20/21



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Picture 163: UD20BPH Bearing: South Date: 10/20/21



Picture 164: UD20BPH Bearing: N/A Date: 10/20/21



Picture 165: UD20BPH Bearing: West Date: 10/20/21



Picture 166: UD21BPH Bearing: East Date: 11/11/21



Picture 167: UD21BPH Bearing: North Date: 11/11/21



Picture 168: UD21BPH Bearing: South Date: 11/11/21



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Picture 169: UD21BPH Bearing: N/A Date: 11/11/21



Picture 170: UD21BPH Bearing: West Date: 11/11/21



Picture 171: UD22BPH Bearing: East Date: 10/21/21



Picture 172: UD22BPH Bearing: North Date: 10/21/21



Picture 173: UD22BPH Bearing: South Date: 10/21/21



Picture 174: UD22BPH Bearing: N/A Date: 10/21/21



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Picture 175: UD22BPH Bearing: West Date: 10/21/21



Picture 176: UD23BPH Bearing: East Date: 10/21/21



Picture 177: UD23BPH Bearing: North Date: 10/21/21



Picture 178: UD23BPH Bearing: South Date: 10/21/21



Picture 179: UD23BPH Bearing: N/A Date: 10/21/21



Picture 180: UD23BPH Bearing: West Date: 10/21/21



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Picture 181: UD24BPH Bearing: East Date: 10/21/21



Picture 182: UD24BPH Bearing: North Date: 10/21/21



Picture 183: UD24BPH Bearing: South Date: 10/21/21



Picture 184: UD24BPH Bearing: N/A Date: 10/21/21



Picture 185: UD24BPH Bearing: West Date: 10/21/21



Picture 186: UD25BPH Bearing: East Date: 10/21/21



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Picture 187: UD25BPH Bearing: North Date: 10/21/21



Picture 188: UD25BPH Bearing: South Date: 10/21/21



Picture 189: UD25BPH Bearing: N/A Date: 10/21/21



Picture 190: UD25BPH Bearing: West Date: 10/21/21



Picture 191: UD26BPH Bearing: East Date: 10/21/21



Picture 192: UD26BPH Bearing: North Date: 10/21/21



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Picture 193: UD26BPH Bearing: South Date: 10/21/21



Picture 194: UD26BPH Bearing: N/A Date: 10/21/21



Picture 195: UD26BPH Bearing: West Date: 10/21/21



Picture 196: UD27BPH Bearing: East Date: 10/21/21



Picture 197: UD27BPH Bearing: North Date: 10/21/21



Picture 198: UD27BPH Bearing: South Date: 10/21/21



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Picture 199: UD27BPH Bearing: N/A Date: 10/21/21



Picture 200: UD27BPH Bearing: West Date: 10/21/21



Picture 201: UD28BPH Bearing: East Date: 10/18/21



Picture 202: UD28BPH Bearing: North Date: 10/18/21



Picture 203: UD28BPH Bearing: N/A Date: 10/18/21



Picture 204: UD28BPH Bearing: South Date: 10/18/21



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Picture 205: UD28BPH Bearing: West Date: 10/18/21



Picture 206: UD29BPH Bearing: East Date: 10/18/21



Picture 207: UD29BPH Bearing: North Date: 10/18/21



Picture 208: UD29BPH Bearing: N/A Date: 10/18/21



Picture 209: UD29BPH Bearing: South Date: 10/18/21



Picture 210: UD29BPH Bearing: West Date: 10/18/21



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Picture 211: UD30BPH Bearing: East Date: 10/18/21



Picture 212: UD30BPH Bearing: North Date: 10/18/21



Picture 213: UD30BPH Bearing: N/A Date: 10/18/21



Picture 214: UD30BPH Bearing: South Date: 10/18/21



Picture 215: UD30BPH Bearing: West Date: 10/18/21



Picture 216: UD31BPH Bearing: East Date: 10/18/21



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*Picture 217: UD31BPH Bearing: North Date: 10/18/21*



*Picture 218: UD31BPH Bearing: N/A Date: 10/18/21*



*Picture 219: UD31BPH Bearing: South Date: 10/18/21*



*Picture 220: UD31BPH Bearing: West Date: 10/18/21*



*Picture 221: UD32BPH Bearing: East Date: 10/18/21*



*Picture 222: UD32BPH Bearing: North Date: 10/18/21*



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Picture 223: UD32BPH Bearing: N/A Date: 10/18/21



Picture 224: UD32BPH Bearing: South Date: 10/18/21



Picture 225: UD32BPH Bearing: West Date: 10/18/21



Picture 226: UD33BPH Bearing: East Date: 10/18/21



Picture 227: UD33BPH Bearing: North Date: 10/18/21



Picture 228: UD33BPH Bearing: N/A Date: 10/18/21



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Picture 229: UD33BPH Bearing: South Date: 10/18/21



Picture 230: UD33BPH Bearing: West Date: 10/18/21



Picture 231: UD34BPH Bearing: East Date: 10/18/21



Picture 232: UD34BPH Bearing: North Date: 10/18/21



Picture 233: UD34BPH Bearing: N/A Date: 10/18/21



Picture 234: UD34BPH Bearing: South Date: 10/18/21



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Picture 235: UD34BPH Bearing: West Date: 10/18/21



Picture 236: UD35BPH Bearing: East Date: 10/18/21



Picture 237: UD35BPH Bearing: North Date: 10/18/21



Picture 238: UD35BPH Bearing: N/A Date: 10/18/21



Picture 239: UD35BPH Bearing: South Date: 10/18/21



Picture 240: UD35BPH Bearing: West Date: 10/18/21



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Picture 241: UD36BPH Bearing: East Date: 10/18/21



Picture 242: UD36BPH Bearing: North Date: 10/18/21



Picture 243: UD36BPH Bearing: N/A Date: 10/18/21



Picture 244: UD36BPH Bearing: South Date: 10/18/21



Picture 245: UD36BPH Bearing: West Date: 10/18/21



Picture 246: UD37BPH Bearing: East Date: 10/18/21



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Picture 247: UD37BPH Bearing: North Date: 10/18/21



Picture 248: UD37BPH Bearing: N/A Date: 10/18/21



Picture 249: UD37BPH Bearing: South Date: 10/18/21



Picture 250: UD37BPH Bearing: West Date: 10/18/21



Picture 251: UD38BPH Bearing: East Date: 10/18/21



Picture 252: UD38BPH Bearing: North Date: 10/18/21



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Picture 253: UD38BPH Bearing: N/A Date: 10/18/21



Picture 254: UD38BPH Bearing: South Date: 10/18/21



Picture 255: UD38BPH Bearing: West Date: 10/18/21



Picture 256: UD39BPH Bearing: East Date: 10/18/21



Picture 257: UD39BPH Bearing: North Date: 10/18/21



Picture 258: UD39BPH Bearing: N/A Date: 10/18/21



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Picture 259: UD39BPH Bearing: South Date: 10/18/21



Picture 260: UD39BPH Bearing: West Date: 10/18/21



Picture 261: UD40BPH Bearing: East Date: 10/18/21



Picture 262: UD40BPH Bearing: North Date: 10/18/21



Picture 263: UD40BPH Bearing: N/A Date: 10/18/21



Picture 264: UD40BPH Bearing: South Date: 10/18/21



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Picture 265: UD40BPH Bearing: West Date: 10/18/21



Picture 266: UD41BPH Bearing: East Date: 10/18/21



Picture 267: UD41BPH Bearing: North Date: 10/18/21



Picture 268: UD41BPH Bearing: N/A Date: 10/18/21



Picture 269: UD41BPH Bearing: South Date: 10/18/21



Picture 270: UD41BPH Bearing: West Date: 10/18/21



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Picture 271: UD42BPH Bearing: East Date: 10/18/21



Picture 272: UD42BPH Bearing: North Date: 10/18/21



Picture 273: UD42BPH Bearing: N/A Date: 10/18/21



Picture 274: UD42BPH Bearing: South Date: 10/18/21



Picture 275: UD42BPH Bearing: West Date: 10/18/21



Picture 276: UD43BPH Bearing: East Date: 10/18/21



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Picture 277: UD43BPH Bearing: North Date: 10/18/21



Picture 278: UD43BPH Bearing: N/A Date: 10/18/21



Picture 279: UD43BPH Bearing: South Date: 10/18/21



Picture 280: UD43BPH Bearing: West Date: 10/18/21



Picture 281: UD44BPH Bearing: East Date: 10/18/21



Picture 282: UD44BPH Bearing: North Date: 10/18/21



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Picture 283: UD44BPH Bearing: N/A Date: 10/18/21



Picture 284: UD44BPH Bearing: South Date: 10/18/21



Picture 285: UD44BPH Bearing: West Date: 10/18/21



Picture 286: UD45BPH Bearing: East Date: 10/18/21



Picture 287: UD45BPH Bearing: North Date: 10/18/21



Picture 288: UD45BPH Bearing: N/A Date: 10/18/21



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Picture 289: UD45BPH Bearing: South Date: 10/18/21



Picture 290: UD45BPH Bearing: West Date: 10/18/21



Picture 291: UD46BPH Bearing: East Date: 10/18/21



Picture 292: UD46BPH Bearing: North Date: 10/18/21



Picture 293: UD46BPH Bearing: N/A Date: 10/18/21



Picture 294: UD46BPH Bearing: South Date: 10/18/21





*Picture 295: UD46BPH Bearing: West Date: 10/18/21*



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*Picture 1: WD01BPH Bearing: East Date: 10/18/21*



*Picture 2: WD01BPH Bearing: North Date: 10/18/21*



*Picture 3: WD01BPH Bearing: South Date: 10/18/21*



*Picture 4: WD01BPH Bearing: N/A Date: 10/18/21*



*Picture 5: WD01BPH Bearing: West Date: 10/18/21*



*Picture 6: WD01KNT Bearing: Northeast Date: 10/19/21*



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Picture 7: WD01KNT Bearing: Northwest Date: 10/19/21



Picture 8: WD01KNT Bearing: Southeast Date: 10/19/21



Picture 9: WD01KNT Bearing: N/AS Date: 10/19/21



Picture 10: WD01KNT Bearing: Southwest Date: 10/19/21



Picture 11: WD02BPH Bearing: East Date: 10/18/21



Picture 12: WD02BPH Bearing: North Date: 10/18/21



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Picture 13: WD02BPH Bearing: South Date: 10/18/21



Picture 14: WD02BPH Bearing: N/A Date: 10/18/21



Picture 15: WD02BPH Bearing: West Date: 10/18/21



Picture 16: WD02KNT Bearing: Northeast Date: 10/18/21



Picture 17: WD02KNT Bearing: Northwest Date: 10/18/21



Picture 18: WD02KNT Bearing: Southeast Date: 10/18/21



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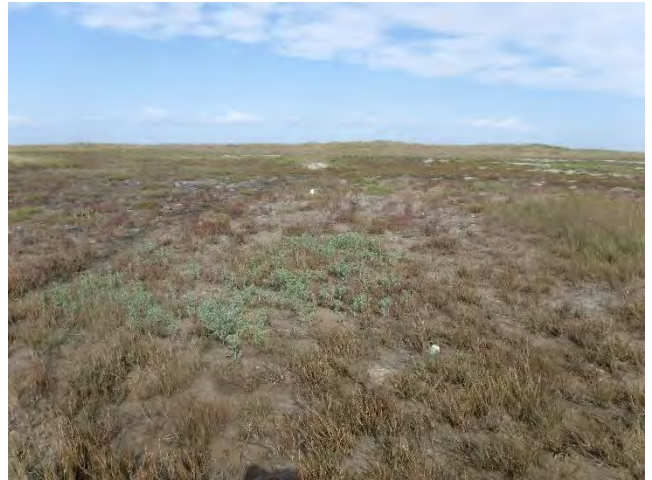
Picture 19: WD02KNT Bearing: N/AS Date: 10/18/21



Picture 20: WD02KNT Bearing: Southwest Date: 10/18/21



Picture 21: WD03BPH Bearing: East Date: 10/20/21



Picture 22: WD03BPH Bearing: North Date: 10/20/21



Picture 23: WD03BPH Bearing: South Date: 10/20/21



Picture 24: WD03BPH Bearing: N/A Date: 10/20/21



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Picture 25: WD03BPH Bearing: West Date: 10/20/21



Picture 26: WD03KNT Bearing: Northeast Date: 10/18/21



Picture 27: WD03KNT Bearing: Northwest Date: 10/18/21



Picture 28: WD03KNT Bearing: Southeast Date: 10/18/21



Picture 29: WD03KNT Bearing: N/AS Date: 10/18/21



Picture 30: WD03KNT Bearing: Southwest Date: 10/18/21



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Picture 31: WD04BPH Bearing: East Date: 11/11/21



Picture 32: WD04BPH Bearing: North Date: 11/11/21



Picture 33: WD04BPH Bearing: South Date: 11/11/21



Picture 34: WD04BPH Bearing: N/A Date: 11/11/21



Picture 35: WD04BPH Bearing: West Date: 11/11/21



Picture 36: WD04KNT Bearing: Northeast Date: 10/18/21



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Picture 37: WD04KNT Bearing: Northwest Date: 10/18/21



Picture 38: WD04KNT Bearing: Southeast Date: 10/18/21



Picture 39: WD04KNT Bearing: N/AS Date: 10/18/21



Picture 40: WD04KNT Bearing: Southwest Date: 10/18/21



Picture 41: WD05BPH Bearing: East Date: 10/20/21



Picture 42: WD05BPH Bearing: North Date: 10/20/21



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Picture 43: WD05BPH Bearing: South Date: 10/20/21



Picture 44: WD05BPH Bearing: N/A Date: 10/20/21



Picture 45: WD05BPH Bearing: West Date: 10/20/21



Picture 46: WD05KNT Bearing: Northeast Date: 10/18/21



Picture 47: WD05KNT Bearing: Northwest Date: 10/18/21



Picture 48: WD05KNT Bearing: Southeast Date: 10/18/21



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Picture 49: WD05KNT Bearing: N/AS Date: 10/18/21



Picture 50: WD05KNT Bearing: Southwest Date: 10/18/21



Picture 51: WD06BPH Bearing: East Date: 11/11/21



Picture 52: WD06BPH Bearing: North Date: 11/11/21



Picture 53: WD06BPH Bearing: South Date: 11/11/21



Picture 54: WD06BPH Bearing: N/A Date: 11/11/21



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Picture 55: WD06BPH Bearing: West Date: 11/11/21



Picture 56: WD06KNT Bearing: Northeast Date: 10/18/21



Picture 57: WD06KNT Bearing: Northwest Date: 10/18/21



Picture 58: WD06KNT Bearing: Southeast Date: 10/18/21



Picture 59: WD06KNT Bearing: N/AS Date: 10/18/21



Picture 60: WD06KNT Bearing: Southwest Date: 10/18/21



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Picture 61: WD07BPH Bearing: East Date: 10/20/21



Picture 62: WD07BPH Bearing: North Date: 10/20/21



Picture 63: WD07BPH Bearing: South Date: 10/20/21



Picture 64: WD07BPH Bearing: N/A Date: 10/20/21



Picture 65: WD07BPH Bearing: West Date: 10/20/21



Picture 66: WD07KNT Bearing: Northeast Date: 10/18/21



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Picture 67: WD07KNT Bearing: Northwest Date: 10/18/21



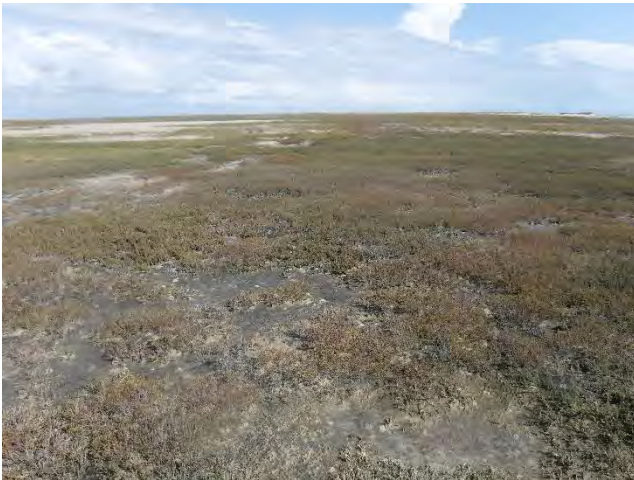
Picture 68: WD07KNT Bearing: Southeast Date: 10/18/21



Picture 69: WD07KNT Bearing: N/AS Date: 10/18/21



Picture 70: WD07KNT Bearing: Southwest Date: 10/18/21



Picture 71: WD08BPH Bearing: East Date: 11/11/21



Picture 72: WD08BPH Bearing: North Date: 11/11/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 73: WD08BPH Bearing: South Date: 11/11/21



Picture 74: WD08BPH Bearing: N/A Date: 11/11/21



Picture 75: WD08BPH Bearing: West Date: 11/11/21



Picture 76: WD09BPH Bearing: East Date: 11/11/21



Picture 77: WD09BPH Bearing: North Date: 11/11/21



Picture 78: WD09BPH Bearing: South Date: 11/11/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 79: WD09BPH Bearing: N/A Date: 11/11/21



Picture 80: WD09BPH Bearing: West Date: 11/11/21



Picture 81: WD10BPH Bearing: East Date: 11/11/21



Picture 82: WD10BPH Bearing: North Date: 11/11/21



Picture 83: WD10BPH Bearing: South Date: 11/11/21



Picture 84: WD10BPH Bearing: N/A Date: 11/11/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 85: WD10BPH Bearing: West Date: 11/11/21



Picture 86: WD11BPH Bearing: East Date: 10/21/21



Picture 87: WD11BPH Bearing: North Date: 10/21/21



Picture 88: WD11BPH Bearing: South Date: 10/21/21



Picture 89: WD11BPH Bearing: N/A Date: 10/21/21



Picture 90: WD11BPH Bearing: West Date: 10/21/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 91: WD12BPH Bearing: East Date: 10/21/21



Picture 92: WD12BPH Bearing: North Date: 10/21/21



Picture 93: WD12BPH Bearing: South Date: 10/21/21



Picture 94: WD12BPH Bearing: N/A Date: 10/21/21



Picture 95: WD12BPH Bearing: West Date: 10/21/21



Picture 96: WD13BPH Bearing: East Date: 10/21/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 97: WD13BPH Bearing: North Date: 10/21/21



Picture 98: WD13BPH Bearing: South Date: 10/21/21



Picture 99: WD13BPH Bearing: N/A Date: 10/21/21



Picture 100: WD13BPH Bearing: West Date: 10/21/21



Picture 101: WD14BPH Bearing: East Date: 10/18/21



Picture 102: WD14BPH Bearing: North Date: 10/18/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 103: WD14BPH Bearing: N/As Date: 10/18/21



Picture 104: WD14BPH Bearing: Southouth Date: 10/18/21



Picture 105: WD14BPH Bearing: Westest Date: 10/18/21



Picture 106: WD15BPH Bearing: Eastast Date: 10/18/21



Picture 107: WD15BPH Bearing: Northorth Date: 10/18/21



Picture 108: WD15BPH Bearing: N/As Date: 10/18/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 109: WD15BPH Bearing: Southouth Date: 10/18/21



Picture 110: WD15BPH Bearing: Westest Date: 10/18/21



Picture 111: WD16BPH Bearing: Eastast Date: 10/18/21



Picture 112: WD16BPH Bearing: Northorth Date: 10/18/21



Picture 113: WD16BPH Bearing: N/As Date: 10/18/21



Picture 114: WD16BPH Bearing: Southouth Date: 10/18/21



PCCA – Corpus Christi Ship Channel Deepening Project  
Wetland Determination Form Plot Locations  
SJI Survey Area Photographs



Picture 115: WD16BPH Bearing: Westest Date: 10/18/21



Picture 116: WD17BPH Bearing: Eastast Date: 10/18/21



Picture 117: WD17BPH Bearing: Northorth Date: 10/18/21



Picture 118: WD17BPH Bearing: N/As Date: 10/18/21



Picture 119: WD17BPH Bearing: Southouth Date: 10/18/21



Picture 120: WD17BPH Bearing: Westest Date: 10/18/21



## **E. Aquatic Resources Survey Workplan and Report**





**Aquatic Survey Plan for the  
Corpus Christi Ship Channel Deepening Project  
SWG-2019-00067  
Prepared for: Port of Corpus Christi Authority  
(PCCA)  
April 20, 2021 (draft)  
April 26, 2021 (rev.)**



## **1.0 Introduction/Background:**

The Port of Corpus Christi Authority (PCCA) is proposing to utilize six (6) separate dredged material Placement Area (PA) sites in association with the proposed Corpus Christi Ship Channel Deepening Project (SWG-2019-00067). Field surveying and quantification of sensitive resources within the proposed PA sites are required to support the Draft Environmental Impact Statement (EIS) being prepared by the U.S. Army Corps of Engineers (USACE). The following aquatic survey plan shall be performed to document and quantify sensitive resource occurrence and coverage within each respective survey area.

Six survey areas have been established, based on spatial data and project plans provided by the PCCA. Triton Environmental Solutions, LLC (Triton) has established Global Positioning System (GPS) coordinates for survey boundaries, transects, and sample stations. To create the respective survey areas, Triton buffered each PA boundary by 500 feet to delineate any seagrasses and/or live oysters within the project vicinity, per USACE requirements. Survey files will be loaded onto Trimble real time kinetic (RTK) and/or GEO7x GPS units for field mapping, data collection, and navigation. The total survey area encompasses roughly 3,878.67-acres across the six survey areas and include SS1/PA4 (Approx. 884.05-acres), SS2 (Approx. 250.60-acres), HI-E (Approx. 269.39-acres), SJI (Approx. 1,482.35-acres) and MI (Approx. 992.28-acres). All PA boundaries were provided to Triton by PCCA, excluding PA4. The boundary for PA4 was downloaded from the USACE Geospatial website on April 20, 2021. As shown on the Preliminary Survey Planning Map for SS1 and PA4, creation of 500-foot buffers around SS1 and PA4 caused the survey area for the two proposed placement areas to merge. The aquatic survey will be conducted within the limits of the survey boundaries shown on the enclosed plans (Appendix A).

Triton anticipates the aquatic survey to be conducted between April 26 – May 31, 2021. The proposed schedule may be affected by inclement weather (i.e., high winds, thunderstorms, high tides, etc.), or other unanticipated factors and circumstances. Triton initially proposed a schedule timeframe of 42 days to conduct the aquatic survey but has revised the timeline to accommodate pressing schedules associated with the project. Triton will make every effort to complete the aquatic field survey by May 31, 2021.

## **2.0 Methodology**

### **2.1 Aquatic Sensitive Resource Surveys (Seagrass and Oyster): SS1, PA4, SS2, HI-E, SJI, MI Survey Areas**

#### ***2.1.1 Sampling Design and Data Collection***

The seagrass and oyster survey will be conducted with systematic, analytical methodology utilizing wading visual and/or hand detection sampling (i.e., feeling the bay bottom by hand) in conjunction with a modified Braun-Blanquet rapid visual assessment technique (Braun-Blanquet 1972; Fourqurean 2001). The implementation of wading presence/absence (i.e., percent frequency) and Braun-Blanquet techniques will allow for the landward and bayward delineation of seagrass beds to determine seagrass bed extents (acreage) while also providing species composition and percent cover (i.e., relative abundance) information. Triton personnel will travel to the sites in outboard skiffs ranging in length from 17- to 25-feet. Skiffs draw less than one foot of water and prop-washing will be strictly avoided. Sample data points will be collected along pre-defined transects, orienting from the shoreline and extending waterward within each respective survey area. Transects will be spaced at 100-foot intervals. Orienting from the shoreline, Triton will utilize hand detection sampling spaced at 10-foot intervals and



a modified Braun-Blanquet rapid visual quadrat assessment conducted at every 5<sup>th</sup> (i.e., 50-feet) sampling interval. All transects and sample stations are shown in the enclosed Survey Plan Illustrations (Appendix A) and the following will be observed:

- a. SS1 and PA4 Sites: 280 total transects (mean total length = 1,015-ft; range: 160 – 2,592-ft); 284,268 linear feet of transects; 34,880 total sample stations (N = 28,799 total hand detection feels; N = 6,081 quadrats)
- b. SS2 Site: 117 total transects (mean total length = 686-ft; range: 63 – 1,807-ft); 80,208 linear feet of transects; 13,504 total sample stations (N = 11,734 total hand detection feels; N = 1,770 quadrats)
- c. HI-E Site: 82 total transects (mean total length = 504-ft; range: 190 – 1,042-ft); 41,352 linear feet of transects; 5,159 total sample stations (N = 4,227 total hand detection feels; N = 932 quadrats)
- d. SJI Site: 19 total transects (mean total length = 1,721-ft; range: 1,449 – 2,175-ft); 32,703 linear feet of transects; 3,976 total sample stations (N = 3,294 total hand detection feels; N = 682 quadrats)
- e. MI Site: 14 total transects (mean total length = 1,601-ft; range: 1,537 – 1,673-ft); 22,415 linear feet of transects; 2,730 total sample stations (N = 2,261 total hand detection feels; N = 469 quadrats)
- f. *Note: the above represents the maximum number of sample points, transects, etc. and will likely be less, especially if transect or sample station length decreases. Also, attributed to transect termination at deep-water channels and intersection with land features.*

At each sample station, Triton personnel will identify composition of substrate, determine presence/absence of seagrass, and identify seagrasses to species (Braun-Blanquet stations only). To determine presence or absence of seagrass, survey staff will conduct a visual or hand feel detection on the bay bottom, centered on the transect line. For the Braun-Blanquet data collection points, a 0.25m<sup>2</sup> quadrat will be randomly tossed within 1-meter of the transect line. Triton will conduct each quadrat assessment by visually identifying each seagrass species present and estimating percent cover for each species within the 0.25m<sup>2</sup> quadrat. Percent cover, as defined for this purpose, is the fraction of the total quadrat area that is obscured by a particular species when observed from an overhead view. Seagrass will not be removed or disturbed with the hand detection or rapid visual assessment techniques. Seagrass species and Braun-Blanquet data will be recorded according to Tables 1 and 2, respectively.

Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 feet NAVD 88 due to safety concerns (ship traffic, currents, etc.) and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 feet NAVD 88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.

In areas where oyster reef and/or shell are encountered during the wading surveys (i.e., ≤ -3.0 feet NAVD 88), a grab from the bay bottom will be utilized to determine whether the substrate encountered was live oyster, dead shell, or shell hash. A grab will only be utilized if shell type cannot be visually identified. All oyster identified will be circumnavigated to delineate the boundary, providing spatial acreage estimates. In waters beyond -3.0 feet NAVD 88, Triton staff will consolidate readily available



current oyster geospatial data from National Oceanic Atmospheric Administration (NOAA) National Centers for Environmental Information; Gulf of Mexico Data Atlas to identify any known existing oyster reef locations within the survey areas. Once consolidated, Triton staff will survey these locations by sounding to verify/determine oyster boundaries and acreage extent.

Substrate composition will be recorded at each sample point, providing substrate profile and frequency of occurrence information. Substrate will be recorded according to the key in Table 3. Representative bottom elevations and depth of soft sediment will be collected with a sounding rod (tide-adjusted) within each survey area; primarily in areas of identified sensitive resources (i.e., seagrass beds) and occur at roughly 300-foot transect intervals, every 10-feet. Note: This survey will not result in comprehensive seafloor bathymetric mapping throughout the entire survey areas. All survey data will be georeferenced and recorded with a Trimble RTK GPS receiving real-time corrections from the VRS Network, or into a GEO 7x handheld GPS and will comply with the USACE Standard Operating Procedures for recording jurisdictional delineations with a GPS. Position coordinates will be recorded and then plotted in the office with ArcGIS 10.6 and ArcGIS Pro software.

### *2.1.2 Data Analysis*

Determining presence/absence (i.e., frequency of occurrence) of seagrass by hand detection at each sample station will be calculated as follows:

$$F_O = (\sum O_S / N_H)$$

where  $F_O$  = seagrass percent frequency of occurrence,  $O_S$  = seagrass occurrence, and  $N_H$  = number of total hand detection sampling stations. The presence/absence component of the survey will facilitate delineation of seagrass extent throughout the survey areas.

The data for each 0.25-meter<sup>2</sup> quadrat will be analyzed to quantify percent cover and frequency by species encountered within the survey areas. These data will provide species composition information, frequency of occurrence by species, as well as percent cover values for seagrass species. Percent cover will be calculated as follows:

$$VC_{S1} = (\sum Q_{S1} / N_Q)$$

where  $VC_{S1}$  = mean percent vegetative cover by species,  $Q_{S1}$  = quadrat score per species, and  $N_Q$  = number of total quadrats.

Percent frequency by seagrass species will be calculated with the following equation:

$$F_{OS} = (\sum O_{S1} / N_Q)$$

where  $F_{OS}$  = seagrass percent frequency of occurrence by species,  $O_{S1}$  = seagrass occurrence by species, and  $N_Q$  = number of total quadrats.

Substrate data will be quantified by summing the total occurrence of substrate type and dividing by total number of substrate sample stations, providing substrate composition information for each respective survey area.



## 2.2 Meteorological Data and Photographic Record

Triton will document general meteorological conditions on daily field sheets. The nearest operational tide station is determined to be USS Lexington, Corpus Christi Bay, TX - Station ID: 8775296 and will be accessed via the National Oceanic and Atmospheric Administration's website. Air and water temperature, salinity, wind speed and direction, and daily tide data will be obtained from <https://tidesandcurrents.noaa.gov/stationhome.html?id=8775296>.

Additionally, Triton staff will photo-document the field survey collections and include images of representative habitats and general site conditions.

## 2.3 General Survey Comments

1. At date of this survey plan, Triton understands site access is currently granted for SS1, PA4, SS2, HI-E, and SJI. SJI and MI aquatic survey transects and sample points will need to be accessed via land. PCCA is currently working toward attaining access approval for MI. Triton will not initiate the MI survey until access approval is attained and authorized by the PCCA.
2. Triton has developed this survey plan in accordance with the provided Scope of Work as well as recent correspondence. The transect and sample station spacing of 100- and 10-feet, respectively, could result in a timeframe that does not meet the current project schedule. Triton respectfully requests feedback from the USACE and/or other resource agencies on any acceptable transect and/or sample point spacing variances which could produce sufficient data over the span of the survey areas while also accommodating project timelines. For instance, Triton requests approval to adjust transect and/or sample station spacing, as necessary, to accommodate the compressed project schedule (e.g., from 100- to 200-foot transects and/or 10- to 20-foot sampling spacing).
3. Strategies to increase sampling efficiency (i.e., < timeline)
  - a. > transect and sample point (hand feel & B-B assessments) spacing
    - i. Transect: 100 to 200 or greater, consider > spacing in buffered areas
    - ii. Hand feel: 10 to 20-ft or greater
    - iii. B-B: every 50 to 60-ft or greater
  - b. Consider > survey spacing in the buffer areas only (example: 100-ft in survey area proper, 200-ft in buffered areas, etc., etc.)
4. If detailed seafloor mapping is required, substantial revisions to the scope and project timeline would need to occur.



### 3.0 Tables

Table 1. Seagrass species list key

Abbreviation	Common Name	Scientific Name
O	Not present	N/A
H	Shoalweed	<i>Halodule wrightii</i>
T	Turtle grass	<i>Thalassia testudinum</i>
S	Manatee grass	<i>Syringodium filiforme</i>
R	Beaked ditch-grass (Widgeon)	<i>Ruppia maritima</i>
Ha	Clovergrass	<i>Halophila englemannii</i>
A	Algae	N/A
W	Seagrass wrack material	N/A

Table 2. Braun-Blanquet abundance scores (S). Each seagrass species will be scored in each 0.25-meter<sup>2</sup> quadrat according to Fourqurean et al., 2001 and assigned a percent cover score. (Shoot density applies to *Thalassia* only).

S	Interpretation
0	Species absent from quadrat
0.1	Species represented by a single solitary short shoot, < 5% cover
0.5	Species represented by a few (< 5%) short shoots, < 5% cover
1	Species represented by many (> 5%) short shoots, < 5% cover
2	Species represented by many (> 5%) short shoots, 5 – 25% cover
3	Species represented by many (> 5%) short shoots, 25 – 50% cover
4	Species represented by many (> 5%) short shoots, 50 – 75% cover
5	Species represented by many (> 5%) short shoots, 75 – 100% cover

Table 3. Substrate list key

Abbreviation	Substrate Type
M	Mud
S	Sand
C	Clay
G	Gravel
SH	Shell (gaping, halves, or fragments)
OY	Live Oyster

Table 4. Summary of transect length and number of transects, sample stations, and quadrats by survey area and combined totals.

Survey Area	Transect Length (ft.)	N Transects	N Sample Stations	N Quadrats
SS1 and PA4	284,268	280	28,799	6,081
SS2	80,208	117	11,734	1,770
HI-E	41,352	82	4,227	932
SJI	32,703	19	3,294	682
MI	22,415	14	2,261	469
<b>Combined Totals:</b>	<b>457,638 (86.67 mi)</b>	<b>503</b>	<b>49,974</b>	<b>9,854</b>

Note: subject to change based on site conditions and methods discussed above (i.e., land overlap, edge of deepwater channel transect termination).



#### **4.0 Literature Cited**

Braun-Blanquet. 1972. Plant Sociology: The Study of Plant Communities. Hafner Publishing Company

Fourqurean J.W., A. Willsie, C.D. Rose, and L.M. Rutten. 2001. Spatial and Temporal Patterns in Seagrass Community Composition and Productivity in South Florida. Marine Biology Journal 138:341-354

Pulich, W.M., Jr., B. Hardegree, A. Kopecky, S. Schwelling, C. P. Onuf, and K.H. Dunton. 2003. Texas Seagrass Monitoring Strategic Plan (TSMSP). Publ. Texas Parks and Wildlife Department, Resource Protection Division, Austin, Texas. 27 pp.

#### **5.0 Appendices**

**Appendix A: Survey Plan Maps**

**Appendix B: Survey Plan Development Reference Materials**

**PCCA Scope of Work,**

**USACE WOTUS Letter, June 22, 2020**

**USACE Email Correspondence, Jayson Hudson, January 8, 2021**



**Appendix A: Survey Plan Maps**



## Legend

- NOAA Channel Shapefile
- SS1 & PA4 Survey Boundary
- Proposed SS1 & PA4 Placement Areas
- SS1 & PA4 Aquatic Survey Transects

## Survey Notes:

- Total Number of Aquatic Survey Transects in SS1/PA4 Survey Boundary: 280
- Total Length of Aquatic Survey Transects in SS1/PA4 Survey Boundary: 53.84 miles
- Mean Length of Aquatic Survey Transects in SS1/PA4 Survey Boundary: 1,015 feet
- Range of Aquatic Survey Transect Lengths in SS1/PA4 Survey Boundary: 160 feet - 2,592 feet
- Hand Detection Sample Stations in SS1/PA4 Survey Boundary: 28,799
- Braun Blanquet Sample Stations in SS1/PA4 Survey Boundary: 6,081
- Total Aquatic Survey Sample Stations in SS1/PA4 Survey Boundary: 34,880

*Redfish Bay*

*Harbor Island*

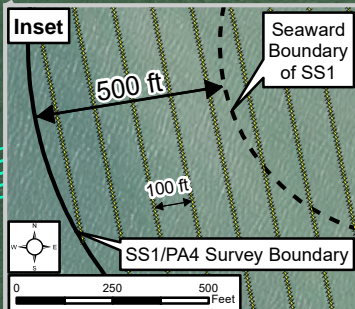
SS1 & PA4 Survey Boundary  
(884.05 Acres)

Proposed SS1  
Placement Area  
(307.59 Ac)

Proposed PA4  
Placement Area  
(139.32 Ac)

*Corpus Christi Ship Channel*

*Mustang Island*



## Sampling Methodology Notes:

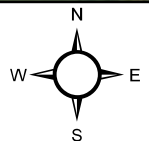
Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 ft NAVD88 due to safety/tidal current concerns and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 ft NAVD88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.



## Aquatic Survey Overview Map SS1 & PA4 Survey Areas & Aquatic Survey Transects Corpus Christi Ship Channel Deepening Project (SWG-2019-00067)

Prepared By:

Triton Environmental Solutions, LLC  
P.O. Box 1755  
Rockport, TX 78381



Prepared for:





Port of Corpus Christi Authority  
222 Power Street  
Corpus Christi, Texas 78401

## Map Notes:

- BaseMap Source: -ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
- Placement Area boundary shapefiles for SS1, SS2, HI-E, MI & SJI were provided by the Port of Corpus Christi Authority.
- The shapefile for PA4 was obtained from the U.S. Army Corps of Engineers.
- Map Preparation Date: April 26, 2021 (BPH).



## Legend

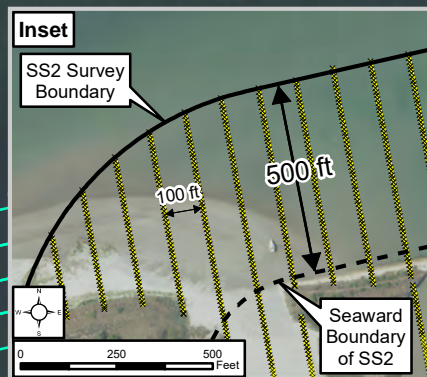
-  NOAA Channel Shapefile
-  SS2 Survey Boundary
-  Proposed SS2 Placement Area
-  SS2 Aquatic Survey Transects

## Sampling Methodology Notes:

Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 ft NAVD88 due to safety/tidal current concerns and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 ft NAVD88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.

## Survey Notes:

- Total Number of Aquatic Survey Transects in SS2 Survey Boundary: 117
- Total Length of Aquatic Survey Transects in SS2 Survey Boundary: 15.19 miles
- Mean Length of Aquatic Survey Transects in SS2 Survey Boundary: 686 feet
- Range of Aquatic Survey Transect Lengths in SS2 Survey Boundary: 63 feet - 1,807 feet
- Hand Detection Sample Stations in SS2 Survey Boundary: 11,734
- Braun Blanquet Sample Stations in SS2 Survey Boundary: 1,770
- Total Aquatic Survey Sample Stations in SS2 Survey Boundary: 13,504



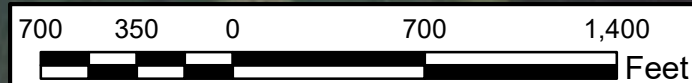
*Corpus Christi Ship Channel*

SS2 Survey Boundary  
(250.60 Acres)

Proposed SS2  
Placement Area  
(94.80 Ac)

*Mustang Island*

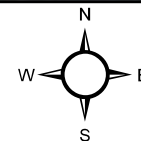
*Island Moorings Channel*



## Aquatic Survey Overview Map SS2 Survey Area & Aquatic Survey Transects Corpus Christi Ship Channel Deepening Project (SWG-2019-00067)

Prepared By:

Triton Environmental Solutions, LLC  
P.O. Box 1755  
Rockport, TX 78381



Prepared for:





Port of Corpus Christi Authority  
222 Power Street  
Corpus Christi, Texas 78401

## Map Notes:

- BaseMap Source: -ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
- Placement Area boundary shapefiles for SS1, SS2, HI-E, MI & SJI were provided by the Port of Corpus Christi Authority.
- The shapefile for PA4 was obtained from the U.S. Army Corps of Engineers.
- Map Preparation Date: April 26, 2021 (BPH).



## Legend

-  NOAA Channel Shapefile
-  HI-E Survey Boundary
-  Proposed HI-E Placement Area
-  HI-E Aquatic Survey Transects

Terrestrial Vegetation Communities  
to be Mapped & Described by  
Wetland Delineation

HI-E Survey Boundary  
(269.39 Acres)

Proposed HI-E  
Placement Area  
(138.74 Ac)

Landward Terminus of  
Aquatic Survey Transects

Low Marsh Wetland to be  
Mapped & Described by  
Wetland Delineation Survey

*Harbor  
Island*

*Arensas Channel*

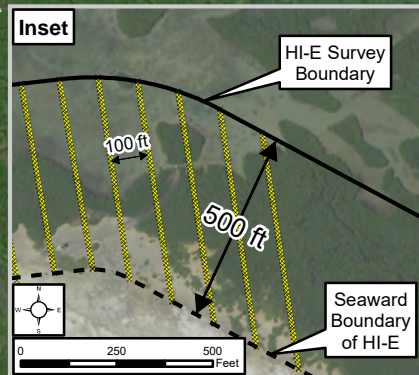
*Harbor  
Island*

*Lydia Ann Channel*

### Sampling Methodology Notes:

Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 ft NAVD88 due to safety/tidal current concerns and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 ft NAVD88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.

700 350 0 700 1,400  
Feet



### Survey Notes:

- Total Number of Aquatic Survey Transects in HI-E Survey Boundary: 82
- Total Length of Aquatic Survey Transects in HI-E Survey Boundary: 7.83 miles
- Mean Length of Aquatic Survey Transects in HI-E Survey Boundary: 504 feet
- Range of Aquatic Survey Transect Lengths in HI-E Survey Boundary: 190 feet - 1,042 feet
- Hand Detection Sample Stations in HI-E Survey Boundary: 4,227
- Braun Blanquet Sample Stations in HI-E Survey Boundary: 932
- Total Aquatic Survey Sample Stations in HI-E Survey Boundary: 5,159

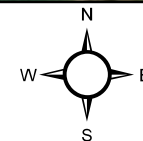
## Aquatic Survey Overview Map HI-E Survey Area & Aquatic Survey Transects Corpus Christi Ship Channel Deepening Project (SWG-2019-00067)

Prepared for:

Port of Corpus Christi Authority  
222 Power Street  
Corpus Christi, Texas 78401

Prepared By:

Triton Environmental Solutions, LLC  
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Rockport, TX 78381






### Map Notes:

- BaseMap Source: -ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
- Placement Area boundary shapefiles for SS1, SS2, HI-E, MI & SJI were provided by the Port of Corpus Christi Authority.
- The shapefile for PA4 was obtained from the U.S. Army Corps of Engineers.
- Map Preparation Date: April 26, 2021 (BPH).



## Legend

-  SJI Survey Boundary
-  Proposed SJI Placement Area
-  SJI Aquatic Survey Transects

### Survey Notes:

- Total Number of Aquatic Survey Transects in SJI Survey Boundary: 19
- Total Length of Aquatic Survey Transects in SJI Survey Boundary: 6.19 miles
- Mean Length of Aquatic Survey Transects in SJI Survey Boundary: 1,721 feet
- Range of Aquatic Survey Transect Lengths in SJI Survey Boundary: 1,449 feet - 2,175 feet
- Hand Detection Sample Stations in SJI Survey Boundary: 3,294
- Braun Blanquet Sample Stations in SJI Survey Boundary: 682
- Total Aquatic Survey Sample Stations in SJI Survey Boundary: 3,976

Aransas Bay

San Jose Island

Gulf of Mexico

Lydia Ann Channel

Corpus Christi Ship Channel

Port Aransas, TX

Proposed SJI Placement Area  
(592.96 Ac)

SJI Survey Boundary  
(1,482.35 Acres)

Inset



4,000 2,000 0 4,000 8,000  
Feet

### Sampling Methodology Notes:

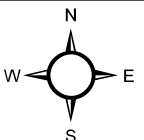
Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 ft NAVD88 due to safety/tidal current concerns and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 ft NAVD88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.

## Aquatic Survey Overview Map SJI Survey Area & Aquatic Survey Transects Corpus Christi Ship Channel Deepening Project (SWG-2019-00067)

Prepared for: Port of Corpus Christi Authority  
222 Power Street  
Corpus Christi, Texas 78401

Prepared By:

Triton Environmental Solutions, LLC  
P.O. Box 1755  
Rockport, TX 78381






### Map Notes:

- BaseMap Source: -ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
- Placement Area boundary shapefiles for SS1, SS2, HI-E, MI & SJI were provided by the Port of Corpus Christi Authority.
- The shapefile for PA4 was obtained from the U.S. Army Corps of Engineers.
- Map Preparation Date: April 26, 2021 (BPH).



## Legend

-  MI Survey Boundary
-  Proposed MI Placement Area
-  MI Aquatic Survey Transects

### Survey Notes:

- Total Number of Aquatic Survey Transects in MI Survey Boundary: 14
- Total Length of Aquatic Survey Transects in MI Survey Boundary: 4.25 miles
- Mean Length of Aquatic Survey Transects in MI Survey Boundary: 1,601 feet
- Range of Aquatic Survey Transect Lengths in MI Survey Boundary: 1,537 feet - 1,673 feet
- Hand Detection Sample Stations in MI Survey Boundary: 2,261
- Braun Blanquet Sample Stations in MI Survey Boundary: 469
- Total Aquatic Survey Sample Stations in MI Survey Boundary: 2,730

Corpus Christi Ship Channel

Port Aransas, TX

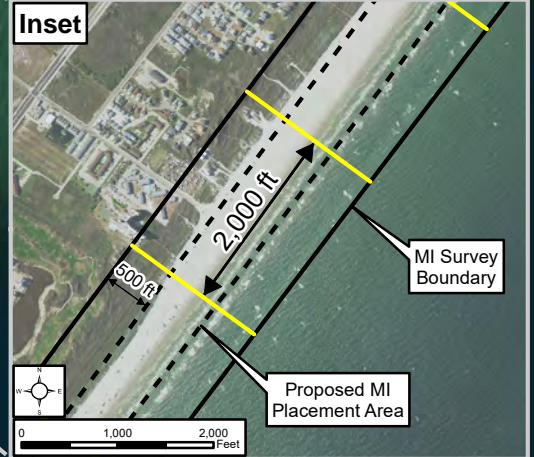
Gulf of Mexico

Mustang Island

Proposed MI Placement Area (362.21 Ac)

MI Survey Boundary (992.28 Acres)

Inset



### Sampling Methodology Notes:

Wading visual hand detection and Braun-Blanquet survey methods will terminate at approximately -3.0 ft NAVD88 due to safety/tidal current concerns and inability to effectively and efficiently sample seagrass in deeper waters. In waters > -3.0 ft NAVD88, when necessary, Triton will confirm the bayward edge of seagrass surveying from a vessel using a post-hole grab. Sampling will continue at three consecutive sample stations (i.e., 30-feet) from the last identified seagrass location on the transect line. If any transect intersects a deep-water channel, the survey transect line will terminate at channel edge for safety concerns. Transects will terminate at 30-feet past the bayward edge of seagrass or the leading slope of deep-water channels, whichever occurs first.

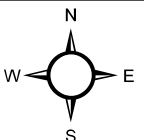


## Aquatic Survey Overview Map MI Survey Area & Aquatic Survey Transects Corpus Christi Ship Channel Deepening Project (SWG-2019-00067)

Prepared for: Port of Corpus Christi Authority  
222 Power Street  
Corpus Christi, Texas 78401

Prepared By:

Triton Environmental Solutions, LLC  
P.O. Box 1755  
Rockport, TX 78381



### Map Notes:

- BaseMap Source: -ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
- Placement Area boundary shapefiles for SS1, SS2, HI-E, MI & SJI were provided by the Port of Corpus Christi Authority.
- The shapefile for PA4 was obtained from the U.S. Army Corps of Engineers.
- Map Preparation Date: April 26, 2021 (BPH).



**Appendix B: Survey Plan Development Reference Materials**

**PCCA Scope of Work,**

**USACE WOTUS Letter, June 22, 2020**

**USACE Email Correspondence, Jayson Hudson, January 8, 2021**



**REQUEST FOR PROPOSAL**  
**Field Delineation and Report for Port of Corpus Christi Authority**  
**Channel Deepening Project Draft Environmental Impact Statement**  
**Being Prepared By U.S. Army Corps of Engineers**

Scope

Scope of work to delineate wetlands and sea grass beds and conduct threatened and endangered species surveys within the project area will include:

**Task 1 - Field Investigations**

Using the wetland delineation field plan provided in Attachment A, Consultant will conduct a wetland delineation for the project sites identified on Exhibit A. The survey will cover the project site and a 500 ft buffer area around each location. Consultant will also conduct investigations necessary to determine the likely jurisdictional status of any identified wetlands under USACE/Environmental Protection Agency (EPA) regulations or guidance resulting from applicable U.S. Supreme Court decisions. The *Waters of the United States Delineation Report, Part 1: Potentially Jurisdictional Waters of the United States* report is provided in Attachment B and provides supporting detail for each area.

Additionally, The *Waters of the United States Delineation Report, Part 2: Seagrass Investigation* report is provided in Attachment C. Seagrass beds identified within report will be field verified through sampling. Seagrass will be sampled along transects by feeling the substrate of the bay by hand. Sampling will include the project sites identified in Exhibit A and a 500 ft buffer around each project site. Maps which depict proposed sampling transects for sea grass delineation will be developed prior to field work for coordination with USACE.

The KMZ files and high-resolution aerials for each location will be provided upon request.

All work in this task will be completed in accordance with the USACE 1987 Wetland Delineation Manual and the 2010 U.S. Army Corps of Engineers Regional Supplement Manual for the Atlantic and Gulf Coastal Plain Region to identify and delineate all wetlands, which requires transects for areas greater than 5 acres.

Additionally, the Mean (average) High Water and High Tide Line will be delineated where appropriate. Please see definitions for each in Task 2.

A complete threatened and endangered species survey will be performed on each of the project sites identified on Exhibit A as appropriate. Prior to performing the survey, Consultant will develop a work plan for field activities for coordination with USACE. The threatened and endangered species survey will be completed in strict compliance with the finally approved work plan.



Field work will not commence on non-port owned properties until explicit written approval for access is provided by respective landowner(s). PCCA will coordinate approval for access. Other approvals required for fieldwork not specifically mentioned in this scope of work will be the responsibility of the Consultant.

## **Task 2 - Prepare Delineation Report**

Consultant will prepare a formal Water of the United States delineation and seagrass survey and threatened and endangered species survey report based on results from Task 1 above. The report will include all content (e.g. mapping, GPS, coordinate tables, boundary rationales, field data sheets, Navigable Water Protection Rule or the current definition of Waters of the U.S. interpretation for each wetland, and/or jurisdictional status of any wetlands and waters on the property etc.) required by the USACE's current procedures and will include all data and assessments required by USACE methodologies for inclusion in a request for a Jurisdictional Determination. The threatened and endangered species will be detailed in accordance with the approved work plan.

The wetland assessment determination and delineation report will include all necessary exhibits, photos and supporting maps that identify features that could potentially be subject to the USACE jurisdiction under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. The report will also include the supporting routine wetland delineation data forms for all features within the surveyed area. The report will contain a map showing the delineated waters and wetland boundaries, sea grass beds, and associated GPS coordinates. Use of GPS, will be done in accordance with the USACE Standard Operating Procedure titled *Recording and Submitting Jurisdictional Delineations Using Global Positioning Systems (GPS) and Geographic Information Systems (GIS) Tools and Technologies* dated 4/21/2016. Geospatial data of all sample locations will also be provided to PCCA in the following formats/files: ESRI ArcGIS shapefile (\*.shp, \*.shx, and \*.dbf), ArcGIS geodatabase file (\*.mdb, \*.gdb), comma separated values file (\*.csv). Raw data, copies of physical field books, and digital data collector files will be included in addition to any processed data along with corresponding metadata for each.

Per 33 CFR 329.12(a)(2) Shoreward limit of jurisdiction, navigable waters of the United States extend to the line on the shore reached by the plane of the Mean (average) High Water (MHW), which is the shoreward limit of Section 10 waters. Per 33 CFR 328.3(d). waters of the United States (Section 404) extend shoreward to the High Tide Line (HTL), which is the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. Maps shall be correctly demarcated with the MHW and HTL. Acreages for both sea grass beds and delineated WOUS and wetlands will also be provided on each map. Placement area boundaries, Section 103 of the Marine Protection, Research, and Sanctuaries Act geographical jurisdictional boundary (as per 33CFR 2.20), and Section 408 Mean Low Low Water (MLLW) will also be clearly depicted on each



map. Draft maps will be coordinated with USACE through Authority prior to finalizing.

Datasheets will be properly completed, accurate and free of errors and type-o's.

Consultant will provide PCCA a draft report detailing all field surveys – wetlands, seagrasses, and threatened and endangered species. Consultant will incorporate Authority input into the report for a finalized version for Authority's reference. Consultant will submit all documents in Microsoft Word and a final compiled .pdf document for Authority's use.

### **Task 3 – Field Verification Support & Follow Up**

Consultant will coordinate schedule of field activities with U.S. Army Corps of Engineers Channel Deepening Project – Project Manager to allow personnel to accompany Consultant on fieldwork. Consultant will provide full access to U.S. Army Corps of Engineers to delineation and sea grass verification activities including providing space on work boats.

Consultant will also provide additional information or clarification following U.S. Army Corps of Engineers / Third-Party Contractor review of the final report.

### **Timeline**

Consultant will provide appropriate number of teams in order that all field activities will be completed within a two to three-week period to be started not later than March 1, 2021.

The complete draft report will be provided within three weeks of completion of the field activities. The final report will be provided within one week of receiving PCCA comments.



## **Exhibit A**