



2017 Coastal Master Plan

Attachment A4: Project-Specific Attributes by Project Type (Structural Protection)



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Coastal Protection and Restoration Authority

This document was prepared in support of the 2017 Coastal Master Plan being prepared by the Coastal Protection and Restoration Authority (CPRA). CPRA was established by the Louisiana Legislature in response to Hurricanes Katrina and Rita through Act 8 of the First Extraordinary Session of 2005. Act 8 of the First Extraordinary Session of 2005 expanded the membership, duties, and responsibilities of CPRA and charged the new authority to develop and implement a comprehensive coastal protection plan, consisting of a master plan (revised every five years) and annual plans. CPRA's mandate is to develop, implement, and enforce a comprehensive coastal protection and restoration master plan.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Structural Protection				
Length	Lngth	m	Overall length of the structural protection project.	The overall length of levees was measured along the centerline using GIS from endpoint to endpoint including all levee feature types (i.e., earthen levee, T-wall, gates).
Earthen Levee				
Top Width	Top_Wdth	m	The width of the levee crown.	A crown width of 10 ft/3.048 m was used unless specified otherwise.
Side Slope Water	Sd_Slp_Wtr	Ratio	The slope of the fill expressed as the ratio of horizontal distance to vertical distance.	Typical side slopes used by the USACE for levee design were assumed to be 4H:1V front slopes of the levee itself (not wave berm) unless otherwise specified in reports or other published documents. The side slope water refers to the "Flood Side" or front side of the levee.
Side Slope Marsh	Sd_Slp_Mh	Ratio	The slope of the fill expressed as the ratio of horizontal distance to vertical distance.	Typical side slopes assumed are those used by the USACE for HSDRRS levee design were assumed to be 3H:1V back slopes for the levee itself (not stability berm) unless otherwise specified in reports or other published documents. The side slope marsh refers to the "Protected Side" or back side of the levee.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Armoring Type	Armr_Type	Textual Code	Type of armoring used to protect earthen levees.	Full earthen levee section - turf on flood side and protected side is universal assumption. Levee turf is included in the cost of fertilizing and seeding. Riprap is used on flood side wave berms when exposed to open fetch. Levee to floodwall tie-ins and slope pavement transitions are typically constructed at hardened structures and are armored with 6" concrete slope pavement. The transition slope pavement, riprap, and tie-ins are considered minor cost to the overall project and is not included as a line item for a high level study.
Design Elevation	Lev_Elev	m (NAVD88)	Crown elevation of levee feature.	All required design elevations are provided from previous studies and reports, where existing. Where previous information was not available, project profiles and submittal information was used.
Existing Average Elevation	ExstAvgEI	m (NAVD88)	Average surface elevation within project footprint.	The following three steps were performed for calculated the existing average elevation: 1) Existing non-federal levee - the existing average elevation of the crown will be taken from the HNTB/CPRA database, 2) New-start levee project concepts - the existing average elevation of the ground will be taken from the 2017 Coastal Master Plan DEM, 3) Existing federal levees - the existing average elevation of the crown will be taken from the design elevation.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Earthen Levee Length	Leve_Lngth	m	Total length of the earthen levee section.	The length of levees was measured along the centerline using GIS from endpoint to endpoint. The length of gates and T-walls were deducted from the overall length to obtain the earthen levee portion of the project. Because the design elevation can change within a single project, most levees are broken into "Reaches". These reaches are typically where there is a change in design elevation or change in cross section. Varying elevations within a reach were averaged where necessary.
Footprint	Footprint	km ²	Levee footprint based on the length and width of each levee section.	The levee width includes crown width, slope width, and any flood side wave berm and/or protected side stability berm widths.
Construction Grade	Con_Grade	m (NAVD88)	The crown elevation of the levee including the design elevation plus construction overbuild that compensates for settlement.	Additional fill added to design elevation to achieve construction elevation to account for settlement.
Concrete T-Wall				
Base Width	Bse_Wdth	m	The base width of the concrete T-wall which was developed as a function of the wall height.	Base width will vary depending on the forces and height of the wall. Base width will be refined in final design. Wall cross-sections were taken from existing projects with similar heights and soil conditions, such as those constructed using HSDRRS guidelines. All floodwalls are assumed protected from vessel impact; only a debris loading was considered.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Design Elevation	Wall_Elev	m (NAVD88)	Elevation to protect against a specified storm event (Example: 50-year, 100-year) including acceptable overtopping at Year 50. Unless stated otherwise the acceptable overtopping rate is 0.1 cfs/LF (.002832 cms/ 0.3048 m)	All required design elevations are provided from project profiles. The provided design grades were assumed to include sufficient height for future conditions (subsidence and sea level rise).
Existing Average Elevation	ExstAvgEl	m (NAVD88)	Average surface elevation within project footprint.	Taken from existing reports when available. When reports were unavailable, the following steps were used to for existing average elevation: 1) For existing non-federal levees and walls - the existing average elevation of the ground or structure was taken from the HNTB/CPRA database using survey elevations, 2) For existing federal levees and walls - the existing ground or structure elevation was taken from the design elevation, 3) For new levees and walls - the existing average elevation of the ground was taken from the 2017 DEM model.
Base Thickness	BseThckns	m	The base thickness of the concrete T-wall which was developed as a function of the wall height.	Base thickness will vary depending on the forces and height of the wall. Base thickness will be refined at final design. Wall cross-sections were taken from existing projects with similar heights and soil conditions such as projects constructed according to HSDRRS guidelines. All floodwalls are assumed protected from vessel impact; only a debris loading was considered.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Wall Height	Wall_Ht	m (NAVD88)	Distance from the top of the base foundation to top of wall.	T-wall height is based on project profile elevations. The wall heights are assumed to include sufficient height to account for future sea level rise and ground subsidence, structural superiority has not been added to the wall heights.
Wall Length	Wall_Lngth	m	The total length of the T-wall section.	Actual length of wall was used where reports available. Where reports were unavailable, GIS measurement was used to assign wall length. Assumed tie-in lengths were used at isolated structures such as floodgates and pump stations. Assumed transition lengths: @ vehicular and railroad gates - 120 ft/35.576 m each side, @ floodgates 200 ft/60.96 m each side, @ pump stations 200 ft/60.96 m each side.
Wall Thickness	Wall_Thck	m	Thickness of T-wall as proportioned to the wall height.	All walls are assumed protected from vessel impact, the wall thickness considers the hydrostatic forces and a debris loading.
Floodgate - Land				
Length	Lngth	m	Total length of the project centerline.	The gate monolith assumed to be 10 ft/3.048 m longer than the gate opening on each side. Base widths are based on the wall height.
Design Elevation	Design_El	m (NAVD88)	Elevation to protect against a specified storm event (Example: 50-year, 100-year) including acceptable overtopping rate for target Year 50. Unless stated otherwise the acceptable overtopping rate is 0.1 cfs/LF.	All required design elevations were provided from project profiles. The wall heights are assumed to include sufficient height to account for future sea level rise and ground subsidence.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Gate Height	Gate_Ht	m	Distance from sill to the top of gate.	The top of gate is set at the required design elevation plus 1 ft/0.3048 m of structural superiority, unless specified otherwise. Sill elevation is set by the road or RR track grade.
Gate Type	Gate_Type	Textual Code	Type of floodgate utilized.	Unless noted otherwise, swing gates shall be used for openings less than 40 ft/12.192 m in width; roller gates shall be used at gate openings greater than 40 ft/12.192 m. Vehicular gate widths shall exceed the existing road width plus 6 ft/1.8288 m clearance on each side to gate columns. The minimum opening width is 30 ft/ 9.144 m. Railroad gates shall include the centerline to centerline distance of the outer rails plus 9 ft/2.7432 m from the centerline of the outer rails to the gate columns. The minimum railroad gate opening is 18 ft/5.4864 m. Small pedestrian gate crossings are an insignificant increase in cost over T-wall sections and are not considered in this estimate.
Floodgate - Water				
Length	Lngh	m	Total length of the project centerline.	The length of the gate depends on the requirement of the navigational channel. Barge gates typically range from 30 ft/9.144 m long to 220 ft/67.056 m long. Sector gates typically range from 56 ft/17.0688 m long to 250 ft/76.2 m long. The 56 ft/17.0688 m wide sector gate shall be used in cost estimating unless noted otherwise.

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Attribute	Attribute Reporting Name	Reporting Unit	Definition	Assumptions
Design Elevation	Design_El	m (NAVD88)	Elevation to protect against a specified storm event (Example: 50-year, 100-year) including acceptable overtopping rate for target Year 50. Unless stated otherwise the acceptable overtopping rate is 0.1 cfs/LF (0.002832 cms/ 0.3048 m).	All required design elevations are provided from project profiles. Structural superiority was NOT added.
Gate Height	Gate_Ht	m	Total height of the gate structure.	Unless stated otherwise, the sill was assumed to be set at EI -14 ft/-4.2672 m. Top of floodgate shall match the adjacent walls. The sill is set at the authorized channel depth plus 2 ft/0.6096 m of clearance.
Gate Type	Gate_Type	Textual Code	Type of floodgate utilized.	Unless stated otherwise, the gate shall be a 56 ft/ 17.0688 m sector gate supported on a pile founded concrete gate bay monolith. The more durable and operable sector gate was used in all navigation channel floodgates.
Pumps				
Operational Regime	Op_Regime	Textual Description	Explanation of the operational strategies and triggers for each structure.	Strategies and triggers are provided from project profiles.
Impeller Elevation	Implr_El	m (NAVD88)	Elevation of the impeller.	Provided from reports or assumed bottom elevation of the canal.
Capacity	Capacity	m ³ /s	Discharge of the pumps at the design head.	Capacities are provided from project profiles. The pumping was assumed to work against the design storm grade and the intake stage at EI 0.0 ft/0 m NAVD88.

Note: Soil stabilization for earthen levees was not considered for the master plan. It is assumed the levees will be constructed in lifts to achieve final design elevation.