Environmental Assessment

Dillard University Mitigation Project

FEMA-1603-DR-LA

Orleans Parish, Louisiana

Hazard Mitigation Grant Program

Project Number 1603-0320

May 2016

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency, Region VI
Louisiana Recovery Office
1500 Main Street
Baton Rouge, LA 70802

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APE	Area of Potential Effects
ACHP	Advisory Council on Historic Preservation
ACTT	Alabama-Coushatta Tribe of Texas
BMP	Best Management Practices
CAA	Clean Air Act
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CFS	cubic feet per second
CNO	Choctaw Nation of Oklahoma
CT	Coushatta Tribe of Louisiana
CUP	Coastal Use Permit
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DEA	Draft Environmental Assessment
DFIRM	Digital Flood Insurance Rate Map
DOTD	Department of Transportation and Development
EA	Environmental Assessment
EHP	Environmental and Historic Preservation
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness
HMP	Hazard Mitigation Plan
HP	FEMA Historic Preservation
JBCI	Jena Band of Choctaw Indians
LA HMGP PA	Louisiana State-Specific Hazard Mitigation Grant Program Programmatic Agreement
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LNHP	Louisiana Natural Heritage Program
LSU	Louisiana State University
MBCI	Mississippi Band of Choctaw Indians
MCN	Muscogee Creek Nation
N/A	Not applicable
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NFI	National Flood Insurance
NFIP	National Flood Insurance Program

NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NRHD	National Register Historic District
NRCS	Natural Resources Conservation Services
OPA	Otherwise Protected Area
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
ROW	Right of Way
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office/Officer
SNO	Seminole Nation of Oklahoma
SOW	Scope of Work
TBTL	Tunica-Biloxi Tribe of Louisiana
THPO	Tribal Historic Preservation Office/Officer
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WSRA	Wild and Scenic Rivers Act

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1.0 INTRODUCTION

1.1 Project Authority

On August 29, 2005 Hurricane Katrina, a Category 4 hurricane with a storm surge well above normal high tide levels, moved across the Louisiana, Mississippi, and Alabama Gulf Coasts. Maximum sustained winds at landfall were estimated at 140 miles per hour. President George W. Bush declared a major disaster for the state of Louisiana due to damages from Hurricane Katrina and signed a disaster declaration (FEMA-1603-DR-LA) authorizing the Department of Homeland Security's Federal Emergency Management Agency (FEMA) to provide federal assistance in designated areas of Louisiana. FEMA is administering this disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended 42 U.S.C. 5121, *et seq.* Section 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Dillard University, applied for funding under FEMA's HMGP for a drainage project on the Dillard University campus located in of New Orleans, LA.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations Parts 1500-1508), and FEMA's regulations implementing NEPA (44 CFR Part 10). Before FEMA can fund or implement an action that may affect the environment, agency decision-makers must study the potential impacts that the proposed action and alternatives would have on the human and natural environment, and make that information available to the public. The purpose of this EA is to analyze the potential impacts to the natural and human environment for the proposed HMGP Dillard University mitigation project. FEMA would use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.2 Background

In 1869, with the support of the Missionary Association of the Congregational Church (now the United Church of Christ) and the Freedman's Aid Society of the United Methodist Church, Straight University and Union Normal School were founded. Later, they were renamed Straight College and New Orleans University, respectively.

Gilbert Academy, a secondary school, was a unit of New Orleans University. Straight College operated a law department from 1874 to 1886. New Orleans University in 1889 opened a medical department, including a school of pharmacy and a school of nursing. The medical department was named Flint Medical College and the affiliated hospital was named the Sarah Goodridge Hospital and Nurse Training School. The medical college was discontinued in 1911, but the hospital, including the nursing school, was continued under the name Flint Goodridge Hospital.

In 1930, New Orleans University and Straight College merged to form Dillard University. The trustees of the new university called for the implementation of a coeducational, interracial school, serving a predominantly African American student body adhering to Christian principles and values. The university was named in honor of James Hardy Dillard, a distinguished academician dedicated to educating African Americans.

1.3 Project Location and Site Description

Located in Orleans Parish, Louisiana, Dillard University is set upon a 55-acre campus filled with live signature oak trees and a mixture of historic buildings and modern facilities (Figure 1). The university is located in the Gentilly Community of New Orleans, which is bounded by the London Avenue Canal on the west and Gentilly Boulevard on the south. The topography of the campus is relatively flat with low-lying areas most notably located at the front and rear portions of the campus. The ground surface elevation within the campus ranges from roughly 3 feet above sea level down to 3 feet below sea level in some areas.

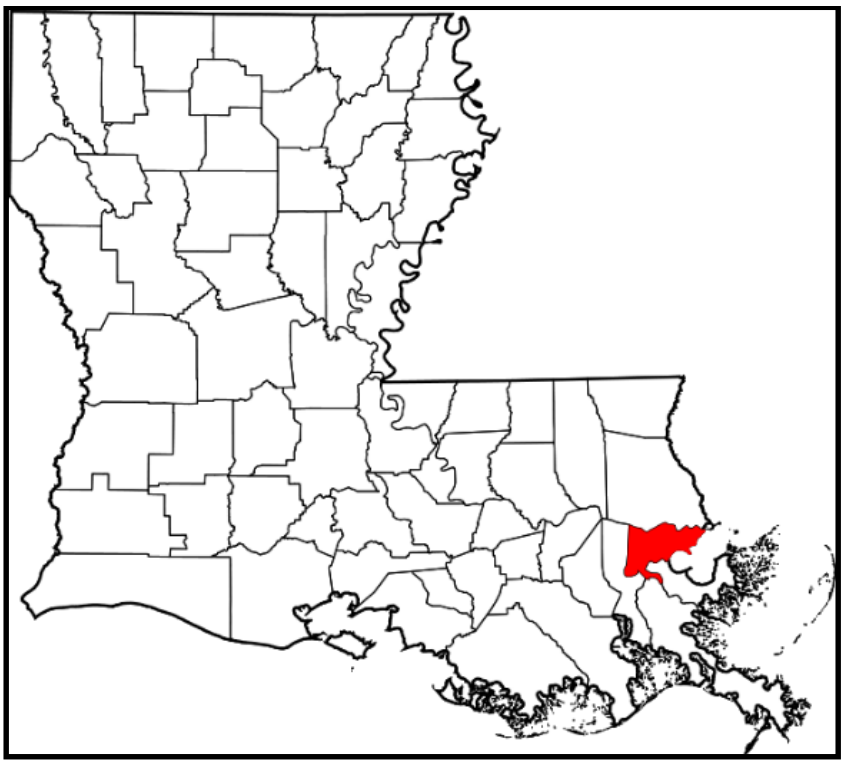

Figure 1: State of Louisiana, Orleans Parish highlighted

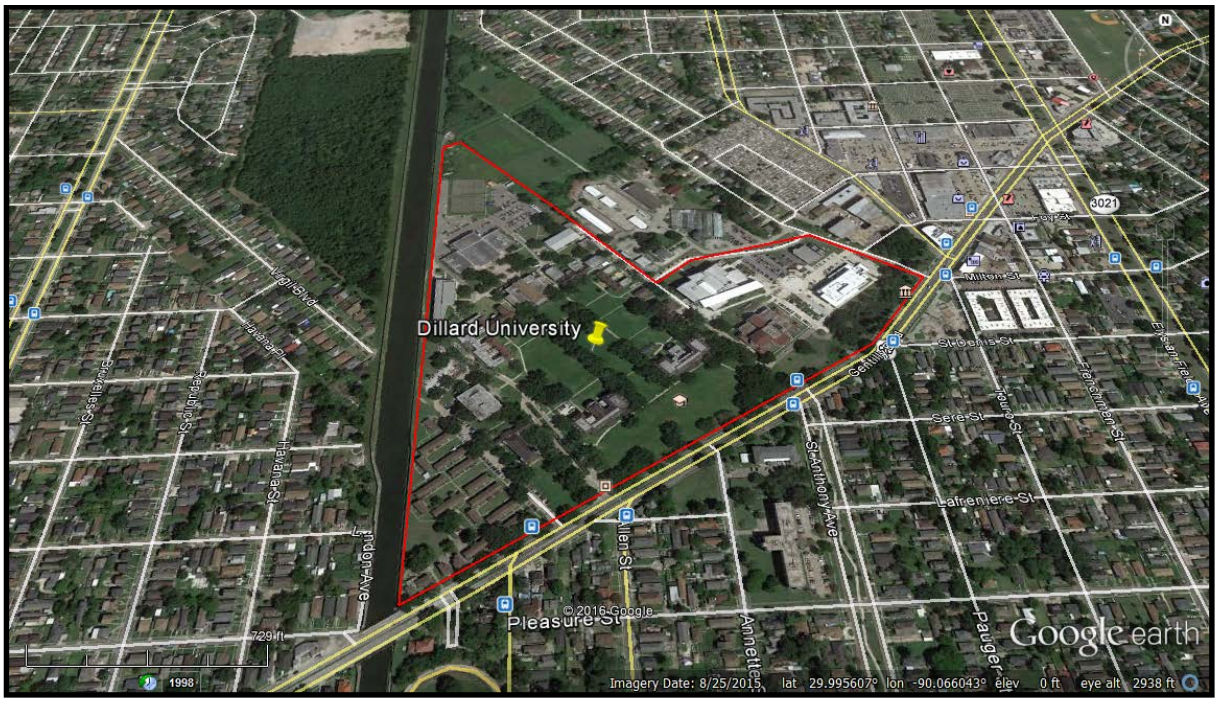

Figure 2: Dillard University Outlined

2.0 PURPOSE AND NEED

Dillard University remains at high risk of water inundation from various sources, including flooding, hurricanes, tropical storms, and thunderstorms. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Dillard University has undertaken a progressive initiative to address the campus drainage issues. The purpose of this project is to construct low-impact mitigation measures and enhance the campus drainage system's ability to capture, store and convey stormwater runoff during moderate to severe rain events which would aid in protecting existing buildings, infrastructure, property, and daily functions of the university from damages caused by flooding.

The university experiences localized flooding during moderate to severe rain events. The campus has experienced historic flooding that has damaged buildings as well as disrupted daily classes; prevented entry/exit at Gentilly Boulevard; and caused closures of University operations. The main causes of the flooding are due to the existing bowl-shaped topography of the campus and its insufficient drainage infrastructure, which has been negatively impacted by subsidence from excessive stormwater ponding. At the University entrance, near Rosenwald Hall, rain waters from Gentilly Boulevard flow from the boulevard to drainage pipes along the campuses' front pedestrian walkways. This flooding is due to the downward slopes from Gentilly Boulevard towards the University. The specific need of this project is to effectively alleviate localized flooding experienced during and after storm events.

3.0 ALTERNATIVES

3.1 No Action Alternative

Under the No Action Alternative, flooding would not be abated or improved. The No Action Alternative would result in continued flooding on the university campus during moderate to severe rain events. This would result in hazardous conditions for the student population, staff, administration, etc. The university would continue to be at risk for incurring future damages by flooding from future events, including damages to buildings, contents, level of services, flood related closures. This alternative does not meet the purpose and need, but will continue to be evaluated throughout this EA and serve as a baseline comparison of impacts from other action alternatives.

3.2 Proposed Action: Overall System Improvements, Resizing of grassed swales, Expansion of Concrete-lined ditch, and Construction of dry detention pond

The applicant proposes to improve the existing subsurface drainage infrastructure. These improvements would include increasing the diameter, expanding the length, and realigning - where feasible - to connect hydraulically as an integrated system. This new subsurface system would also connect with newly designed and/or upgraded storm water surface detention and conveyance features located throughout the University. As a result the drainage system would work more effectively (capturing, storing, and conveying rainfall runoff) as one overall gravity system. Scope of work to occur on the campus of Dillard University within three corner coordinates: (29.999333, -90.068451), (29.992610, -90.068028), and (29.996760, -90.062039).

The overall system improvements consist of upgrading and realigning the existing collector storm pipes into a network of nine (9) subsurface drainage systems. The existing concrete-lined ditch would be re-sized and three (3) grassed swales and one large dry detention pond would be built integral with the subsurface drainage system. The following scope of work (SOW) summary illustrates the low-impact mitigation measures to be constructed.

Storm Drain 1 (SD-1)

SD-1 is located along Gentilly Blvd. and connects to the Sewage and Water Board (S&WB) storm drainage system. Approximately 260 linear feet of 6”and 12” diameter lines would be replaced with 970 linear feet of 15” diameter pipes. It is important to note that the connecting pipe sizes and locations to the S&WB system along Gentilly Blvd. would not be changed from what exists. Nonetheless, a change from the existing drainage system would be that SD-1 would have the ability to convey stormwater toward the rear of the campus through new connections to be built via storm drains SD-9A and SD-2. As a result, drainage from the front entrance of the campus entering SD-1 would also have access to the mitigation features located at the rear of the campus, including the new grassed swales, concrete ditch and the dry detention pond.

Storm Drain 2 (SD-2)

Storm drain SD-2 is connected to SD-1 along Gentilly Blvd. but flows in a northerly direction into Swale No 2 which ultimately discharges into the concrete-lined ditch at the rear of the campus, which would discharge into the proposed detention pond. Approximately 340 linear feet of 10" diameter pipes would be increased to approximately 800 linear feet of 18" and 24" equivalent pipes.

Storm Drain 3 (SD-3)

SD-3 would collect stormwater from Swale No. 3 and would discharge from SD-4 and connect into SD-8 to convey flow into the existing concrete-lined ditch and the proposed detention pond. Approximately 970 linear feet of 10", 12", 15" and 30" storm drain would be expanded with over 1,200 linear feet of 15" and 36" equivalent pipes.

Storm Drains 4 and 4A (SD-4, SD-4A)

SD-4 collects stormwater from Swale No. 2 and the Avenue of the Oaks, and SD-4A collects stormwater runoff from the campus area south of Kearny Hall, and between Camphor Hall and Kearny Hall. Approximately 500 linear feet of 12", 15" and 18" storm drain has been improved with over 470 linear feet of 24" and 30" equivalent pipe sizes.

Storm Drains 5, 5A and 6 (SD-5, SD-5A, SD-6)

SD-5, SD-5A and SD-6 collect runoff from the campus areas west of the Cook Fine Arts Center and the Professional Schools and Sciences Building and the areas east of Straight Hall, Williams Hall and Henson Hall. Approximately 800 linear feet of 12", 24" and 30" equivalent pipes have been upgraded with over 1,300 linear feet of 18", 24" and 36" pipes. Collected runoff is discharged into the concrete-lined ditch and is diverted into the dry detention pond.

Storm Drains 7 and 7A (SD-7, SD-7A)

SD-7 and SD-7A collect runoff from the western area of the campus north of Camphor Hall, east of the DUICEF Building, the area west of Dent Hall, and the tennis courts. Approximately 800 linear feet of 12", 15" and 24" storm drain has been improved with over 1000 linear feet of 15", 24", 30", 36" and 42" equivalent pipes. Discharge is conveyed directly into the dry detention pond but also has access to the concrete-lined ditch.

Storm Drain 8 (SD-8)

SD-8 conveys stormwater from SD-7 and SD-3 to the concrete-lined ditch. SD-8 collects stormwater runoff from the rear campus parking areas north of Dent Hall. Approximately 130 linear feet of 12" storm drain would be expanded with over 465 linear feet of 24", 36", and 42" equivalent pipe sizes. Discharge from SD-8 enters the concrete-lined ditch and is eventually diverted into the dry detention pond.

Storm Drain 9 and 9A (SD-9, SD-9A)

SD-9 and SD-9A collect runoff from the area south and west of Rosenwald Hall including Virgil Blvd. SD-9 flows in a northerly direction that discharges into Swale No. 2. SD-9A connects SD-1 with SD-9 and also flows by gravity in the northerly direction. Proposed improvements to SD-9 and SD-9A includes replacing approximately 500 linear feet of 10" and 18" diameter storm drain with over 1,600 linear feet of 24" storm pipes.

Concrete Lined Ditch

The existing concrete lined ditch located in the rear of the campus collects stormwater runoff flowing northeasterly and discharges the runoff through an earthen-lined open channel to the City of New Orleans drainage system at Warrington Drive and Mandolin Street. The ditch would be improved along its length with concrete, through an expansion in width and length to maximize storage capacity and improve conveyance to the Mandolin Canal. The proposed improvements would also reduce ditch maintenance. The existing ditch is approximately 550 feet in length and has a 2-foot wide bottom and is approximately 4 feet deep. The improvements to the existing ditch would be 660 feet in length with a 6-foot wide bottom and the same depth as existing (4 feet).

Grassed Swales Nos. 1-3

Three (3) depressed grassed swale storage areas would be constructed within the campus to increase storage capacity within the campus drainage system and to reduce the peak discharge rate to the downstream public stormwater system. The three (3) swales would be constructed to help detain stormwater before reaching the underground stormwater drainage system. The swale grading would be moderate, (with maximum slopes not exceeding 10:1) such that their appearance would blend-in with the surrounding area. Swale No. 1 located near the southeast corner of Albert W. Dent Hall would cover an area of approximately 4,000 square feet and would have a depth of approximately 1.0 foot (coordinates 29.997554, -90.067130). Swale No. 2, located west of the Avenue of the Oaks, north of Rosenwald Hall, would cover an area of approximately 21,000 square feet and have of depth of approximately 4.0 feet (coordinates 29.995518, -90.066802). Swale No. 3, located east of the Avenue of the Oaks and north of Stern Hall would cover an area of approximately 11,000 square feet and would have a depth of approximately 1.5 feet (coordinates 29.996068, -90.065887).

Detention Pond (No. 5)

The applicant proposes to construct a triangular shaped detention pond located in the northwest corner of the campus property on land that is presently owned by the City of New Orleans Parks and Parkways Commission. The proposed detention pond would be 6.5 feet deep, cover a surface area of approximately 39,000 square feet and would provide approximately 176,000 cubic feet of storage volume (coordinates 30.000674, -90.067865). The pond would benefit the University as well as adjacent communities since the proposed storage of water would slow the rate at which water is discharged from the campus into the City of New Orleans drainage system. Therefore, adjacent communities would realize drainage improvement as well.

Sheet Pile Wall Adjacent to Dry Detention Pond

The SOW would also include the installation of a sheet pile cut-off wall 346 feet by 48 feet adjacent to the detention pond and parallel to the London Avenue Canal Floodwall. The top of the sheet pile wall would be buried approximately 10 inches below the top of the ground surface and the bottom tip elevation of the wall would be driven down to 48.5 feet below sea level. The bottom tip elevation was calculated to maintain at least 5 feet of embedment into the subsurface clay layer. The construction of the new wall would minimize the possibility of groundwater interaction with the London Avenue Canal and would satisfy USACE's geotechnical factor of safety requirements for the construction of detention pond within 300 feet of the Floodwall. The applicant is in the process of securing a USACE permit for this action.

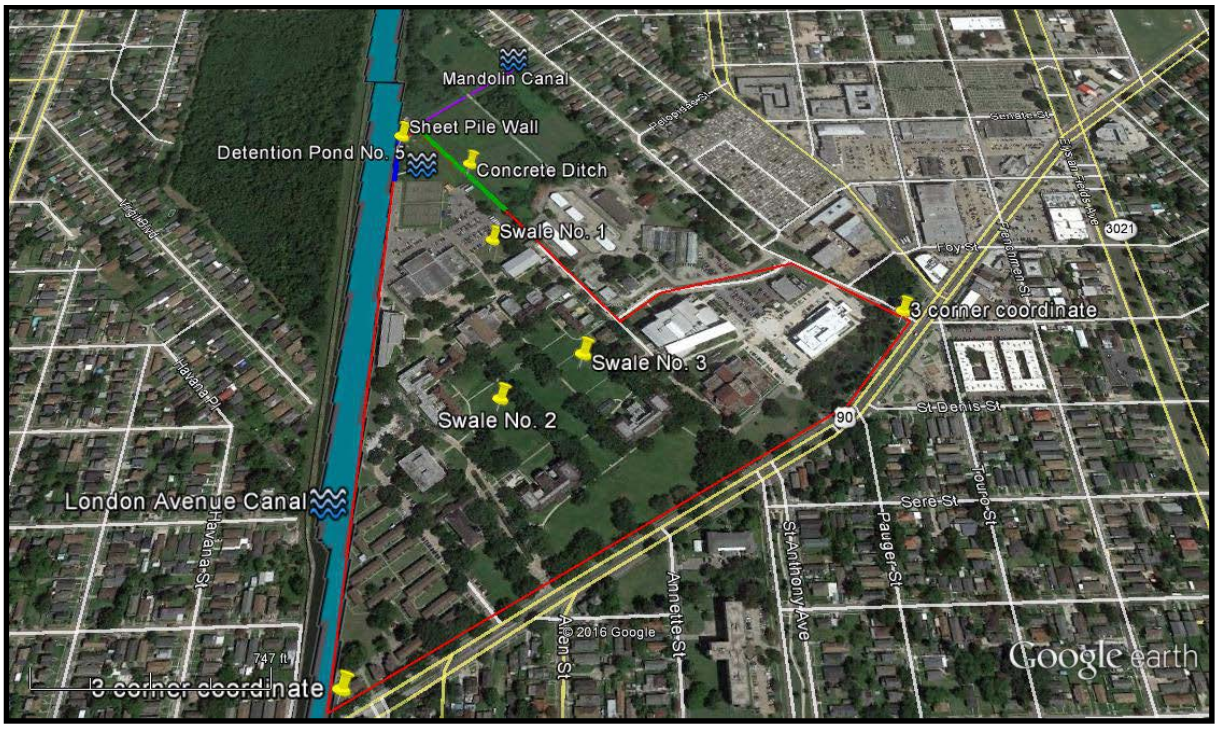

Figure 3: Proposed Drainage Improvement Locations

3.3 Considered Alternative: Temporary Flood Wall and Levee System

This alternative consists of building a temporary modular flood wall and levee system around the perimeter of the campus. This alternative would have incorporated the installation of modular panels around the campus to form a barrier against high water levels. The panels would have to be installed upon alert of potential severe storm threat. Through studies and town hall meetings, it was determined that this would not be a viable option based on the high operational cost incurred by the university to install and remove the panels prior to and after a storm event; and the potential adverse esthetic, hydrologic, and hydraulic impact on the neighboring community. Thus, this alternative will not be carried forward or evaluated.

4.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

4.1 Impact Summary

FEMA-EHP consulted with resource agencies on December, 31, 2015. To date, FEMA-EHP has not received all responses/concurrence from the solicitation of views that were submitted to the resource agencies. However, FEMA-EHP has reviewed the proposed action, the no action alternative, and a considered action alternative and has determined that the proposed action alternative would not result in significant environmental impacts to the human or natural environment. The matrix below summarizes the results of the environmental review process (Table 1). Potential environmental impacts that were found to be negligible are not further evaluated. Resource areas that have the potential for impacts of minor, moderate, or major intensity are further developed in the subsequent sections. Definitions of impact intensity are described below:

Negligible: The resource area (e.g., geology) would either not be affected, changes would be non-detectable, or if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable. Effects to Cultural Resources would be either non-existent, i.e., a building is less than 50 years old and/or no known archeological sites are present on the site, or the project is determined not likely to affect and State Historic Preservation Officer (SHPO)/Tribal Historic Preservation Officer (THPO) concurs. No mitigation is needed.

Minor: Changes to the resource would be measurable, although the changes would be small and localized. Impacts would be within or below regulatory standards, as applicable. Mitigation measures would reduce any potential adverse effects. Effects to Cultural Resources are not likely, i.e., building is at least 50 years old and/or known archaeological sites are near the project area, but special conditions/mitigation are sufficient to maintain the "not likely to affect determination."

Moderate: Changes to the resource would be measurable and have both localized and regional scale impacts. Impacts would be within or below regulatory standards, but historical conditions would be altered on a short-term basis. Mitigation measures would be necessary to reduce any potential adverse effects. Effects to Cultural Resources are likely, i.e., building is 50 years old and/or known archeological sites are in the project area. Impacts would have at least local and possibly regional scale impacts.

Major: Changes would be readily measurable and would have substantial consequences on a local and regional level. Impacts would exceed regulatory standards. Mitigation measures to offset the adverse effects would be required to reduce impacts, although long-term changes to the resource would be expected. Effects to Cultural Resources are likely, i.e., building is at least 50 years old and/or known archaeological sites are in the project area. Impacts would have substantial consequences on a local and regional level.

Table 1: Affected Environment and Environmental Consequences Matrix (Preferred Action: Dillard University Drainage Improvements)

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Geology and Soils	Negligible	The Farmland Protection Policy Act (FPPA: Public Law 97-98, §§ 1539-1549; 7 U.S.C. 4201, *et seq*.) was enacted in 1981 and is intended to minimize the impact federal actions may have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. It assures that, to the extent possible, federal programs and policies are administered to be compatible with state and local farmland protection policies and programs. Farmland subject to FPPA requirements can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. NRCS policy clarifies several activities that are not subject to the rules and regulations of the FPPA: "projects on land already in urban development or used for water storage" – which is applicable here. Per review of the National Resources Conservation Services (NRCS) Web Soil Survey, the soils located on the proposed project area are Cancienne silt loam (Cm), (approximately 90% of project area), Cancienne silty clay loam (Co) (approximately 6.5% of project area), and Schriever clay (Sk) (approximately 3.1% of project area) all 0 to 1 percent slopes. Potential for short-term localized increase in soil erosion during construction. Per Natural Resources Conservation Services (NRCS) Web Soil Survey, the soil located on the proposed project area is not classified as a prime farmland soil and the proposed project areas would not impact prime farmland and is therefore exempt from the rules and regulations of the FPPA.	NRCS Web Soil Survey accessed 02/16/2016.	Implement construction Best Management Practices (BMPs); install silt fences/straw bales to reduce sedimentation. Area soils should be covered and/or wetted during construction. All precaution should be observed to control nonpoint source pollution from construction activities. Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project. All precaution should be observed to control nonpoint source pollution from construction activities. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Hydrology and Floodplains (Executive Order 11988)	Minor	Executive Order (EO) 11988 (Floodplain Management) requires Federal agencies to avoid direct or indirect support or development within the 100-year floodplain whenever there is a practicable alternative. FEMA's regulations for complying with EO 11988 are found at 44 CFR Part 9. All areas of selected alternative modifications are outside the Special Flood Hazard Area, per preliminary Flood Insurance Rate Map, panels 22071C 0114F, 22071C 0227F, and 22071C 0231F, 12/01/2014, which is considered the best available data regarding floodplain inundation at this time. The locally adopted map places this proposal in a Special Flood Hazard Area. The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s)/authorizations prior to the start of any activities		The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards. Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Wetlands (Executive Order 11990)	Negligible	EO 11990, Protection of Wetlands, directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects. FEMA regulations for complying with EO 11990 are found at 44 CFR Part 9, Floodplain Management and Protection of Wetlands. Per EPA response dated February 10, 2016, jurisdictional waters of the U.S. may occur on the proposed sites. The EPA does not object to the project and recommends coordination with the U.S. Army Corps of Engineers at the New Orleans District Office to verify which permits, if any, are needed. Per dated correspondence, the applicant is in the process of securing an USACE permit. All conditions and mitigations requirements of said permit must be adhered to before initiating any work.	FEMA submitted SOVs on 12/31/2015.EPA Region 6 Wetlands Section response dated 02/10/2016. USACE response received 04/29/2016. See Appendix C External Agency Correspondence.	The applicant is responsible for coordinating with and obtaining any required Section 401 and Section 404 Permit(s) from USACE prior to initiating work. All conditions of the permit must be adhered to. Failure to do so would jeopardize receipt of federal funding. All coordination pertaining to these activities should be documented and copies forwarded to the State and FEMA as part of the permanent project files. Extreme care should be taken during the construction process through the appropriate use and maintenance of BMPs. Erosion Control Devices (ECDs) such as silt fencing, hay bales, sediment traps, etc. must be used and maintained extensively to prevent any potential direct or indirect adverse impacts to nearby wetland areas per the Clean Water Act (CWA) and EO 11990. Potential concerns include but are not limited to silting-in and contamination from spills. Any changes or modifications to the proposed project would require a revised determination. Off-site locations of activities such as borrow, disposals, haul- and detour roads, and work mobilization site developments may be subject to USACE regulatory requirements. Department of Army (DA) Section 404 permit would be required prior to the deposition or distribution of dredged or fill material into the wetland. Applicant must comply with Regional Condition 9: For installation of culverts, twenty percent (20%) of the culvert diameter (20 percent of the height of elliptical culverts) must be installed below the natural grade of the stream. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Surface Water and Water Quality	Negligible	USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to §§ 401 and 404 of the CWA. Section 402 of the CWA, entitled National Pollutant Discharge Elimination System (NPDES), authorizes and sets forth standards for state administered permitting programs regulating the discharge of pollutants into navigable waters within the state's jurisdiction. The USACE also regulates the building of structures in waters of the U.S. pursuant to §§ 9 and 10 of the Rivers and Harbors Act (RHA). The applicant must adhere to the conditions of the USACE project response dated April 22, 2016. Although there is potential for short-term localized increase in sedimentation during construction, the project as proposed would not have significant long term impacts to water quality.	FEMA submitted SOVs on 12/31/2015. LDEQ response received 01/15/2016. USACE response received 04/29/2016. See Appendix C External Agency Correspondence.	Applicant must coordinate with USACE prior to the start of construction to acquire any necessary permits or authorizations, if any, are required. The work shall be accomplished in accordance with vicinity maps and drawings provided to the USACE. The sheet-pile wall should be installed prior to the excavation of the retention pond to avert any complications from seepage concerns. The applicant must have a mandatory order of work in which the installation of the sheet-pile should precede any work on the excavation of the detention pond. Any damage to the floodwall and/or levee right-of-way resulting from the applicant's activities shall be repaired at the applicant's expense. If changes in the location or section of the existing floodwall, or in the generally prevailing conditions in the vicinity, be required in the future in the public interest, the applicant shall make changes in the project concerned, or in the arrangement thereof, as may be necessary to satisfactorily meet the situation and shall bear the cost thereof. The applicant must provide written notification to the USACE of the construction timeline to include the start and end dates. Additionally, the applicant must notify USACE prior to the commencement and prior to the completion of the approved scope of work. Applicant must comply with all conditions of the permit and forward all correspondence to GOHSEP and FEMA for inclusion in the project files. The project results in a discharge to waters of the State; submittal of a LPDES application is necessary. All precautions must be observed to control nonpoint source pollution from construction activities. LDEQ has storm-water general permits for construction areas equal to or greater than one (1) acre. The applicant must contact the LDEQ Water Permits Division at 225- 219-9371 to determine if the proposed project requires a permit. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at 225- 219-9371. If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at 225-219-3640 is required. Additionally, precautions must be taken to protect workers from these hazardous constituents. Erosion Control Devices (ECD's) such as silt fencing, hay bales, sediment traps, etc. must be **used and maintained extensively** to prevent any potential direct or indirect adverse impacts to nearby waterways. See also Section 6.0 Conditions and Mitigation Measures.
Groundwater	Negligible	The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. Orleans Parish does not overlay a Sole Source Aquifer. Project as proposed is not expected to affect any groundwater.	EPA NEPAssist Tool. See Appendix C External Agency Correspondence.	The contractor must observe all precautions to protect the groundwater of the region. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Wild and Scenic River	Negligible	The Wild and Scenic Rivers Act (Act), (P. L. 90-543 as amended: 16 U.S.C. 1271-1287) established a method for providing federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. There are no Wild and Scenic Rivers in the project vicinity.	National Wild and Scenic Rivers System and LDWF response dated 01/22/2016	Not applicable.
Coastal Resources	Minor	The Coastal Zone Management Act of 1972 (CZMA) encourages the management of coastal zone areas and provides grants to be used in maintaining coastal zone areas. It is intended to ensure that federal activities are consistent with state programs for the protection and, where, possible, enhancement of the nation's coastal zones. The USFWS regulates federal funding in Coastal Barrier Resource System (CBRS) units under the Coastal Barrier Resources Act (CBRA). This Act protects undeveloped coastal barriers and related areas (*i.e.*, Otherwise Protected Areas [OPAs]) by prohibiting direct or indirect Federal funding of projects that support development in these areas. The project is not on or connected to a CBRS or OPA. Per LDNR response P20160002 the project site is located within the Louisiana Coastal Zone and would require a Coastal Use Permit (CUP).	FEMA submitted SOVs on 12/31/2015. U.S. Fish & Wildlife Service, Louisiana Digital Coastal Barrier Resource System Boundaries Map. LDNR CUP No P20160002 dated 01/05/2016.	The applicant is responsible for coordinating with and obtaining the required permit(s) from the Louisiana Department of Natural Resources' (LDNR) Coastal Management Division prior to initiating work. Projects may be coordinated by contacting LDNR at 1-800-267-4019. All coordination activities should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files.
Air Quality	Negligible	The Clean Air Act (CAA) requires the State of Louisiana to adopt ambient air quality standards to protect the public from potentially harmful amounts of pollutants. The LDEQ has designated areas meeting the state's ambient air quality standards by their monitoring and modeling program efforts. Orleans Parish is classified as attainment under the National Ambient Air Quality Standards (NAAQS) and has no general conformity determination obligations. The proposed project includes activities that would produce a minor, temporary, and localized impact on air quality from vehicle emissions and fugitive dust particles.	FEMA submitted SOVs on 12/31/2015. LDEQ response received 01/15/2016. See Appendix C External Agency Correspondence.	Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Vegetation and Wildlife	Negligible	The Fish and Wildlife Coordination Act (FWCA) provides the basic authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires Federal agencies that construct, license or permit water resource development projects to first consult with the Service (and the National Marine Fisheries Service [NMFS] in some instances) and State fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. The site is developed in an urban area with native vegetation present. Impacts of the proposed project would be temporary, but native vegetation would reemerge after construction.	FEMA submitted SOVs on 12/31/2015. LDWF response dated 01/22/2016. See Appendix C External Agency Correspondence.	Extreme care must be taken during the construction process through the appropriate use and maintenance of BMPs. See also Section 6.0 Conditions and Mitigation Measures.
Threatened and Endangered Species (Endangered Species Act Section 7)	Negligible	The Endangered Species Act (ESA) of 1973 prohibits the taking of listed, threatened, and endangered species unless specifically authorized by permit from the USFWS or the National Marine Fisheries Service. No rare, threatened, or endangered species are present on the site. No impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or Federal parks, wildlife refuges, or wildlife management areas are known at the site.	USFWS ESA Technical Assistance Tool accessed on 02/10/2016. LDWF response dated 01/22/2016 See Appendix C External Agency Correspondence.	Per the ESA Technical Assistance Tool, if there are any changes to the scope or location of the proposed project or if the project has not been initiated one (1) year from the date of the solicitation of views (02/10/2016), the applicant/FEMA is responsible for coordinating with USFWS prior to making any expenditures as threatened and endangered species information is updated annually. If the scope or location of the proposed project are changed coordination should occurs as soon as changes occur. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Cultural Resources (National Historic Preservation Act Section 106)	Moderate	Section 106 of the National Historic Preservation Act (NHPA) requires Federal Agencies to take into account their effects on historic properties (i.e. historic and cultural resources) and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. FEMA has reviewed this project under 36 CFR Part 800 and determined that there is a finding of an Adverse Effect to Historic Properties. FEMA will mitigate the adverse effects of the Undertaking through the implementation of Standard Treatment Measures in accordance with Stipulation X of the LA HMGP PA. See Cultural Resources Section 4.3.	FEMA initiated SHPO and THPO consultations dated January 21, 2016. The SHPO, the Choctaw Nation of Oklahoma (CNO) and the Muscogee Creek Nation (MCN) concurred with FEMA's determination.	In accordance with Stipulation X of the LA HMGP PA, FEMA will resolve the adverse effects of the Undertaking through implementation of Standard Treatment Measure, X.E.1, Digital Photography, as detailed in the Standard Mitigation Measures Agreement (SMMA) dated January 21, 2016. If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within twenty-four hours of the discovery. The applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within seventy-two hours of the discovery. (Louisiana Unmarked Human Burial Sites Preservation Act) If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform its, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who should in turn contact FEMA Historic Preservation (HP) staff. The applicant should not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause). See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Environmental Justice (Executive Order 12898) Socioeconomics	Negligible	EO 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed on February 11, 1994. The EO directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high adverse human health, environmental, economic, and social effects of its programs, policies and activities on minority or low-income populations. According to the U.S. Census Bureau, 2010-2014 Five-Year American Community Survey, the estimated percent populations of zip code 70122 are 79.8% Black/African American, 3.7% Hispanic/Latino and, 18.1% White. The median family income estimate for 2014 was $37,116, and 24.3% of families earned incomes below the poverty level. Low income or minority population are in or near project area; however, the proposed project would not have a disproportionately high and/or adverse impact on low income or minority populations. This proposal would benefit all populations in the community.	U.S. Census Bureau, 2010-2014 Five-Year American Community Survey	N/A

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Resource Conservation and Recovery Act (RCRA)	Negligible	The objectives of the RCRA are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Project involves excavation of soil and existing culvert and/or piping. All debris should be disposed of at a permitted landfill.		If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at 225-219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies. Applicant is responsible for acquiring LDEQ permits for the temporary debris staging and reduction sites (TDSRS) associated with this project prior to project closeout. Failure to provide FEMA with LDEQ approval may jeopardize project funding eligibility. All debris should be disposed of at a permitted landfill. See also Section 6.0 Conditions and Mitigation Measures.
Noise	Negligible	Noise is commonly defined as unwanted or unwelcome sound, and most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. Sound is federally regulated by the Noise Control Act of 1972, which charges the Environmental Protection Agency (EPA) with preparing guidelines for acceptable ambient noise levels. EPA guidelines, and those of many other federal agencies, state that outdoor sound levels in excess of 55 dB day-night average sound level (DNL) are "normally unacceptable" for noise-sensitive land uses including residences, schools, or hospitals. During the construction period there would be a short-term increase in noise levels.		Mitigation and abatement measures would be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Public Safety and Access	Negligible	Congress passed the Occupational and Safety Health Act (OHSA) to ensure worker and workplace safety. The goal was to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. During construction heavy equipment should not be located in a populated area. Impacts to public safety and security should be minimized with mitigation measures, including following Occupational Safety and Health Administration (OSHA) regulations.		The contractor must place fencing around the work area perimeters to protect nearby residents from vehicular traffic. To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations and the USACE safety manual. The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns. See also Section 6.0 Conditions and Mitigation Measures.
Traffic and Transportation	Negligible	Traffic volumes near the respective work access areas would increase temporarily during work activities.		Appropriate signage and barriers should be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes. The contractor must implement traffic control measures, as necessary. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Hazardous Materials and Toxic Wastes	Negligible	The management of hazardous materials is regulated under various federal and state environmental and transportation laws and regulations, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Toxic Substances Control Act of 1976 (TSCA); the Emergency Planning and Community Right-to-Know Act; the Hazardous Materials Transportation Act; and the Louisiana Voluntary Investigation and Remedial Action statute. The purpose of the regulatory requirements set forth under these laws is to ensure the protection of human health and the environment through proper management (identification, use, storage, treatment, transport, and disposal) of these materials. Some of these laws provide for the investigation and cleanup of sites already contaminated by releases of hazardous materials, wastes, or substances. Per NEPAssist database search, there are no Louisiana State Brownfield (LSB), Superfund, hazardous waste (RCRA), or Toxic Release Inventory sites located within 0.5 mile of the sites.	EPA NEPAssist Tool accessed on 02/10/2016	If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area. If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's (SPOC) at 225-219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. The LDNR Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are encountered during construction work. For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020 prior to commencing operations. See also Section 6.0 Conditions and Mitigation Measures.

Resource Area	Impact	Impact Summary	Agency Coordination/Permits	Mitigation
Climate Change	Negligible	E.O. 13514, Federal Leadership in Environmental, Energy, and Economic Performance, signed on 5 October 2009, directs federal agencies to reduce greenhouse gases (GHG) emissions and address climate change in NEPA analyses. E.O. 13514 identifies numerous energy goals in several areas, including GHG management, management of sustainable buildings and communities, and fleet and transportation management. The GHGs covered by this E.O. are: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). These GHGs have varying heat-trapping abilities and atmospheric lifetimes (U.S. President 2009). E.O. 13653, Preparing the United States for the Impacts of Climate Change, agencies "reform policies and Federal funding programs that may, perhaps unintentionally, increase the vulnerability of natural or built systems, economic sectors, natural resources, or communities to climate change related risks." In response to this directive, FEMA has begun augmenting its flood risk information to reflect potential sea level rise, considering climate change in hazard mitigation planning, and affording grantees the opportunity to incorporate climate resilience measures in alternate projects (DHS 2013, 2014). This alternative potentially includes short-term impacts to air quality resulting from construction activities. Particulate emissions from the generation of fugitive dust during project construction would likely be increased temporarily in the immediate project vicinity. Other emission sources on site could include internal combustion engines from work vehicles, air compressors, or other types of construction equipment. These effects would be localized and of short duration. No significant post-construction change in GHG emissions would be expected.	EO 13514 - Federal Leadership in Environmental, Energy, and Economic Performance https://www.fedcenter.gov/programs/eo13514/ EO 13423 - Strengthening Federal Environmental, Energy, and Transportation Management http://www.gpo.gov/fdsys/pkg/FR-2007-01-26/pdf/07-374.pdf EO 13693 - Planning for Federal Sustainability in the Next Decade https://www.whitehouse.gov/the-press-office/2015/03/19/executive-order-planning-federal-sustainability-next-decade EO 13653 - Preparing the United States for the Impacts of Climate Change http://www.gpo.gov/fdsys/pkg/FR-2013-11-06/pdf/2013-26785.pdf	To reduce potential short term effects to air quality from construction-related activities, the contractor would be responsible for using BMPs to reduce fugitive dust generation and diesel emissions. Emissions from the burning of fuel by internal combustion engines would temporarily increase the levels of some of the criteria pollutants, including CO, NOx, O3, and PM10, and non-criteria pollutants such as Volatile Organic Compounds (VOCs). To reduce these emissions, running times for fuel-burning equipment should be kept to a minimum and engines should be properly maintained.

4.2 Floodplains

Executive Order (EO) 11988 (Floodplain Management) requires federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practicable alternative. A floodplain is defined as the lowland and relatively flat areas adjoining inland and coastal waters, including at a minimum that area subject to a 1 percent or greater chance of flooding in any given year. FEMA complies with EO 11988 through 44 CFR Part 9, Floodplain Management and Protection of Wetlands. FEMA typically uses Flood Insurance Rate Maps (FIRM) created by the NFIP, as the best available flood data. However, in cases where overwhelming evidence exists, typically due to recent flood events, FEMA may use Advisory Base Flood Elevation Maps (ABFE) or preliminary FIRMs as best available data.

EO 11988 requires federal agencies proposing activities in a 100-year floodplain to consider alternatives and avoid adverse effects and incompatible development in the floodplain.

No Action Alternative:

The No Action Alternative would not improve the drainage on this campus. Roads, and possibly buildings, would continue to flood causing further damage to the community.

Proposed Action:

While the project appears to be outside the SFHA on the preliminary FIRM (FEMA's best available data), the City of New Orleans has floodplain management requirements that are more restrictive (ABFEs are the locally adopted code). In accordance with EO 11988 (Floodplain Management) and EO 11990 (Wetland Protection), an 8 Step-Process assessment was prepared by FEMA to evaluate the impacts related to the construction of the Proposed Action within the 100-year floodplain (Appendix E). Since the project location is in zone X (shaded), per step 1, this project would have no impact on the 100-year floodplain, so no additional steps need to be assessed. FEMA has determined that no other practicable alternative has been identified that would meet the purpose and need of the project. The proposed action would not either directly or indirectly modify the 100-year floodplain, per preliminary FIRM dated 12/01/2014. The various projects would reduce the duration for above ground surface inundation by storm water, as well as maintain or decrease maximum flood heights during rainfall-runoff events at Dillard University.

The results of the post project analysis conclude that the SFHA would not be modified or impacted as a result of the proposed improvements. No direct or indirect impacts would occur to floodplains under the Proposed Action.

4.3 Cultural Resources

4.3.1 Regulatory Setting

The consideration of impacts to historic and cultural resources is mandated under Section 101(b) 4 of the NEPA as implemented by 40 CFR Part 1501-1508. Section 106 of the NHPA requires Federal agencies to take into account their effects on historic properties (i.e. historic and cultural resources) and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. FEMA has chosen to address potential impacts to historic properties through the "Section 106 consultation process" of NHPA as implemented through 36 CFR Part 800.

To fulfill Section 106 responsibilities, FEMA has initiated consultation on this project in accordance with the *Louisiana State-Specific Programmatic Agreement* (LA HMGP PA) dated January 31, 2011, between the *Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the Louisiana State Historic Preservation Officer (SHPO), the Alabama- Coushatta Tribe of Texas, the Chitimacha Tribe of Louisiana, the Choctaw Nation of Oklahoma, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Seminole Tribe of Florida, and the Advisory Council on Historic Preservation Regarding FEMA's Hazard Mitigation Grant Program* (http://www.fema.gov/pdf/hazard/hurricane/2005katrina/LA_HMGP%PA.pdf). The LA HMGP PA was created to streamline the Section 106 review process for all FEMA HMGP projects in Louisiana resulting from Hurricanes Katrina and Rita.

The "Section 106 process" outlined in the LA HMGP PA requires the identification of historic properties that may be affected by the proposed action or alternatives within the project's APE. Historic properties, defined in Section 101(a)(1)(A) of NHPA, include districts, sites (archaeological and religious/cultural), buildings, structures, and objects that are listed in or determined eligible for listing in the NRHP. Historic properties are identified by qualified agency representatives in consultation with interested parties. Table 3 contains the assessment of the impacts for the alternative under consideration.

4.3.2 Existing Conditions

Dillard University - Standing Structures

The Dillard Historic District is located within a portion of the Dillard University campus. The district was listed in the NRHP on April 10, 2003, under Criterion A, for its association with education and African-American heritage, at both the state and local level of significance, considering that the university has provided a quality education to thousands of African-Americans, principally from New Orleans and southern Louisiana for several decades. Dillard played a critical role in educating what at the time would have been considered the black elite. As it was widely believed that private colleges and universities were the very best institutions African-Americans could receive a respectable education in the segregated south.

The period of significance for the listed National Register Historic District (NRHD) is from 1935-1952. Nine buildings (that include the President's House, four dormitories,

two academic buildings, two administrative buildings) and one power plant encompass the boundaries of the listed historic district which consists of approximately 22 acres (1,215 square meters). The school opened in 1935 with the completion of four major campus buildings designed by New Orleans native architect and colonial American Architecture enthusiast, Moise Goldstein. The campus was originally planned in the Beaux Arts tradition, with ten classical brick buildings painted entirely white and oriented around an extensive open grassed quadrangle with a central lawn separated into two rows of mature live oak trees, or "avenue of oaks" as they are often referred to. Thoughtfully placed sidewalks divide "the avenue" and connect each of the buildings. As typical of the Beaux Arts tradition, Goldstein's design is anchored by a broad central axis with a secondary cross axis (evident in site plan view). It was not until 1945, that prominent Landscape Architect William Wiedorn began implementing his vision on the campus grounds with the women's housing and vehicle circulation that later carried over into the landscape design which has become a prominent feature of the campus in addition to its pristine white architecture.

Dillard University – Archaeological Resources

Upon consultation of data provided by SHPO on October 21, 2015, there are three recorded archaeological sites within ½ mile of the archaeological APE: 16OR417, 16OR538, and 16OR539 (Figure 4). Site 16OR417 is a late 19th early 20th century residence, identified by a FEMA walk-over after demolition. 16OR538 and 16OR539 are late 19th early 20th century residence, identified by shovel testing and pedestrian survey. 16OR417 has not been assessed for its eligibility for the NRHP. 16OR538 and 16OR539 have been determined ineligible for inclusion on the NRHP. None of the sites are within the archaeological APE and they will not be affected by the undertaking.

FEMA archaeologists conducted a site visit that consisted of a pedestrian survey of the APE and excavation of two shovel probes on October 28, 2015. The shovel probes were excavated within the proposed retention swales. These locations afforded an area that will have the most ground disturbance, and the storm lines to be placed further south are mostly re-located in previous storm drains. A single white ware ceramic was identified in the western shovel probe within Layer 1 (20cmbs). A single piece of modern plastic was identified in Layer 2. No other cultural material was identified within either probe. The western probe was excavated to a depth of 110cmbs and the eastern probe to a depth of 95cmbs. The stratigraphy of both probes were similar, with the exception that the eastern probe had a layer of sand fill from 0-10cmbs. The first layer consisted of dark brown loamy clay from 0(10)-25cmbs, the second layer consisted of dark yellowish clay from 25-50cmbs, the third layer consisted of dark gray, sub-soil clay from 50-110cmbs. The depth of the shovel tests exceeded the depth of the proposed swale pond.

The 1723 Newberry Library and 1798 Trudeau maps identify the archaeological APE as being north of Bayou Gentilly/Gentilly Road, in Cypress swamp. The 1878 Hardee map identifies the APE as being north of the Bayou and west of London Avenue Canal. Future neighborhoods are platted adjacent to the APE, but the APE is Cypress Swamp. The Robinson 1883 map does not include the project area. The 1929 Sanborn Fire Insurance Map indicates that the APE is within the Rosehill Cemetery. The Rosehill

Cemetery was gridded, but never actually used as a cemetery. The 1937 Sanborn Fire Insurance Map identifies that Dillard University was established. Dillard University is the first historic construction within the APE, and the APE was Cypress Swamp prior.

A portion of the APE was surveyed in 1999 by PF.NET, LLC. The survey was along the right-of-way north of Gentilly Blvd. for a fiber optics cable. Two archaeological sites were identified within Orleans parish, neither one of them within the archaeological APE. A second survey was conducted along London Avenue Canal in 2008 by R. Christopher Goodwin and Associates, Inc. for Individual Environmental Report Area 5. No archaeological sites were identified within the APE. The northwestern ¾ of the APE is located within the Orleans Parish Low Archaeological Probability Zone, while the southeastern ¼ of the APE is located within the Orleans Parish High Archaeological Probability Zone. The soils in the APE are Convent-Commerce-Sharkey, a recent alluvium.

The construction of the swale/retention ponds and sheet piling is new construction. As identified by the shovel probes, the two southern swale ponds closer to Gentilly Ridge will be located in a disturbed context with limited archaeological material. The construction of the storm drains will mostly be in areas that previous storm drains were placed.

Based upon available evidence it is unlikely that intact NRHP-eligible archaeological deposits would be recovered during the drainage construction project as the area was originally back swamp, there has been no historic construction within the APE until the construction of Dillard University, and archaeological testing revealed only one historic shard in a disturbed context.

4.3.3 Environmental Consequences

4.3.3.1 Alternative 1- No Action

Implementation of the no action alternative would not affect any historic properties because no construction would occur.

4.3.3.2 Alternative 2 – Proposed Action: Overall System Improvements, Resizing of grassed swales, Expansion of Concrete-lined ditch, and Construction of dry detention pond

A review of this alternative was conducted in accordance with FEMA's *Louisiana State-Specific Programmatic Agreement* (LA HMGP PA). The subsurface storm drainage infrastructure SD-1 through SD-9 will be expanded in length and realigned where feasible to connect hydraulically as an integrated underground system; therefore, resulting in a more cohesive gravity system by capturing, storing, and conveying water runoff during rainfall events. Installation of this upgraded subsurface system will take place underground and will not introduce any visual effects to the historic district.

The concrete lined ditch located along the rear eastern boundary of the campus will be expanded in width and length to maximize storage capacity and improve conveyance to

the nearby Mandolin Canal. This proposed improvement is located outside of the Dillard NRHD; therefore, it will not result in a direct effect to the historic district.

The proposed triangular shaped dry detention pond to be located in the northwest corner of the university's campus, approximately 600' feet outside of the Dillard NRHD, This element of the project would not result in a direct effect nor will it present any visual effect to the historic district.

The sheet pile wall proposed for construction will be located adjacent to the dry detention pond. The need for the sheet pile will minimize the possibility of groundwater interaction from the neighboring London Avenue Canal. The sheet pile wall will be constructed -40' feet below the ground surface. This proposed improvement is located approximately 720' feet outside of the Dillard NRHD, and would not result in a direct effect nor will it present any visual effect to the historic district.

The depressed grassed swale storage areas numbers 1-3 will be constructed to increase storage capacity within the campus drainage system and to reduce the peak discharge rate to the downstream public storm water system. The construction of swale number 1 will be located near the southwest corner of Dent Hall, which is situated approximately 130' feet outside of the Dillard NRHD boundary, and would not result in a direct effect t nor will it present any visual effect to the historic district.

The remaining swales will be constructed within the boundaries of the Dillard University NRHD. Swale number 2 will be located east of the Avenue of Oaks, west of the Alumni House and will cover an area of approximately 21, 000 square feet and have a depth of four feet. Swale number 3 will be located west of the Avenue of Oaks and north of Rosenwald Hall and will cover and an area of approximately11, 000 square feet and have a depth of approximately 1.5 feet. As such, the viewshed along the center most portion of the district would be somewhat altered as a result of the construction of swales Number 2 and 3. The size and depth of these swales may alter the appearance of the quadrangle landscape, one of the major characteristics that qualifies the district for listing in the NRHP. In relationship to the overall campus setting, the undertaking will result in a diminishment in the design, setting, feeling and association of the district.

FEMA consulted with the SHPO and affected Tribes regarding the proposed undertaking in a letter dated 21 January 2016. Based on the aforementioned identification and evaluation, FEMA determined that, as a result of the construction of these swales within the historic district, this undertaking will result in an *Adverse Effect* to the Dillard University NRHD, as the essential landscape characteristics and features that illustrate its historic character and significance will be compromised. In accordance with Stipulation X of the LA HMGP PA, FEMA recommended that the adverse effects of the Undertaking will be adequately mitigated through implementation of Standard Treatment Measure, X.E.1, Digital Photography. FEMA received SHPO concurrence with this determination on 22 January 2016.

Consultation with affected Tribes (the Alabama-Coushatta Tribe of Texas, the Chitimacha Tribe of Louisiana, the Choctaw Nation of Oklahoma, the Coushatta Tribe of

Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Muscogee Creek Nation, the Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Tunica-Biloxi Tribe of Louisiana) was conducted per 36 CFR § 800.2(c)(2)(i)(B). The Choctaw Nation of Oklahoma and the Muskogee Creek Nation (MCN) concurred with FEMA's determination.

The Applicant must comply with the NHPA conditions (Louisiana Unmarked Human Burial Sites Preservation Act and Inadvertent Discovery Clause) described in Section 6.0 below.

5.0 CUMULATIVE IMPACTS

The Council on Environmental Quality's (CEQ) regulations state that cumulative impacts represent the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

In its comprehensive guidance on cumulative impacts analysis under NEPA, the CEQ notes that: "[t]he range of actions that must be considered includes not only the project proposal, but all connected and similar actions that could contribute to cumulative effects" (CEQ, 1997). The term "similar actions" may be defined as "reasonably foreseeable or proposed agency actions [with] similarities that provide a basis for evaluating the environmental consequences together, such as common timing or geography" (40 CFR Part 1508.25[a][3]; see also 40 CFR Parts 1508.25[a][2] and [c]).

Not all potential issues identified during cumulative effects scoping need be included in an EA. Because some effects may be irrelevant or inconsequential to decisions about the proposed action and the alternative, the focus of the cumulative effects analysis should be narrowed to important issues of national, regional, or local significance. To assist agencies in this narrowing process, CEQ (2007) provides a list of several basic questions, including: (1) Is the proposed action one of several similar past, present, or future actions in the same geographic area?; (2) Do other activities (governmental or private) in the region have environmental effects similar to those of the proposed action?; (3) Have any recent or ongoing NEPA analyses of similar actions or nearby actions identified important adverse or beneficial cumulative effect issues?; and, (4) Has the impact been historically significant, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

It is normally insufficient when analyzing the contribution of a proposed action to cumulative effects to merely analyze effects within the immediate area of the proposed action. Geographic boundaries should be expanded for cumulative effects analysis, and conducted on the scale of human communities, landscapes, watersheds, or airsheds. Temporal frames should be extended to encompass additional effects on the resources, ecosystems, and human communities of concern. A useful concept in determining appropriate geographic boundaries for a cumulative effects analysis is the project impact

zone; that is, the area (and resources within that area) that could be affected by the proposed action. The area appropriate for analysis of cumulative effects would, in most instances, be a larger geographic area occupied by resources outside of the project impact zone (CEQ 2007).

In accordance with NEPA, and to the extent reasonable and practicable, this EA considered the combined effects of the Proposed Action Alternative, as well as other actions undertaken by FEMA and other public and private entities that also affect environmental resources the proposed action would affect, and that occur within the considered geographic area and temporal frame(s).

Specifically, a range of past, present, and reasonably foreseeable actions undertaken by FEMA within the designated geographic boundary area were reviewed: (1) for similarities such as scope of work, common timing, and geography; (2) to determine environmental effects similar to those of the proposed action, if any; and (3) to identify the potential for cumulative impacts. As part of the cumulative effects analysis, FEMA also reviewed known past, present, and reasonably foreseeable projects of Federal resource agencies and other parties within the designated geographic boundary. These reviews were performed in order to assess past proposed actions, as well as the effects of completed and ongoing actions in order to determine whether the incremental impacts of the current proposed action, when combined with the effects of other past, present, and reasonably foreseeable future projects, are cumulatively considerable or significant.

From August 2005 continuing to April 2016, FEMA funded PA and HMGP projects within the Dillard University geographic area (project center at latitude 29.9971, longitude -90.067), were protective measures, and repair projects for public buildings, public utilities, mitigation measures, and recreational facilities that have occurred, are occurring, or are reasonably foreseen to occur (developed with enough specificity to provide useful information to a decision maker and the interested public) Figure 4.

Over 200 FEMA funded projects near the proposed and related projects throughout Orleans Parish are within a one mile radius of zip code 70122. With the highest concentration of FEMA-funded projects within the one mile buffer around the Dillard University campus, FEMA EHP has chosen a 1.0 mile radius buffer of the hazard mitigation site as an appropriate boundary for a cumulative impact analysis of the proposed actions and alternatives. The maps in Figures 4 and 5 represent FEMA-funded projects funded subsequent to and including Hurricane Katrina. To date, FEMA has funded approximately 225 Public Assistance projects. Types of PA projects categorized by declared disaster within the one mile buffer for HM 0320 were:

Table 2: FEMA Funded PA Program Types

PA Program Type	Grand Total	Disaster 1603[1]	Disaster 1786[2]	Disaster 4080[3]
B - Protective Measures	76	71	2	3
E - Public Buildings	140	132	0	8
F - Public Utilities	1	1	0	0
G - Recreational or Other	8	7	0	1
Totals	*225*	*211*	*2*	*12*

[1]Disaster 1603 - Hurricane Katrina, 09/18/2005
[2]Disaster 1786 - Hurricane Gustav, 09/02/2008
[3]Disaster 4080 - Hurricane Isaac, 08/26/2012

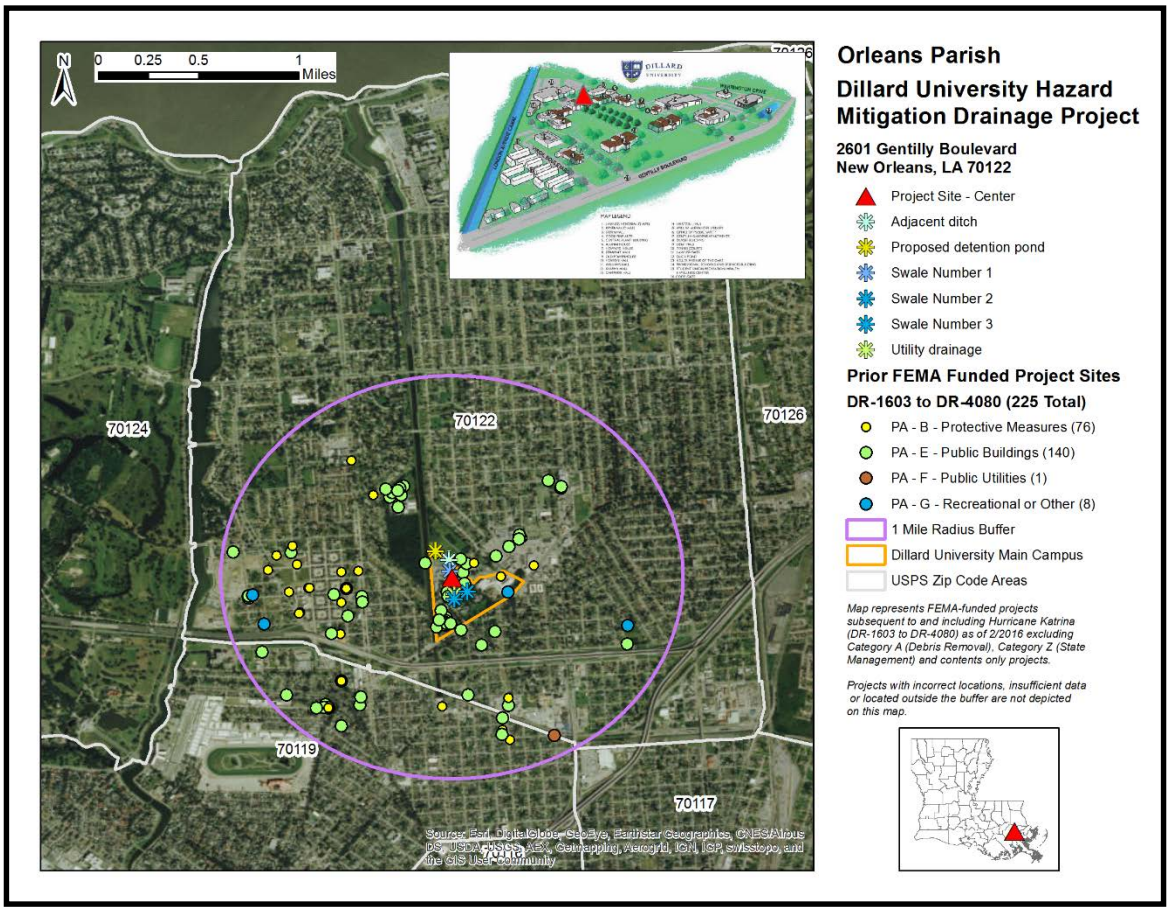

Figure 4: Cumulative Impacts Map, Prior FEMA Funded Projects near Dillard University

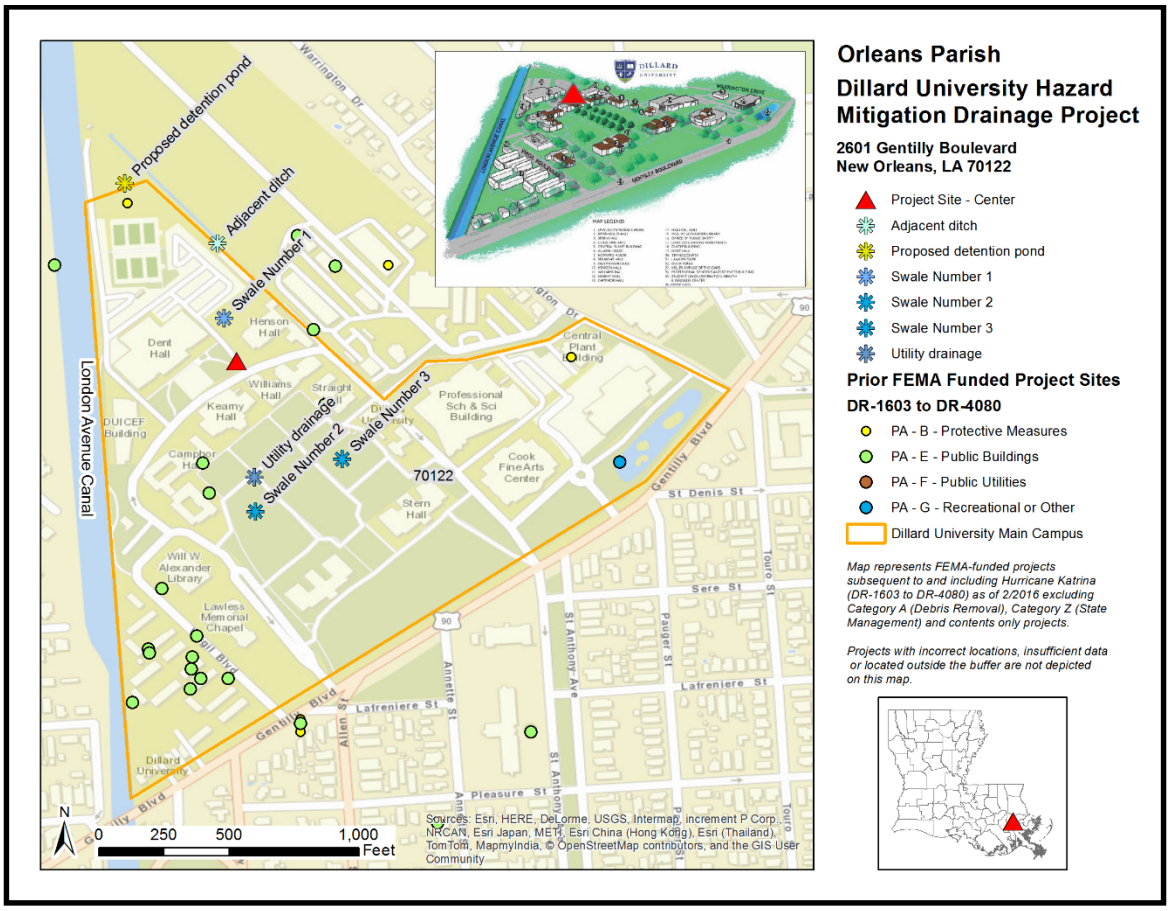

Figure 5: Dillard University Project Area, Zoomed View of Prior FEMA Funded Project Sites

FEMA is also in the process of funding dozens of mitigation (HM) projects in the New Orleans area.

FEMA-funded actions are subjected to various levels of environmental review as a requirement for the receipt of federal funding. An applicant's failure to comply with any required environmental permitting or other condition is a serious violation which can result in the loss of Federal assistance, including funding.

FEMA has determined that the incremental effects of the other infrastructure recovery and improvement actions are likely to be similar to the impacts and effects this EA previously described for the present proposed action, in that the effects to socioeconomic resources are expected to be beneficial, and effects to other resources expected to be either non-existent or minimal and temporary. FEMA has further determined that the incremental impact of the present proposed project, when combined with the effects of other past, present, and reasonably foreseeable future projects, is neither cumulatively considerable nor significant.

These infrastructure actions, some of which have already occurred, and many of which would occur concurrent with and/or subsequent to the proposed action, are necessary in order to restore conditions from previous disasters and to mitigate future damage. Considered in relation to past, present, and reasonably foreseeable future actions, the cumulative impact of the proposed action to the built and natural environment would be minimal, beneficial rather than detrimental, and is not expected to contribute to any adverse effects or to otherwise significantly affect the human environment.

6.0 CONDITIONS AND MITIGATION MEASURES

The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds.

- The applicant is required to comply with all federal, state, and local laws, EOs, and regulations. Failure to do so will jeopardize federal funding.

- Implement construction Best Management Practices (BMPs); install silt fences/straw bales to reduce downslope sedimentation. Area soils must be covered and/or wetted during construction.

- Prior to construction, and in accordance with Stipulation X of the LA HMGP PA, Standard Treatment Measure, X.E.1, Digital Photography (Standard Mitigation Measure) will be implemented according to the terms of the Standard Mitigation Measures Agreement (SMMA), dated January 21, 2016, in order to resolve adverse effects of this undertaking for compliance with Section 106 of the NHPA.

- If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The applicant shall inform its GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who would in turn contact FEMA Historic Preservation (HP) staff. The applicant would not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate (Inadvertent Discovery Clause)

- If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within twenty-four hours of the discovery. The applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within seventy-two hours of the discovery. (Louisiana Unmarked Human Burial Sites Preservation Act)

- If fill is stored on site as part of unit installation or removal, the contractor is required to appropriately cover it.

- Construction contractor is required to obtain applicable Louisiana Pollutant Discharge Elimination System (LPDES) permit, and implement stormwater pollution prevention plan.

- The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. All correspondence must be submitted to FEMA and FEMA-EHP for inclusion in the project files. Should the site plans (including drainage design) change the applicant must submit changes to FEMA-EHP for review and approval prior to the start of construction.

- New construction must be compliant with current codes and standards.

- Per 44 CFR 9.11(d)(4), until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the community. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

- Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program.

- The applicant is responsible for coordinating with and obtaining any required Section 401 and Section 404 Permit(s) from USACE prior to initiating work. All conditions of the permit must be adhered to. Failure to do so would jeopardize receipt of federal funding. All coordination pertaining to these activities should be documented and copies forwarded to the State and FEMA as part of the permanent project files.

- The work shall be accomplished in accordance with vicinity maps and drawings.

- The sheet-pile wall should be installed prior to the excavation of the retention pond to avert any complications from seepage concerns. The applicant must have a mandatory order of work in which the installation of the sheet-pile should precede any work on the excavation of the detention pond.

- If changes in the location or section of the existing floodwall, or in the generally prevailing conditions in the vicinity, be required in the future in the public interest, the applicant shall make changes in the project concerned, or in the arrangement thereof, as may be necessary to satisfactorily meet the situation and shall bear the cost thereof.

- The applicant must provide written notification to the USACE of the construction timeline to include the start and end dates. Additionally, the applicant must notify

USACE prior to the commencement and prior to the completion of the approved scope of work.

- Any damage to the floodwall and/or levee right-of-way resulting from the applicant's activities shall be repaired at the applicant's expense.

- Any adverse impacts to adjacent wetlands resulting from the construction of this project would jeopardize receipt of federal funding.

- Any changes or modifications to the proposed project would require a revised determination. Off-site locations of activities such as borrow, disposals, haul- and detour roads, and work mobilization site developments may be subject to USACE regulatory requirements.

- All precautions must be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one (1) acre. The applicant must contact the LDEQ Water Permits Division at 225-219-9371 to determine if the proposed project requires a permit. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx.

- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at 225-219-3640 is required. Additionally, precautions must be taken to protect workers from these hazardous constituents.

- The contractor must observe all precautions to protect the groundwater of the region.

- Vehicle operation times would be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust.

- Any changes to the scope or location of the proposed project or if the project has not been initiated one (1) year from the date of the solicitation of views (02/10/2016), the applicant is responsible for coordinating with USFWS.

- Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies. Applicant is responsible for acquiring LDEQ permits for the temporary debris staging and reduction sites (TDSRS) associated with this project prior to project closeout. Failure to provide FEMA with LDEQ approval may jeopardize project funding eligibility.

- All debris would be disposed of at a permitted landfill.

- Mitigation and abatement measures would be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance.

- To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained in the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations and the USACE safety manual.

- The contractor must post appropriate signage and fencing to minimize potential adverse public safety concerns, and to protect nearby residents from vehicular traffic.

- Appropriate signage and barriers must be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes.

- The contractor must implement traffic control measures, as necessary.

- If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area.

- The LDNR Office of Conservation should be contacted at 225-342-5540 if any unregistered wells of any type are encountered during construction work.

- For pipelines and other underground hazards, Louisiana One Call should be contacted at 800-272-3020.

- To reduce potential short-term effects to air quality from construction-related activities, the contractor would be responsible for using BMPs to reduce fugitive dust generation and diesel emissions. Emissions from the burning of fuel by internal combustion engines would temporarily increase the levels of some of the criteria pollutants, including CO, NOx, O3, and PM10, and non-criteria pollutants such as Volatile Organic Compounds (VOCs). To reduce these emissions, running times for fuel-burning equipment should be kept to a minimum and engines should be properly maintained.

7.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

7.1 Agency Coordination

As part of the development of this EA, federal, tribal, state and local agencies were contacted. All initial Solicitation of Views letters and the respective responses from these agencies are included in Appendix C External Agency Correspondence.

- U.S. Army Corps of Engineers (USACE)
- Louisiana Department of Environmental Quality (LDEQ)
- Louisiana Department of Natural Resources (LDNR)
- Louisiana Department of Wildlife and Fisheries (LDWF)
- Environmental Protection Agency (EPA)
- U.S. Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS)
- Louisiana State Historic Preservation Officer (SHPO)
- U.S. Fish and Wildlife Service (USFWS)
- Alabama-Coushatta Tribe of Texas (ACTT)
- Choctaw Nation of Oklahoma (CNO)
- Coushatta Tribe of Louisiana (CT)
- Jena Band of Choctaw Indians (JBCI)
- Mississippi Band of Choctaw Indians (MBCI)
- Muscogee Creek Nation (MCN)
- Seminole Nation of Oklahoma (SNO)
- Tunica-Biloxi Tribe of Louisiana (TBTL)

7.2 Public Involvement

The draft EA and draft FONSI were available for review at the Norman Mayer Library at 3001 Gentilly Blvd, New Orleans, LA 70122, Monday - Thursday, 10:00 a.m. – 8:00 p.m.; Friday and Saturday, 10:00 a.m. – 5:00 p.m.; and Sunday 1:00 p.m. – 5:00 p.m. This public notice was published in *The Times Picayune* on Friday, April 15; Sunday, April 17; and Wednesday, April 20, 2016. The notice was also published in *The Advocate-New Orleans* edition Friday, April 15 through Thursday, April 21, 2016.

There was a fifteen (15) day comment period, beginning on January 22, 2016 and concluding February 9, 2016. Comments were requested to: FEMA Mail Center/Historic Preservation, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802 and available at http://www.crt.state.la.us/culturalassets/fema106. During this NHPA/NEPA public comment period, no comments were received.

At the conclusion of the public comment period for the Draft EA, no comments were received. Therefore, the EA and associated FONSI were approved on May 31, 2016 and became final.

8.0 CONCLUSION

Construction of the proposed improvements at the proposed location was analyzed based on the studies, consultations, and reviews undertaken as reported in this EA. The findings of this EA conclude that the proposed action at the proposed site would result in no significant adverse impacts to geology, groundwater, floodplains, public health and safety, hazardous materials, socioeconomic resources, environmental justice, or cultural resources.

During project construction, short-term impacts to soils, surface water, transportation, air quality, and noise are anticipated and conditions have been incorporated to mitigate and minimize the effects. Project short-term adverse impacts would be mitigated using BMPs, such as silt fences, proper vehicle and equipment maintenance, and appropriate signage. No long-term adverse impacts are anticipated from the proposed project. Therefore, FEMA presently finds the proposed action meets the requirements for a FONSI under NEPA and the preparation of an EIS would not be required. If new information is received that indicates there may be significant adverse effects, then FEMA would revise the findings and issue a second public notice, for additional comments. Since there were no changes, the Draft EA became the Final EA.

Based upon the studies and consultations undertaken in this environmental assessment, and given the precautionary and mitigating measures, there does not appear to be any significant environmental impacts associated with the Dillard University Drainage/Mitigation Improvements Project.

9.0 LIST OF PREPARERS

Tiffany Spann-Winfield, Deputy Environmental Liaison Officer, Federal Emergency Management Agency, Louisiana Recovery Office

Bianca King London, Environmental Protection Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Jason Emery, M.A., R.P.A., Lead Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

LeSchina Holmes, Lead Environmental Protection Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Kathryn Wollan, Lead Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Alan Johnson, P.E., C.F.M., Floodplain Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Joan Gillard, Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Richard Williamson, Archaeologist, Federal Emergency Management Agency, Louisiana Recovery Office

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Appendix A

Site Photographs and Maps

Figure 1: Aerial Photo of Dillard University, southwest of site, taken 10/18/2009
(Source: Aero Photo Image # 91018 3005)

Figure 2: Aerial Photo of Dillard University, south of site, taken 10/18/2009.
(Source: Aero Photo Image # 91018 3001)

Figure 3: Aerial Photo of Dillard University, east of site, taken 10/18/2009.
(Source: Aero Photo Image # 91018 3003)

Figure 4: Kearny Hall, facing northeast. Campus lawn where utility drainage would be unearthed and replaced (29.99583, -90.066811).
(Source: FEMA, 10/28/2015)

Figure 5: Stern Hall, facing southeast. Campus lawn where utility drainage would be unearthed and replaced (29.995803, -90.065000).
(Source: FEMA, 10/28/2015)

Figure 6: Fence along concrete ditch between Dillard and City New Orleans Parks and Parkways property (29.998692, -90.067592). (Source: FEMA, 10/28/2015)

Figure 7: Earthen ditch facing northeast and London Avenue canal. Cellular tower in foreground (29.998544, -90.067417).
(Source: FEMA, 10/28/2015)

Figure 8: Area of proposed detention pond, facing northeast (29.998972, -90.068181).
(Source: FEMA, 10/28/2015)

Figure 9: Concrete ditch to be improved, grass overgrown.
(Source: FEMA, 10/28/2015)

Appendix B

Site Plans for Preferred Alternative

The following is excerpted documentation relevant to the proposed project. For a full version, the general public can send a request to FEMA-NOMA@dhs.gov, tel: 225-202-5463, fax: 225-346-5848 or by mail to: Department of Homeland Security-FEMA, Louisiana Recovery Office, Attn: EHP-Dillard University Hazard Mitigation Drainage Project, 1500 Main Street, Baton Rouge, LA 70802.

PROJECT NO.	SHEET NO.
1603-DR-LA	01

INDEX TO SHEETS

SCHEDULE OF REVISIONS

DATE	REVISION	DATE	REVISION	DATE	REVISION

100% DESIGN PLANS

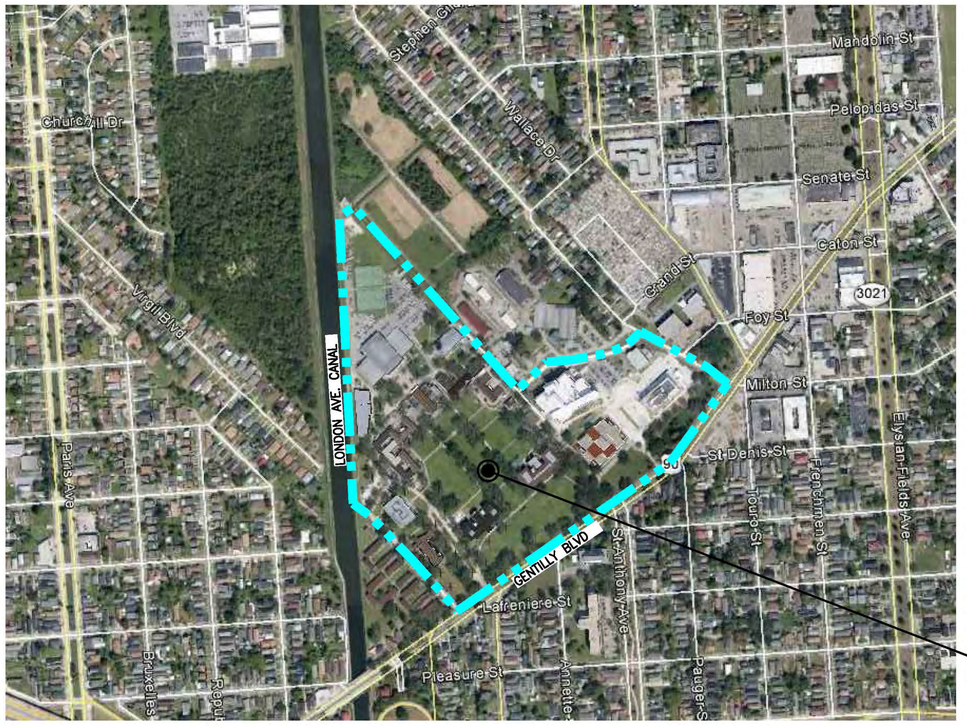
DILLARD UNIVERSITY

HAZARD MITIGATION GRANT PROGRAM

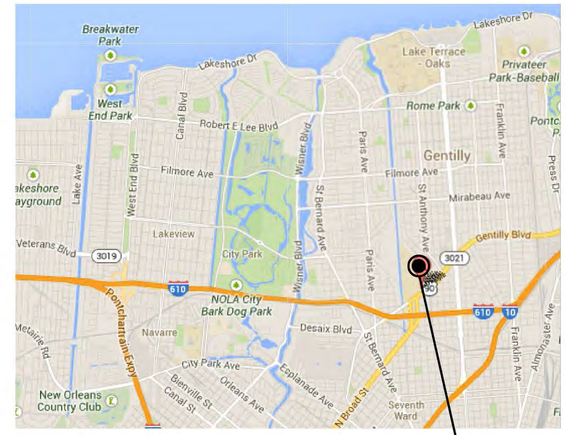
FEMA DRAINAGE PROJECT
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

CITY OF NEW ORLEANS
STATE OF LOUISIANA

OCTOBER 2015



LOCATION MAP
NTS



VICINITY MAP
NTS

SUBMITTED FOR APPROVAL TO:

- DILLARD UNIVERSITY
  APPROVED BY: DATE:
- FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)
  APPROVED BY: DATE
- GOVERNOR'S OFFICE OF HOMELAND SECURITY AND EMERGENCY PREPAREDNESS (GOHSEP)
  APPROVED BY: DATE:
- CITY OF NEW ORLEANS (CNO)
  APPROVED BY: DATE:

PLANS PREPARED BY:

PROJECT MANAGER: MARK SCALLY, P.E.
CHESTER ENGINEERS, INC.

PROJECT ENGINEER: BUTCH WILLOUGHBY, P.E.
CHESTER ENGINEERS, INC.

REVIEWED BY: MARK SCALLY, P.E.
CHESTER ENGINEERS, INC.

NOTE:

THE CITY OF NEW ORLEANS STANDARD PLANS AND SPECIFICATIONS FOR ROADS AND BRIDGES, LATEST EDITION, SHALL GOVERN ON THIS PROJECT EXCEPT AS AMENDED BY SPECIAL PROVISIONS AND/OR SUPPLEMENTAL SPECIFICATIONS AND/OR CONSTRUCTION SPECIFICATIONS.

CHESTER ENGINEERS
601 POYDRAS STREET, SUITE 1600B
NEW ORLEANS, LA 70130
P:504-584-5560 F:504-584-5565

STATE OF LOUISIANA
MARK SCALLY
License No. 38704
PROFESSIONAL ENGINEER

100% DESIGN PLANS
NOT FOR CONSTRUCTION

GENERAL NOTES:

1.0 GENERAL

1.1. ALL ELEVATIONS SHOWN ON THE PLANS ARE REFERENCED TO NAVD 1988.

1.2. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THE PROJECT TEMPORARY BENCH MARKS SHOWN ON PLAN WITH THE PERMANENT BENCH MARK INDICATED ON THE SITE PLAN.

1.3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE WORK AND VERIFYING ALL MEASUREMENTS AND GRADES PRIOR TO BEGINNING OF CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE PROJECT IMPROVEMENTS AND ADDITIONAL TEMPORARY BENCH MARKS FOR CONSTRUCTION PURPOSES BEFORE DESTROYING EXISTING MONUMENTS/NAILS/CROSS CUTS, ETC.

1.4. THE LINES AND GRADES SHOWN ON THE PLANS MAY BE VARIED SLIGHTLY BY THE ENGINEER IN THE FIELD IF CONDITIONS JUSTIFY SUCH A VARIATION. THE CONTRACTOR SHALL NOT BE ENTITLED TO AN EXTRA PAYMENT OTHER THAN WHATEVER INCREASE IN CONTRACT QUANTITIES IS INVOLVED.

1.5. THE CONTRACTOR SHALL BE RESPONSIBLE TO ESTABLISH GRADES FOR ALL ROADS TO MAINTAIN POSITIVE DRAINAGE TO THE NEAREST CATCH BASINS OR DROP INLETS WITHOUT PONDING WATER IN ROADWAYS.

1.6. THE CONTRACTOR SHALL CONTACT ALL UTILITY OWNERS AT LEAST 48 HOURS PRIOR TO SAW-CUTTING OR EXCAVATION. CONTRACTOR IS RESPONSIBLE FOR ANY COSTS IN MARKING AT NO DIRECT COST, THE FEE IS BASED ON PROJECT LIMITS. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY DAMAGED LINES IN 5-DAYS. IF THE CONTRACTOR HAS THE AREA MARKED AND DAMAGE OCCURS OCCURS BECAUSE THE LINES WERE IMPROPERLY MARKED, THE CONTRACTOR WILL NOT BE RESPONSIBLE FOR THE COST ASSOCIATED WITH THE REPAIR.

1.7. ALL EXISTING GRASS AREA DISTURBED BY CONSTRUCTION SHALL BE RESTORED IN-KIND AS DIRECTED BY THE UNIVERSITY.

1.8. ALL ROADWAY CONSTRUCTION TO BE PERFORMED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS

1.9. UNLESS SPECIFIED OTHERWISE, PROPERTY LINES INDICATED ON THE PLANS ARE APPARENT PROPERTY LINES.

1.10. ROADWAY RADII ARE MEASURED TO THE FACE OF CURB.

1.11. ASPHALT TRANSITIONS, RESHAPED DITCHES, AND CRUSHED STONE SHOULDERS FOR SIDE STREETS, IF REQUIRED, SHALL BE DONE PER DIRECTION OF THE FIELD ENGINEER.

1.12. WHENEVER NEW PAVING INTERSECTS OR MEETS EXISTING PAVING THAT IS TO REMAIN, THE GRADES OF THE NEW PAVING SURFACE SHALL MATCH THE GRADE OF THE EXISTING PAVING. ALL SURFACE TRANSITIONS BETWEEN OLD AND NEW WORK SHALL OCCUR WITHIN THE LIMITS OF CONSTRUCTION SHOWN ON THE PLANS.

1.13. FOR CONCRETE BASE ROADWAY, THE CONTRACTOR SHALL NOT OVERLAY OVER EXPANSION JOINTS. AN APPROVED JOINT SEALER SHALL BE USED OVER EXPANSION JOINTS.

1.14. WHENEVER REMOVAL OF EXISTING PAVEMENT SURFACING IS REQUIRED IN CONJUNCTION WITH PROPOSED PROFILE GRADE LINE SHOWN ON THE DRAWINGS, THE EXISTING ASPHALT CONCRETE PAVEMENT IMMEDIATELY ADJACENT TO THE EDGE OF THE CONCRETE GUTTER SHALL BE MILLED TO A MINIMUM DEPTH OF ONE (1") TO OBTAIN A SMOOTH TIE-IN BETWEEN EXISTING AND PROPOSED CONSTRUCTION.

1.15. WHENEVER ADDITIONAL PAVEMENT SURFACING MATERIAL IS REQUIRED, THE ADJACENT CONCRETE GUTTER BOTTOM WILL NOT BE COVERED WITH ASPHALT SURFACING IF THE PROPOSED PROFILE GRADE LINE SHOWN ON THE DRAWINGS IS WITHIN ONE (1") INCH. IN AREAS WHERE THE PROPOSED PROFILE GRADE LINE IS HIGHER THAN THE EXISTING GUTTER BOTTOM BY MORE THAN ONE (1") INCH, THE SURFACE OF THE EXISTING GUTTER BOTTOM OR ROLLING STRIP SHALL BE OVERLAID WITH ASPHALT SURFACING TO THE FACE OF THE CURB.

1.16. THE CONTRACTOR SHALL REMOVE ALL CULVERT PIPES IN DITCHES, METAL GRATES, AND ANY OTHER OBSTRUCTIONS SHOWN TO BE REMOVED THAT ARE WITHIN THE LIMITS OF THE PROPOSED IMPROVEMENTS.

1.17. ALL SALVAGEABLE ROADWAY MATERIALS, AS DETERMINED BY THE ENGINEER SHALL BE DELIVERED TO THE APPROPRIATE LOCATION DIRECTED BY THE ENGINEER.

1.18. THE EXACT LIMITS OF REMOVAL AND REPLACEMENT OF DRIVEWAYS AND SIDEWALKS SHALL BE DETERMINED BY THE ENGINEER. THE CONTRACTOR SHALL NOT REMOVE ANY DRIVEWAY OR SIDEWALK WITHOUT PRIOR APPROVAL OF THE ENGINEER.

1.19. THE CONTRACTOR IS REQUIRED TO SAW CUT SIDEWALKS, DRIVEWAYS, CURBS, AND PAVEMENT, AS SPECIFIED, TO INSURE A STRAIGHT LINE BETWEEN OLD AND NEW WORK.

1.20. ALL SIDEWALKS AND DRIVEWAYS DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION, WHICH IN THE OPINION OF THE ENGINEER ARE OUTSIDE THE LIMITS OF THE ROADWAY CONSTRUCTION, SHALL BE REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE.

1.21. THE CONTRACTOR SHALL ADJUST THE ELEVATIONS OF THE NEW SIDEWALKS SO AS TO ALLOW DRAINAGE AWAY FROM THE PROPERTY AT ALL TIMES. SIDEWALK ELEVATIONS MAY BE ADJUSTED TO ALLOW DRAINAGE THROUGH DRIVEWAYS WITH DEPRESSED CURBS.

1.22. PAYMENT FOR GRADING OF FILL MATERIAL BETWEEN BACK OF CURB AND SIDEWALK SHALL BE INCLUDED IN THE RESPECTIVE ITEM.

2.0 SEWERAGE & WATER BOARD ITEMS

2.1. ALL WORK INCLUDING REPAIRS AND/OR ADJUSTMENTS MADE TO THE SEWERAGE, WATER AND DRAINAGE SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE SEWERAGE AND WATER BOARD OF NEW ORLEANS GENERAL SPECIFICATIONS, GENERAL NOTES AND STANDARD DRAWINGS.

2.2. CONTRACTOR SHALL NOTIFY THE SEWERAGE AND WATER BOARD OF NEW ORLEANS TEN (10) DAYS IN ADVANCE OF THE BEGINNING OF WORK ON SEWERAGE AND WATER BOARD SYSTEMS. ALL WATER AND SEWER WORK MUST BE INSPECTED AND ACCEPTED BY THE SEWERAGE AND WATER BOARD OF NEW ORLEANS.

2.3. CONTRACTOR SHALL VERIFY ELEVATIONS OF EXISTING INVERTS WITHIN PROJECT LIMITS.

3.0 DRAIN LINES

3.1. THE COST FOR DRAINAGE EXCAVATION, BEDDING MATERIAL, SHEETING, BRACING, BACK FILLING, GRADING, AND HAULING AWAY SURPLUS MATERIALS SHALL BE INCLUDED IN THE UNIT PRICE FOR DRAINAGE PIPES BEING INSTALLED. ON DRAIN POINT REPAIRS, NO BRICK OR CONCRETE COLLARS WILL BE ALLOWED.

3.2. FOR ALL SEWER AND DRAIN REPAIRS, THE CONNECTION OF ANY TWO DISSIMILAR MATERIALS SHALL BE ACCOMPLISHED BY INSTALLATION OF A "NO-HUB" COUPLING CONSISTING OF A NEOPRENE SLEEVE AND BUSHING ADAPTER, TWO STAINLESS STEEL BANDS, AND STAINLESS STEEL SCREWS. THE COUPLING SHALL BE MANUFACTURED IN STRICT ACCORDANCE WITH THE CAST IRON SOIL PIPE INSTITUTE SPECIFICATIONS C301, LATEST REVISION, AS MANUFACTURED BY TYLER CLAY PRODUCTS CORP., FERNCO, OR APPROVED EQUAL.

3.3. DRAIN LINES INDICATED FOR REMOVAL WILL BE REMOVED AND DISPOSED IN A PROPER MANNER. THE CONTRACTOR SHALL BACKFILL THE RESULTING VOID WITH APPROVED COMPACTED BACKFILL MATERIAL AT NO DIRECT PAY.

3.4. MANHOLES AND CATCH BASINS INDICATED TO BE ABANDONED IN PLACE, SHALL BE REMOVED TO THREE (3) FEET BELOW GRADE AND THEN PLUGGED AND FILLED WITH SAND.

3.5. THERE WILL BE NO DIRECT PAYMENT FOR TIE-IN NEW OR EXISTING LINES TO ANY CATCH BASIN OR MANHOLES.

3.6. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AN INVENTORY OF ALL CATCH BASINS WITHIN THE LIMITS OF CONSTRUCTION THAT DESCRIBES THE LOCATION AND CONDITION (MISSING LID, BROKEN FRAME, ETC.) AND WHETHER THERE IS DEBRIS OR SOIL PRESENT IN THE CATCH BASIN. (NO DIRECT PAYMENT)

4.0 HORTICULTURE REQUIREMENTS

4.1. THE CONTRACTOR SHALL NOTIFY THE NATURAL RESOURCES CONSERVATION SERVICES AND DILLARD UNIVERSITY FACILITIES DEPARTMENT PRIOR TO REPLACING ANY UTILITY LINES NEAR TREES. IF NECESSARY THE CONTRACTOR SHALL SHORE THE AREA NEAR TREES. USE ROOT GUARDS, AND OTHER PRECAUTIONS NECESSARY TO PROTECT THE TREES.

4.2. THE CONTRACTOR SHALL COMPLY WITH ALL "HORTICULTURE REQUIREMENTS" SPECIFIED BY THE DEPARTMENT OF PARKS AND ROADWAYS.

4.3. ALL TREE REMOVALS, BRANCH PRUNING OR ROOT CUTTING SHALL BE PERFORMED BY A LOUISIANA LICENSED ARBORIST, APPROVED BY THE DEPARTMENT OF PARKS AND ROADWAYS. AN URBAN FORESTER PERMIT SHALL BE OBTAINED THROUGH NEW ORLEANS PARKS AND PARKWAYS AND CITY PARKS.

4.4. THE CONTRACTOR SHALL NOTIFY PROPERTY OWNER/UNIVERSITY PRIOR TO TRIMMING ANY TREES LOCATED ON PRIVATE PROPERTY.

4.5. ALL TREES, SHRUBS, AND VEGETATION DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN KIND AS DIRECTED BY THE DEPARTMENT OF PARKS AND PARKWAYS IN ACCORDANCE WITH THE SPECIFICATIONS.

4.6. NO CONSTRUCTION MATERIALS OR EQUIPMENT CAN BE STORED UNDER THE DRIP LINE OF THE TREE WITHIN THE PROJECT AREA.

5.0 TRAFFIC CONTROL

5.1. THE CONTRACTOR SHALL SEEK APPROVAL FOR ANY TRAFFIC RELATED PLAN REQUIREMENTS BEFORE OR DURING THE COURSE OF CONSTRUCTION.

5.2. ALL EXISTING TRAFFIC CONTROL DEVICES THAT ARE IN CONFLICT WITH THE CONSTRUCTION OR WORK ZONE TRAFFIC CONTROL PLAN SHALL BE COVERED OR REMOVED BY THE CONTRACTOR, AND THE REMOVED DEVICES RETURNED TO THE ORIGINAL POSITION. ALL EXISTING DEVICES LEFT IN THE CONSTRUCTION OR WORK ZONE SHALL BE MAINTAINED IN GOOD CONDITION BY THE CONTRACTOR DURING THE COURSE OF CONSTRUCTION.

5.3. ALL REMOVED TRAFFIC CONTROL DEVICES SHALL BE RESTORED TO THEIR ORIGINAL POSITION AND ORIENTATION BY THE CONTRACTOR PRIOR TO THE TIME OF FINAL INSPECTION.

5.4. ALL TRAFFIC CONTROL DEVICES AND ASSOCIATED HARDWARE (SIGNS, SIGNALS, CONDUITS, CABLES, MARKINGS, ETC.) REMOVED OR DAMAGED DURING THE EXECUTION OF THIS CONTRACT, OTHER THAN AS PROVIDED FOR IN THIS CONTRACT SHALL BE REPLACED AT NO COST TO THE OWNER/UNIVERSITY.

5.5. ANY DAMAGE CAUSED BY THE CONTRACTOR'S WORK SHALL BE IMMEDIATELY REPORTED BY THE CONTRACTOR TO THE PROJECT ENGINEER AND THE OWNER/UNIVERSITY. REPAIRS SHALL BE PERFORMED BY THE CONTRACTOR AT THE DISCRETION OF THE PROJECT ENGINEER, WITH ALL ASSOCIATED COSTS BEING PAID BY THE CONTRACTOR.

5.6. THE CONTRACTOR SHALL CONTACT THE OWNER/UNIVERSITY PRIOR TO THE START OF THE JOB.

6.0 UTILITIES

6.1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES BEFORE STARTING CONSTRUCTION. THE OWNER IS NOT RESPONSIBLE FOR ACCURACY OF THE LOCATION OF THESE UTILITIES SHOWN ON THE PLANS. ALL UTILITIES ARE NOT SHOWN ON THE PLANS.

6.2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING UTILITIES WHICH OCCURS DURING CONSTRUCTION AND SHALL IMMEDIATELY REPORT ANY DAMAGE TO THE UTILITY ENTITIES. ALL REPAIRS OF THE DAMAGED UTILITIES SHALL BE DONE BY THE RESPECTIVE UTILITY ENTITY, EXCEPT S&WB POWER FEEDER, WHICH SHALL BE REPAIRED BY THE CONTRACTOR. ALL REPAIR COSTS SHALL BE BORNE BY THE CONTRACTOR.

6.3. UTILITY MANHOLES AND OTHER STRUCTURES WILL BE ADJUSTED BY THE UTILITY OWNER. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE UTILITY COMPANIES AND REQUEST THE NECESSARY ADJUSTMENTS. THE ABOVE REQUEST SHALL BE MADE AT LEAST 2 WEEKS PRIOR TO CONSTRUCTION IN AREA OF CONFLICT TO ALLOW THE UNIVERSITY SUFFICIENT TIME FOR PERFORMING WORK. IF THE UTILITY MANHOLES OR OTHER STRUCTURES BELONG TO THE UNIVERSITY THE CONTRACTOR SHALL CONTACT THE UNIVERSITY AT 504-816-4131. THE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING THE UTILITY AS NEEDED AT NO ADDITIONAL COST.

6.4. CONTRACTOR IS TO NOTIFY OWNER OF CONSTRUCTION A MINIMUM OF ONE WEEK PRIOR TO START OF CONSTRUCTION.

6.5. CONTRACTOR SHALL TAKE REASONABLE MEASURES TO AVOID UNNECESSARY NOISE APPROPRIATE FOR THE AMBIENT SOUND LEVELS IN THE AREA DURING WORKING HOURS. ALL CONSTRUCTION MACHINERY AND VEHICLES SHALL BE EQUIPPED WITH PRACTICAL SOUND MUFFLING DEVICES, AND OPERATED IN A MANNER TO CAUSE THE LEAST NOISE, CONSISTENT WITH EFFICIENT PERFORMANCE OF THE WORK.

6.6. CONTRACTOR SHALL TAKE REASONABLE MEASURES TO AVOID UNNECESSARY DUST. SURFACES SUBJECT TO CREATING DUST SHALL BE KEPT MOIST WITH WATER OR BY APPLICATION OF CHEMICAL DUST SUPPRESSANT. DUSTY MATERIAL IN PILES OR IN TRANSIT SHALL BE COVERED TO PREVENT BLOWING.

6.7. CONTRACTOR SHALL CONTACT THE FOLLOWING AT LEAST THREE (3) WORKING DAYS PRIOR TO BEGINNING OF CONSTRUCTION AROUND THEIR RESPECTIVE UTILITIES:

A. SEWERAGE & WATER BOARD OF NEW ORLEANS:
NAME: BRAD KRAMER CONTACT NUMBER: 504-942-3496

B. DEPARTMENT OF PUBLIC WORKS:
NAME: BRAD CASE CONTACT NUMBER: 504-658-8740

C. ENTERGY:
NAME: EMIL BERGERON CONTACT NUMBER: 504-593-3432

D. AT&T:
NAME: CARY LOMBARD CONTACT NUMBER: 504-299-6954

E. COX CABLE:
NAME: BRYAN MCGEE CONTACT NUMBER: 504-401-2503

F. DEPARTMENT OF PARKS AND PARKWAY:
NAME: ANN E. MCDONALD CONTACT NUMBER: 504-658-3201

G. LOUISIANA ONE CALL
1-800-272-3020

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 02

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 10000
NEW ORLEANS, LA 70130
PH: 504-581-2888
FAX: 504-581-2885

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 10000, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	NTS
CHECKED		DATE	10/2015
DETAILED		SHEET	02
CHECKED			

MARK SCALLY
License No. 34760
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

GENERAL NOTES, LEGEND AND ABBREVIATIONS
(1 OF 2)

100% DESIGN PLANS

STATE OF LOUISIANA

LEGEND

- EXISTING
- NEW CONSTRUCTION
- REMOVE/CONSTRUCT BARRIER CURB
- REMOVE/CONSTRUCT MOUNTABLE CURB
- PROPOSED FENCE LINE
- TREE
- HEDGE
- BUILDING
- CULVERT
- BASE LINE OF SURVEY
- EXISTING RIGHT OF WAY
- CENTER LINE
- DIRECTION OF FLOW
- G — EXIST. GAS LINE
- S.F.M. — EXIST. SANITARY SEWER FORCE MAIN
- S — EXIST. SANITARY SEWER LINE
- W — EXIST. WATER LINE
- D — EXIST. DRAIN LINE
- EXIST. STORM DRAIN LINE
- EXIST. FENCE
- EXIST. WATER VALVE
- UGT — UNDERGROUND TELEPHONE CABLE
- UGE — UNDERGROUND ELECTRIC LINE (SPECIFY S&WB OR OTHER)
- TV — UNDERGROUND TELEVISION CABLE
- PROPOSED VERTICAL CATCH BASIN (VCB)
- PROPOSED MOUNTABLE CATCH BASIN (MCB)
- PROPOSED MANHOLE (MH)
- EXISTING CATCH BASIN (EXISTCB)
- PROPOSED CATCH BASIN/DROP INLET
- or / or — DROP INLET EXISTING (DI)
- WATER VALVE/MANHOLE (CIRCULAR)(WVMC)
- WATER VALVE/MANHOLE (RECTANGULAR)(WVMR)
- D — DRAIN MANHOLE (DMH)
- S — SEWER MANHOLE (SEWERMH)
- W — WATER MANHOLE (WATERMH)
- G — GAS MANHOLE (GASMH)
- TR — TRAFFIC MANHOLE (TRMH)
- T — TELEPHONE MANHOLE (TELMH)
- U — TELEGRAPH MANHOLE (TGMH)
- E — ELECTRIC MANHOLE (ELECMH)
- R — TRASH RECEPTACLE (SUB-SURFACE) (TRASH)
- UTILITY VALVE (UV)
- WATER METER (WM)
- RESIDENTIAL MAIL BOX (RMB)
- TELEPHONE INTERFACE BOX (TIB)
- CLEAN OUT FOR SEWER (COS)
- CLEANOUT FOR DRAIN (COD)
- CABLE TV BOX (TVB)
- TSB — TRAFFIC SIGNAL BOX (TSB)
- TCB — TRAFFIC CONTROL BOX (TCB)
- UTILITY POLE (UP)

- GUY POLE (GP)
- GUY WIRE & ANCHOR (GWA)
- P — PARKING METER (PARKM)
- EXISTING CURB (SPECIFY TYPE)
- LIGHT STANDARD (LS)
- TRAFFIC SIGNAL STANDARD (TSS)
- EXISTING FIRE HYDRANT (EFH)
- PROPOSED FIRE HYDRANT (PFH)
- TRAFFIC SIGN (TS)
- IRON PIPE OR IRON ROD (IP)
- CROSS CUT IN CONCRETE (CROSS)
- SD — REMOVE EXIST. STORM DRAIN LINE
- REMOVE EXIST. MANHOLE (SEWER, DRAIN OR WATER)
- ADJ. — ADJUSTMENT
- T.T. — TREE TRIMMING
- R.P. — ROOT PRUNING
- WATER METER/MANHOLE
- FFE — FINISHED FLOOR ELEVATION
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PRZ (DRIPLINE)
- T1-X — TREE NUMBER
- DRAINAGE LINES FROM LHJ SURVEY DATED DEC. 2013
- FO — FIBER OPTIC FROM PREVIOUS LHJ DESIGN PLANS
- S — SEWER LINES FROM PREVIOUS LHJ DESIGN PLANS
- W — WATER LINES FROM PREVIOUS LHJ DESIGN PLANS
- W — NEW WATER LINES FROM PREVIOUS LHJ DESIGN PLANS
- W — CHILL WATER LINES FROM PREVIOUS LHJ DESIGN PLANS
- NEW PIPING LINES FROM PREVIOUS LHJ DESIGN PLANS
- COAX — COAX LINES FROM PREVIOUS LHJ DESIGN PLANS
- TWP — TWP CABLE LINES FROM PREVIOUS LHJ DESIGN PLANS
- Gas — GAS LINES FROM PREVIOUS LHJ DESIGN PLANS
- E — ELECTRICAL LINES FROM PREVIOUS LHJ DESIGN PLANS
- T — TELEPHONE LINES FROM PREVIOUS LHJ DESIGN PLANS
- STM — STM LINE FROM PREVIOUS LHJ DESIGN PLANS
- CENTERLINE OF CONSTRUCTION
- PROPOSED STORM DRAIN
- PROPOSED SIDEWALK/ CONCRETE PAVEMENT ENHANCEMENT/REPAIR
- PROPOSED PERVIOUS SURFACE
- PROPOSED SWALE/DETENTION POND
- PROPOSED CONCRETE DITCH IMPROVEMENTS
- PROPOSED ASPHALT PAVEMENT

LEGEND:

- STORM DRAIN WITH STRUCTURE
- DMH 43 — DRAINAGE STRUCTURE WITH DESIGNATION
- SF — SILT FENCE (SF)
- TEMPORARY BERM (TB)
- SEDIMENT CHECK DAM (STONE) (SCD)
- STABILIZED CONSTRUCTION ENTRANCE (SCE)
- HAY BALES OR SEDIMENT CHECK DAM (HAY) (HCD)
- INLET PROTECTION (IP)
- SEDIMENT TRAP (ST)
- CONCRETE WASHOUT AREA (CW)
- TURF REINFORCEMENT MATS (TM)
- RIPRAP OUTLET PROTECTION (OP)

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 03

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1606B, NEW ORLEANS, LA 70130

DESIGNED	MGS	SCALE	NTS
CHECKED		DATE	10/2015
DETAILED		SHEET	03
CHECKED			

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

GENERAL NOTES, LEGEND AND ABBREVIATIONS (2 OF 2)

100% DESIGN PLANS

PROJECT NO. 1603.0320 FEMA 1603-DR-LA DILLARD UNIVERSITY

SUMMARY OF QUANTITIES

ITEM CODE	DESCRIPTION	UNIT	QUANTITY
201-01	CLEARING AND GRUBBING	1.15	ACRE
202-01	REMOVAL OF ASPHALT PAVEMENT	2157	SQYD
202-03	REMOVAL OF CONCRETE CATCH BASIN	56	EACH
202-04	REMOVAL OF CONCRETE CURB AND GUTTER	932	LNFT
202-05	REMOVAL OF CONCRETE WALKS AND DRIVES	1605	SQYD
202-06	REMOVAL OF CURBS (CONCRETE)	155	LNFT
202-07	REMOVAL OF FENCE (CHAIN LINK)	700	LNFT
202-08	REMOVAL OF MANHOLES	3	EACH
202-09	REMOVAL OF PAVED DITCHES	960	SQYD
202-10	REMOVAL OF PIPE (STORM DRAIN) (6" RCP)	115	LNFT
202-11	REMOVAL OF PIPE (STORM DRAIN) (8" RCP)	148	LNFT
202-12	REMOVAL OF PIPE (STORM DRAIN) (10" RCP)	1003	LNFT
202-13	REMOVAL OF PIPE (STORM DRAIN) (12" RCP)	1125	LNFT
202-14	REMOVAL OF PIPE (STORM DRAIN) (15" RCP)	573	LNFT
202-15	REMOVAL OF PIPE (STORM DRAIN) (18" RCP)	63	LNFT
202-16	REMOVAL OF PIPE (STORM DRAIN) (24" RCP)	105	LNFT
202-17	REMOVAL OF PIPE (STORM DRAIN) (30" RCP)	286	LNFT
202-18	REMOVAL OF PIPE (STORM DRAIN) (36" RCP)	570	LNFT
202-19	REMOVAL OF PIPE (STORM DRAIN) (30"X18" RCPA)	360	LNFT
202-20	REMOVAL OF PIPE (STORM DRAIN)(51"X31" RCPA)	80	LNFT
202-21	REMOVAL OF PIPE (STORM DRAIN) (6" CPP)	230	LNFT
202-22	REMOVAL OF PIPE (STORM DRAIN) (12" CPP)	420	LNFT
202-23	REMOVAL OF PIPE (WATER LINE) (8" DIP)	300	LNFT
202-24	REMOVAL OF EXCESS MATERIAL	11400	CUYD
203-01	DRAINAGE EXCAVATION	9086	CUYD
203-02	UNDERCUT - DRAINAGE EXCAVATION	1984	CUYD
203-03	EMBANKMENT	2350	CUYD
203-04	CONTROL OF GROUND WATER	1	LUMP
204-01	TEMPORARY EROSION CONTROL	1	LUMP
301-01	CLASS I BASE COURSE (6"THICK)	979	SQYD
306-01	SCARIFYING AND COMPACTING ROADBED (6" THICK)	420	SQYD
500-01	SAW CUTTING ASPHALT PAVEMENT (ALL DEPTHS)	2546	LNFT
500-02	SAW CUTTING CONCRETE PAVEMENT (ALL DEPTHS)	2060	LNFT
502-01	SUPERPAVE ASPHALTIC CONCRETE (2" THICK)	4590	SQYD
502-02	SUPERPAVE ASPHALTIC CONCRETE (4" THICK)	1985	SQYD
504-01	ASPHALT TACK COAT	100	GAL
601-01	PORTLAND CEMENT CONCRETE PAVEMENT (7" THICK)	1023	SQYD
701-01	STORM DRAIN PIPE (12" RCP)	70	LNFT
701-02	STORM DRAIN PIPE (15" RCP)	210	LNFT
701-03	STORM DRAIN PIPE (18" RCP)	334	LNFT
701-04	STORM DRAIN PIPE (24" RCP)	1372	LNFT
701-05	STORM DRAIN PIPE (36" RCP)	377	LNFT
701-06	STORM DRAIN PIPE ARCH (15" EQUIV.RCPA)	1212	LNFT
701-07	STORM DRAIN PIPE ARCH (18" EQUIV.RCPA)	388	LNFT
701-08	STORM DRAIN PIPE ARCH (24" EQUIV.RCPA)	1035	LNFT
701-09	STORM DRAIN PIPE ARCH (30" EQUIV.RCPA)	691	LNFT
701-10	STORM DRAIN PIPE ARCH (36" EQUIV.RCPA)	1131	LNFT
701-11	STORM DRAIN PIPE ARCH (42" EQUIV.RCPA)	406	LNFT
701-12	REINFORCED CONCRETE PIPE EXTENSION (10")	8	LNFT
701-13	REINFORCED CONCRETE PIPE EXTENSION (12")	48	LNFT

ITEM CODE	DESCRIPTION	UNIT	QUANTITY
701-14	REINFORCED CONCRETE PIPE EXTENSION (15")	8	LNFT
701-15	REINFORCED CONCRETE PIPE EXTENSION (18")	32	LNFT
701-16	REINFORCED CONCRETE PIPE EXTENSION (24")	8	LNFT
701-17	PLASTIC PIPE EXTENSION (10" RPVCP)	8	LNFT
701-18	PLASTIC PIPE EXTENSION (12 RPVCP)	24	LNFT
701-19	FLEXIBLE BACKFLOW PREVENTER VALVE FOR 12" RCP	1	EACH
701-20	CLEANING EXISTING PIPES (6" TO 12")	1300	LNFT
701-21	CLEANING EXISTING PIPES (15" TO 30")	800	LNFT
702-01	MANHOLES (R-CB-11)	2	EACH
702-02	CATCH BASIN (CB-01)	48	EACH
702-03	CATCH BASIN (CB-02)	34	EACH
702-04	CATCH BASIN (CB-06)	3	EACH
702-05	CONCRETE FLARED END SECTION (36")	1	EACH
702-06	CONCRETE FLARED END SECTION (36" EQUIV.)	2	EACH
702-07	CONCRETE FLARED END SECTION (42" EQUIV.)	2	EACH
702-08	POND 5 OUTLET CONTROL STRUCTURE AND APPURTENANCES	1	LUMP
702-09	CONCRETE DITCH WEIR STRUCTURE	1	LUMP
705-01	CHAINLINK FENCE (6-FOOT HEIGHT)	700	LNFT
706-01	CONCRETE WALK (4" THICK)	745	SQYD
706-02	CONCRETE DRIVE (6" THICK)	125	SQYD
706-03	INCIDENTAL CONCRETE PAVING (7" THICK)	150	SQYD
707-01	CONCRETE CURB (BARRIER)	120	LNFT
707-02	CONCRETE CURB (MOUNTABLE)	430	LNFT
707-03	CONCRETE CURB AND GUTTER	1527	LNFT
710-01	FLOWABLE FILL	80	CUYD
711-01	RIPRAP (130LB, 24" THICK)	4280	SQYD
712-01	CONCRETE CAST-IN-PLACE CONCRETE DITCH (4" THICK)	2292	SQYD
715-01	TOPSOIL	2590	CUYD
716-01	MULCH (VEGETATIVE)	42	TON
717-01	SEEDING	1200	LB
718-01	FERTILIZER	800	LB
719-01	PLANTS	1	LUMP
719-02	SOD	16617	SY
720-01	TREE PROTECTION	1	LUMP
720-02	EROSION CONTROL	1	LUMP
727-01	MOBILIZATION	1	LUMP
727-02	ALLOWANCE - UTILITY LINE RELOCATION AND REPAIR	1	LUMP
732-01	PLASTIC PAVEMENT STRIPING (4'WIDTH, THERMOPLASTIC 90 MIL)	80	LNFT
732-02	PLASTIC PAVEMENT STRIPING (12'WIDTH, THERMOPLASTIC 90 MIL)	150	LNFT
737-01	PAINTED TRAFFIC STRIPING (SOLID LINE) (4"WIDTH)	500	LNFT
737-02	PAINTED TRAFFIC STRIPING (BROKEN LINE) (4"WIDTH)	500	LNFT
739-01	HYDRO-SEEDING	1.15	ACRE
741-01	WATER MAIN (4" PVC)	300	LNFT
741-02	WATER MAIN (6" PVC)	700	LNFT
741-03	WATER MAIN (4" DUCTILE IRON)	100	LNFT
741-04	WATER MAIN (6" DUCTILE IRON)	250	LNFT
741-05	WATER MAIN (8" DUCTILE IRON)	830	LNFT
741-06	WATER MAIN (10" DUCTILE IRON)	200	LNFT

ITEM CODE	DESCRIPTION	UNIT	QUANTITY
741-07	WATER MAIN (12" DUCTILE IRON)	890	LNFT
741-08	GATE VALVE (6")	2	EACH
741-09	GATE VALVE (8")	2	EACH
741-10	GATE VALVE (12")	2	EACH
741-11	TAPPING SLEEVE AND VALVE (4")	4	EACH
741-12	TAPPING SLEEVE AND VALVE (6")	4	EACH
741-13	TAPPING SLEEVE AND VALVE (8")	4	EACH
741-14	TAPPING SLEEVE AND VALVE (12")	6	EACH
741-15	WATER SERVICE LINE (2" PVC)	100	LNFT
742-01	SANITARY SEWER PIPE (4")	80	LNFT
742-02	SANITARY SEWER PIPE (6")	40	LNFT
742-03	SANITARY SEWER PIPE (8")	40	LNFT
803-01	STEEL SHEET PILE WALL	16608	SQFT

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 04

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
801 POYDRAS STREET, STE 16000
NEW ORLEANS, LA 70130
Tel 504-581-3000
Fax 504-581-3080

CHESTER ENGINEERS, INC.
801 POYDRAS ST., STE 16000, NEW ORLEANS, LA 70130

DESIGNED	MCS
CHECKED	
DETAILED	
CHECKED	

SCALE: NOT TO SCALE
DATE: 10/2015
SHEET: 04

MARK SCALLY License No. 31774 PROFESSIONAL ENGINEER

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

SUMMARY OF QUANTITIES

100% DESIGN PLANS

SUMMARY OF DRAINAGE STRUCTURES

ALIGNMENT NUMBER	STRUCTURE NUMBER	STATION	REMARKS	PLAN SHEET NO.	TYPE	STORM DRAIN PIPE (TYPE 3 JOINTS)						STORM DRAIN PIPE ARCH (TYPE 3 JOINTS)						JACKED OR BORED PIPE	FABRICATED CONDUIT FITTINGS	CATCH BASINS				MANHOLES			ADJUST MANHOLE	ADJUST CATCH BASIN	CONCRETE HEADWALL	CONCRETE COLLAR	BEDDING MATERIAL
						EQUIVALENT ROUND DIA. FOR ARCH PIPE																									
						12"	15"	18"	24"	30"	36"	15"	18"	21"	24"	30"	36"	24"	24"x24"x15"	CB-01	CB-02	CB-06	CB-08	D-870	R-CB-11	R-CB-11 MOD.					
						LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	CU YD.
SD 1	SD1-01	10+11.23																				1									
	P01-01						18																								
	SD1-02	10+28.96																							1						
	P01-02						33																								
	SD1-03	10+61.29																		1											
	P01-03						56																								
	SD1-04	11+16.56																		1											
	P01-04						57																								
	SD1-05	11+73.22																				1									
	P01-05											60																			
	SD1-06	12+32.46																				1									
	P01-06						46																								
	SD1-07	12+77.76																		1											
	P01-07											111																			
	SD1-08	13+88.17																		1											
	P01-08											60																			
	SD1-09	14+48.04																		1											
	P01-09											136																			
	SD1-10	15+83.63																		1											
	P01-10											124																			
	SD1-11	17+06.78																		1											
	P01-11											94																			
	SD1-12	18+00.15																		1											
	P01-12											100																			
	SD1-13	19+00.00																		1											
	P01-13											76																			
	SD1-14	19+76.00																		1											
SD 2	SD2 01	10+45.00																		1											
	P02-01															210															
	SD2 02	12+54.36																			1										
	P02-02								47																						
	SD2 03	13+00.54																		1											
	P02-03								76																						
	SD2 04	13+76.55																		1											
	P02-04								100																						
	SD2 05	14+75.88																		1											
	P02-05														28																
	SD2 06	15+03.24																							1						
	P02-06														97																
	SD2 07	15+99.47																		1											
	P02-07												246																		
			SUBTOTAL THIS SHEET			0	210	0	223	0	0	761	246	0	125	210	0	0	0	15		3	0	0	2	0	0	0	0	0	0

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 05

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 1600B
NEW ORLEANS, LA 70130
Tel 504-581-3000
Fax 504-581-3080

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

DESIGNED	MCS
CHECKED	
DETAILED	
CHECKED	

SCALE	NOT TO SCALE
DATE	10/2015
SHEET	05

MARK SCALLY
License No. 33126
REGISTERED PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603m-071-0038

SUMMARY OF DRAINAGE STRUCTURES
(1 OF 4)

100% DESIGN PLANS

STATE OF LOUISIANA

SUMMARY OF DRAINAGE STRUCTURES

ALIGNMENT NUMBER	STRUCTURE NUMBER	STATION	REMARKS	PLAN SHEET NO.	TYPE	STORM DRAIN PIPE (TYPE 3 JOINTS)						STORM DRAIN PIPE ARCH (TYPE 3 JOINTS)						JACKED OR BORED PIPE	FABRICATED CONDUIT FITTINGS	CATCH BASINS				MANHOLES			ADJUST MANHOLE	ADJUST CATCH BASIN	CONCRETE HEADWALL	CONCRETE COLLAR	BEDDING MATERIAL
						EQUIVALENT ROUND DIA. FOR ARCH PIPE																									
						12"	15"	18"	24"	30"	36"	15"	21"	18"	24"	30"	36"	24"	24"x24"x15"	CB-01	CB-02	CB-06	CB-08	D-870	R-CB-11	R-CB-11 MOD.					
						LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	CU. YD.
SD 3	SD3 01	10+00.00																			1									
	P03 01																184													
	SD3 02	11+83.29																			1									
	P03 02																80													
	SD3 03	12+62.64																			1									
	P03 03																38													
	SD3 04	12+99.87																			1									
	P03 04																158													
	SD3 05	14+57.29																		1										
	P03 05																55													
	SD3 06	15+11.67																		1										
	P03 06																63													
	SD3 07	15+71.08																			1									
	P03 07																83													
	SD3 08	16+53.65																			1									
	P03 08																59													
	SD3 09	17+12.50																			1									
	P03 09																27													
	SD3 10	17+75.26																			1									
	P03 10																41													
	SD3 11	18+16.30																		1										
	P03 11																38													
	SD3 12	18+54.31																		1										
	P03 12																58													
	SD3 13	19+11.40																		1										
	P03 13												95																	
	SD3 14	20+06.24																		1										
	P03 14												48																	
	SD3 15	20+54.18																			1									
	P03 15												118																	
	SD3 16	21+71.66																			1									
	P03 16											50																		
	SD3 17	22+21.66																			1									
SD 4	SD4 01	10+14.59																			1									
	P04-01														104															
	SD402	11+18.55																		1										
	P04-02														51															
	SD4 03	11+68.74																			1									
	P04-03														43															
	SD4 04	12+10.99																			1									
	P04-04														98															
	SD4 05	13+08.93																			1									
	P04-05														164															
SD 4A	SD4 06	20+00.00																			1									
	P04-06														106															
	SD4 07	21+05.46																			1									
	P04-07														23															
	SD4 08	21+28.52																			1									
	P04-08														27															
	SD4 09	21+57.49																			1									
	P04-09														36															
SD4B	SD4 10	30+57.63																			1									
	P04-10														58															
			SUBTOTAL THIS SHEET			0	0	0	0	0	0	50	261	0	710	0	884	0	0	7	20	0	0	0	0	0	0	0	0	0	0

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER
06

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
801 POYDRAS STREET, STE 16008
NEW ORLEANS, LA 70130
Tel 504-581-3588
Fax 504-581-3588

CHESTER ENGINEERS, INC.
801 POYDRAS ST., STE 16008, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	NOT TO SCALE
CHECKED		DATE	10/2015
DETAILED		SHEET	06
CHECKED			

MARK SCALLY
License No. 33536
REGISTERED PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603m-071-0036

SUMMARY OF DRAINAGE STRUCTURES
(2 OF 4)

100% DESIGN PLANS

STATE OF LOUISIANA

SUMMARY OF DRAINAGE STRUCTURES

ALIGNMENT NUMBER	STRUCTURE NUMBER	STATION	REMARKS	PLAN SHEET NO.	TYPE	STORM DRAIN PIPE (TYPE 3 JOINTS)						STORM DRAIN PIPE ARCH (TYPE 3 JOINTS)						JACKED OR BORED PIPE	FABRICATED CONDUIT FITTINGS	CATCH BASINS				MANHOLES			ADJUST MANHOLE	ADJUST CATCH BASIN	36" F.E.S.	CONCRETE HEADWALL	CONCRETE COLLAR	BEDDING MATERIAL
						EQUIVALENT ROUND DIA. FOR ARCH PIPE																										
						12"	15"	18"	24"	30"	36"	15"	18"	21"	24"	30"	36"	24"	24"x24"x15"	CB-01	CB-02	CB-06	CB-08	D-870	R-CB-11	R-CB-11 MOD.						
						LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	CU. YD.
SD 5	SD5 01	10+88.30																											1			
	P05 01										203																					
	SD5 02	12+98.31																			1											
	P05 02										64																					
	SD5 03	13+62.17																			1											
	P05 03										110																					
	SD5 04	14+72.19																			1											
	P05 04								28																							
	SD5 05	14+99.85																		1												
	P05 05								23																							
	SD5 06	15+22.41																			1											
	P05 06								114																							
	SD5 07	16+35.98																		1												
	P05 07								31																							
SD 5A	SD5 08	20+31.05																		1												
	P05 08								23																							
	SD5 09	20+53.47																		1												
SD 6	SD6 02	10+61.00																		1												
	P06 02							100																								
	SD6 03	11+60.96																		1												
	P06 03							130																								
	SD6 04	12+90.68																		1												
	P06 04												142																			
	SD6 05	14+32.36																		1												
	P06 05								22																							
	SD6 06	14+53.71																		1												
	P06 06								156																							
	SD6 07	16+09.03																		1												
	P06 07								68																							
	SD6 08	16+76.4																		1												
	P06 08								50																							
	SD6 09	17+25.82																		1												
	P06 09								103																							
			SUBTOTAL THIS SHEET			0	0	230	618	0	377	0	142	0	0	0	0	0	0	12	4	0	0	0	0	0	0	0	1	0	0	0

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER
07

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
801 PONDRAS STREET, STE 16008
NEW ORLEANS, LA 70130
Tel 504-581-3588
Fax 504-581-3588

CHESTER ENGINEERS, INC.
801 PONDRAS ST., STE 16008, NEW ORLEANS, LA 70130

DESIGNED	MCS
CHECKED	
DETAILED	
CHECKED	

SCALE: NOT TO SCALE
DATE: 10/2015
SHEET: 07

MARK SCALLY
License No. 32536
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

SUMMARY OF DRAINAGE STRUCTURES
(3 OF 4)

100% DESIGN PLANS

SUMMARY OF DRAINAGE STRUCTURES

ALIGNMENT NUMBER	STRUCTURE NUMBER	STATION	REMARKS	PLAN SHEET NO.	TYPE	STORM DRAIN PIPE (TYPE 3 JOINTS)						STORM DRAIN PIPE ARCH (TYPE 3 JOINTS)							JACKED OR BORED PIPE	FABRICATED CONDUIT FITTINGS	CATCH BASINS				MANHOLES			ADJUST MANHOLE	ADJUST CATCH BASIN	30" EQUIV. F.E.S.	36" F.E.S.	CONCRETE HEADWALL	CONCRETE COLLAR	BEDDING MATERIAL
						EQUIVALENT ROUND DIA. FOR ARCH PIPE																												
						12"	15"	18"	24"	30"	36"	15"	18"	21"	24"	30"	36"	42"	24"	24"x 24"x 15°	CB-01	CB-02	CB-06	CB-08	D-870	R-CB-11	R-CB-11 MOD.						
						LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	CU. YD.
SD 7	SD7 01	10+64.84																											1			
	P07 01																	92														
	SD7 02	11+60.51																				1										
	P07 02																	100														
	SD7 03	12+60.11																				1										
	P07 03																	153														
	SD7 04	14+13.06																				1										
	P07 04																150															
	SD7 05	15+62.25																				1										
	P07 05															41																
	SD7 06	16+02.80																				1										
	P07 06															45																
	SD7 07	16+47.38																			1											
	P07 07															25																
	SD7 08	16+71.45																			1											
	P07 08														38																	
	SD7 09	17+07.22																			1											
	P07 09														114																	
	SD7 10	18+20.61																			1											
	P07 10											140																				
	SD7 11	19+60.44																			1											
SD 7A	P07 11							31																								
	SD7 12	20+30.51																			1											
	P07 12							73																								
	SD7 13	21+03.39																			1											
SD 8	S0D 01	10+00.00																											1			
	P08 01																	61														
	SD8 02	10+61.95																				1										
	P08 02																37															
	P08 03															132																
	SD8 03	12+29.17																				1										
	P08 04															159																
	SD8 04	13+87.72																				1										
	P08 05															79																
SD 9	SD9 01	10+0.00																				1										
	P09 01														48																	
	SD902	10+47.09																			1											
	P09 02								35																							
	SD9 03	10+81.96																			1											
	P09 03								44																							
	SD9 04	11+25.11																			1											
	P09 04								87																							
	SD9 05	12+11.49																			1											
	P09 05								72																							
SD 9A	P09 06								71																							
	SD9 06	20+70.74																			1											
	P09 07								45																							
	SD9 07	21+15.59																			1											
	P09 08								73																							
	SD9 08	21+88.35																			1											
	P09 09								104																							
			SUBTOTAL THIS SHEET			0	0	104	531	0	0	140	0	0	200	481	187	406	0	0	14	9	0	0	0	0	0	0	0	2	0	0	0	0

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER
08

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 16008
NEW ORLEANS, LA 70130
Tel: 504-581-2888
Fax: 504-581-2885

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 16008, NEW ORLEANS, LA 70130

DESIGNED	MCS
CHECKED	
DETAILED	
CHECKED	

SCALE	NOT TO SCALE
DATE	10/2015
SHEET	08

MARK SCALLY
License No. 38758
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

SUMMARY OF DRAINAGE STRUCTURES
(4 OF 4)

100% DESIGN PLANS

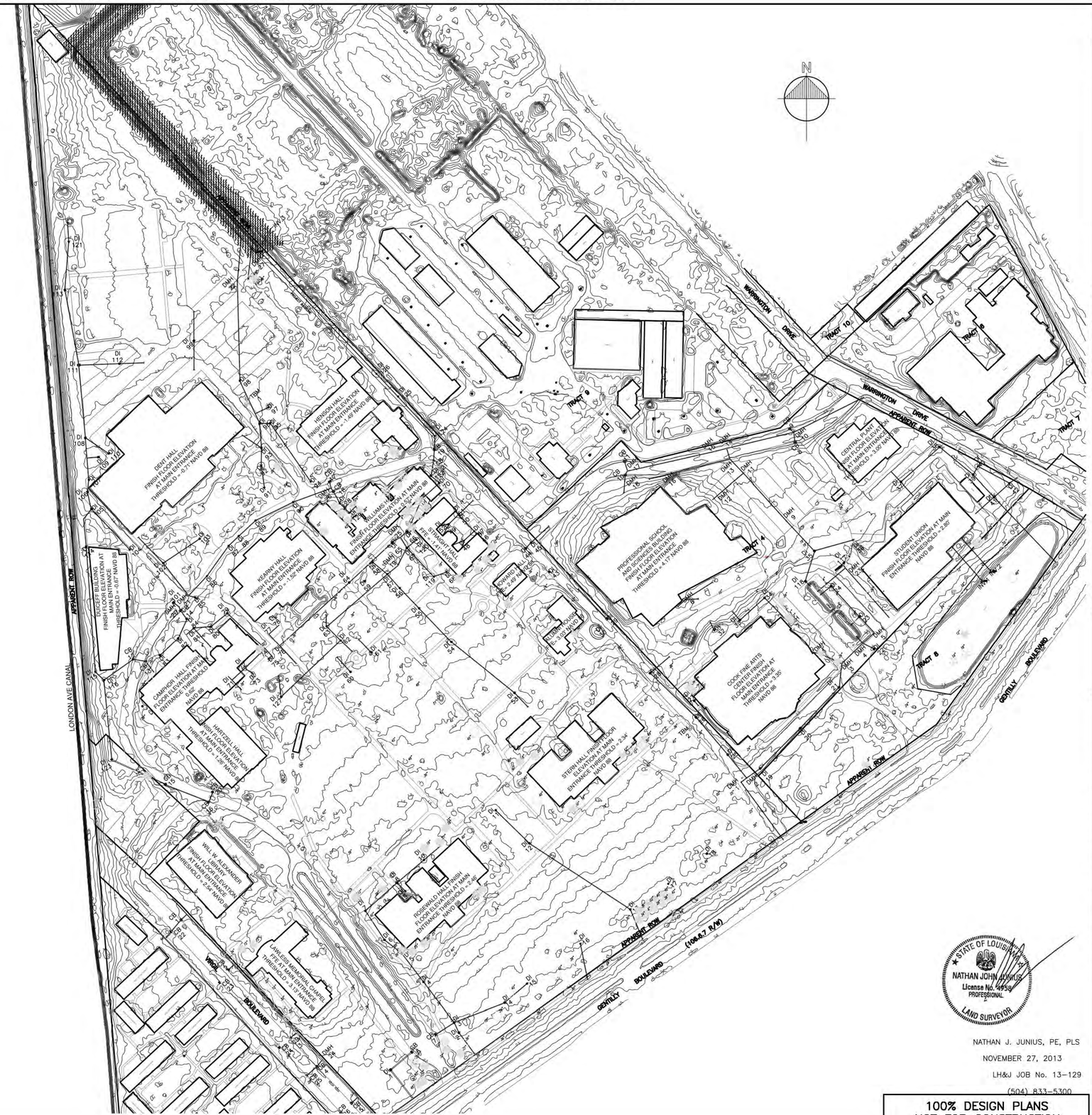
STATE OF LOUISIANA
REGISTERED PROFESSIONAL ENGINEER

DILLARD UNIVERSITY SITE PLAN
NEW ORLEANS
LOUISIANA

LEGEND			
	EXIST. GUY WIRE	EXIST.	EXISTING
(SIZE)	EXIST. DRAIN LINE	SMH	SEWER MANHOLE
	EXIST. CONC. AREA	S	EXIST. SEWER MANHOLE
	OVERHEAD UTILITY	D	EXIST. DRAIN MANHOLE
	EXIST. BOUNDARY LINE		EXIST. SIGN
CONC.	CONCRETE		EXIST. POWER OR TELEPHONE POLE
	WATER METER		EXIST. TREE
	GAS METER		HOSE BIB
GAS	GAS VALVE		LIGHT POLE
WV	WATER VALVE		EXIST. DITCH
	DENOTES RAILROAD SPIKE FOUND		EXIST. MAILBOX
	DENOTES IRON PIPE FOUND		EXIST. TRAFFIC LIGHT
	DENOTES IRON ROD SET		EXIST. FIRE HYDRANT
	EXIST. CHAIN LINK FENCE		EXIST. DROP INLET
	EXIST. MONITORING WELL LID	C O	EXIST. SEWER CLEAN OUT
XCUT	DENOTES CROSS CUT SET	XCUT	DENOTES CROSS CUT FOUND
PT	PORTION	(T)	TITLE
	LINE NOT TO SCALE	(A)	ACTUAL
		T.O.C.	TOP OF CASTING

NOTES:

1. THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HEREON HAVE BEEN PLOTTED BASED UPON DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR OBTAINED FROM RECORDS MADE AVAILABLE TO US BY THE AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF UTILITIES ARE SHOWN. THE ACTUAL NONVISIBLE LOCATIONS MAY VARY FROM THOSE SHOWN HEREON. EACH AGENCY SHOULD BE CONTACTED RELATIVE TO THE PRECISE LOCATION OF ITS UNDERGROUND INSTALLATIONS PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN HEREON. PRIOR TO EXCAVATION AND DIGGING CALL LA. ONE CALL (1-800-272-3020).
2. ELEVATIONS SHOWN REFER TO NAVD88 2004.65
3. THIS IS NOT A BOUNDARY SURVEY.
4. NO TITLE RESEARCH OR UTILITY SERVITUDE RESEARCH WAS PERFORMED BY THE SURVEYOR.
5. AS PER FLOOD INSURANCE RATE MAP, COMMUNITY-PANEL NUMBER 2252030095E EFFECTIVE DATE MARCH 1, 1984 THE SITE IS IN ZONE B.
6. UNDERGROUND DRAINAGE IS THE ONLY UTILITY SHOWN ON THIS DRAWING.
7. TBM #1 IS THE NORTHEAST BOLT ON TOP FLANGE OF FIRE HYDRANT LOCATED IN GRASS APPROXIMATELY 42 FEET EAST OF DENT HALL AND APPROXIMATELY 112 FEET NORTHWEST OF HENSON HALL. (EL. = -0.77)
8. TBM#2 IS THE LETTERS "PATS" WRITTEN ON THE TOP FLANGE OF A FIRE HYDRANT LOCATED APPROXIMATELY 50 FEET WEST OF COOK FINE ARTS CENTER AND APPROXIMATELY 67 FEET SOUTHEAST OF STERN HALL. (EL. = 3.56)



100' 0 100' 200' 300' 400'

SCALE: 1" = 100'

LINFIELD, HUNTER & JUNIUS, INC.
CONSULTING ENGINEERS AND ARCHITECTS
3608 18th Street / Suite 200
Metairie, Louisiana 70002

STATE OF LOUISIANA
NATHAN JOHN JUNIUS
License No. 4958
PROFESSIONAL
LAND SURVEYOR

NATHAN J. JUNIUS, PE, PLS
NOVEMBER 27, 2013
LH&J JOB No. 13-129
(504) 833-5300

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 09

NO.	DATE	REVISION DESCRIPTION	BY

CHIESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600
NEW ORLEANS, LA 70130
PH: 504-581-3200
FAX: 504-581-3360

DESIGNED	MCS	SCALE	NOT TO SCALE
CHECKED		DATE	10/2015
DETAILED		SHEET	09
CHECKED			

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 16035-071-0036

SITE PLAN SURVEY
(1 OF 2)

100% DESIGN PLANS

STATE OF LOUISIANA

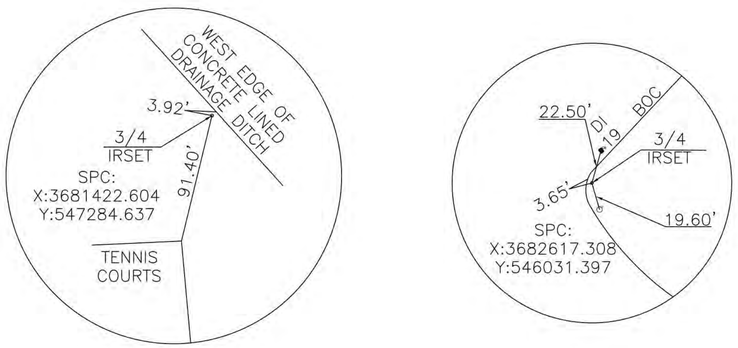
DILLARD UNIVERSITY SITE PLAN
NEW ORLEANS
LOUISIANA

LEGEND

—C—	EXIST. GUY WIRE	EXIST.	EXISTING
(SIZE)	EXIST. DRAIN LINE	SMH	SEWER MANHOLE
	EXIST. CONC. AREA	Ⓢ	EXIST. SEWER MANHOLE
—•—	OVERHEAD UTILITY	Ⓓ	EXIST. DRAIN MANHOLE
	EXIST. BOUNDARY LINE		EXIST. SIGN
CONC.	CONCRETE		EXIST. POWER OR TELEPHONE POLE
	WATER METER		EXIST. TREE
	GAS METER		HOSE BIB
GAS	GAS VALVE		LIGHT POLE
WV	WATER VALVE		EXIST. DITCH
	DENOTES RAILROAD SPIKE FOUND		EXIST. MAILBOX
	DENOTES IRON PIPE FOUND		EXIST. TRAFFIC LIGHT
	DENOTES IRON ROD SET		EXIST. FIRE HYDRANT
—o—o—o—	EXIST. CHAIN LINK FENCE		EXIST. DROP INLET
	EXIST. MONITORING WELL LID		EXIST. SEWER CLEAN OUT
XCUT	DENOTES CROSS CUT SET		DENOTES CROSS CUT FOUND
PT	PORTION	(T)	TITLE
	LINE NOT TO SCALE	(A)	ACTUAL
		T.O.C.	TOP OF CASTING

NOTES:

1. THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HEREON HAVE BEEN PLOTTED BASED UPON DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR OBTAINED FROM RECORDS AVAILABLE TO US BY THE AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF UTILITIES ARE SHOWN. THE ACTUAL NONVISIBLE LOCATIONS MAY VARY FROM THOSE SHOWN HEREON. EACH AGENCY SHOULD BE CONTACTED RELATIVE TO THE PRECISE LOCATION OF ITS UNDERGROUND INSTALLATIONS PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN HEREON. PRIOR TO EXCAVATION AND DIGGING CALL LA. ONE CALL (1-800-272-3020).
2. ELEVATIONS SHOWN REFER TO NAVD88 2004.65
3. THIS IS NOT A BOUNDARY SURVEY.
4. NO TITLE RESEARCH OR UTILITY SERVITUDE RESEARCH WAS PERFORMED BY THE SURVEYOR.
5. AS PER FLOOD INSURANCE RATE MAP, COMMUNITY-PANEL NUMBER 2252030095E EFFECTIVE DATE MARCH 1, 1984 THE SITE IS IN ZONE B.
6. UNDERGROUND DRAINAGE IS THE ONLY UTILITY SHOWN ON THIS DRAWING.
7. TBM #1 IS THE NORTHEAST BOLT ON TOP FLANGE OF FIRE HYDRANT LOCATED IN GRASS APPROXIMATELY 42 FEET EAST OF DENT HALL AND APPROXIMATELY 112 FEET NORTHWEST OF HENSON HALL. (EL. = -0.77)
8. TBM#2 IS THE LETTERS "PATS" WRITTEN ON THE TOP FLANGE OF A FIRE HYDRANT LOCATED APPROXIMATELY 50 FEET WEST OF COOK FINE ARTS CENTER AND APPROXIMATELY 67 FEET SOUTHEAST OF STERN HALL. (EL. = 3.56)



BASELINE MONUMENTATION

100' 0 100' 200' 300' 400'

SCALE: 1" = 100'

DI 1 6"RCP(S) 6"RCP(E)	DROP INLET T.O.C.=-1.24 INV.(S)=-2.34 INV.(E)=-2.14	DI 11 10"PVC(S)	DROP INLET T.O.C.=1.20 INV.(S)=-1.35	DI 23 12"PVC(N) 18"PVC(S) 24"RCP(E)	DROP INLET T.O.C.=-0.48 INV.(N)=-3.50 INV.(S)=-3.56 INV.(W)=-2.90
DI 2 12"RCP(N) 12"RCP(S)	DROP INLET T.O.C.=-1.36 INV.(N)=-3.26 INV.(S)=-3.51	DI 12 10"PVC(N) 10"CPP(S)	DROP INLET T.O.C.=0.96 INV.(N)=-1.94 INV.(S)=-1.99	DI 24 12"PVC(S) 8"PVC(S)	DROP INLET T.O.C.=-0.11 INV.(S)=-3.21 INV.(W)=-2.61
DI 3 10"RCP(N) 12"RCP(S) 12"RCP(W)	DROP INLET T.O.C.=-1.25 INV.(N)=-3.85 INV.(S)=-4.00 INV.(E)=-3.75 INV.(W)=-3.85	DI 13 10"CPP(N) 12"RCP(S)	DROP INLET T.O.C.=-1.83 INV.(N)=-3.73 INV.(S)=-3.83	DI 25 12"PVC(S) 24"RCP(S)	DROP INLET T.O.C.=0.26 INV.(N)=-5.80 INV.(S)=-5.83
DI 4 10"RCP(N) 10"RCP(S)	DROP INLET T.O.C.=-0.13 INV.(N)=-2.57 INV.(S)=-2.72	DI 14 6"CPP(E) 6"CPP(W)	DROP INLET T.O.C.=-1.50 INV.(E)=-3.32 INV.(W)=-3.35	DI 26 12"RCP(N) 12"RCP(S)	DROP INLET T.O.C.=0.25 INV.(N)=-5.62 INV.(S)=-5.70
DI 5 10"RCP(N) 10"RCP(S) 6"RCP(E)	DROP INLET T.O.C.=1.25 INV.(N)=-2.05 INV.(S)=-2.15 INV.(E)=-1.73	DI 15 6"CPP(W)	DROP INLET T.O.C.=-1.67 INV.(W)=-3.57	DI 27 12"RCP(S) 12"RCP(E)	DROP INLET T.O.C.=1.03 INV.(S)=-1.17 INV.(E)=-1.07
DI 6 10"RCP(N) 10"RCP(S)	DROP INLET T.O.C.=1.61 INV.(N)=-1.54 INV.(S)=-1.64	DI 16 12"CPP(S)	DROP INLET T.O.C.=-1.83 INV.(S)=-3.23	DI 28 12"PVC(NE) 12"RCP(S)	DROP INLET T.O.C.=0.38 INV.(NE)=-5.26 INV.(S)=-5.37
DI 7 10"PVC(E) 10"RCP(S)	DROP INLET T.O.C.=1.33 INV.(E)=-1.03 INV.(S)=-1.13	DI 17	DROP INLET T.O.C.=-2.05 INV.=-4.05 FULL OF DEBRIS	DI 29 12"RCP(N)	DROP INLET T.O.C.=0.08 INV.(N)=-5.67
DI 8 10"RCP(E) 10"RCP(W) 10"RCP(S)	DROP INLET T.O.C.=1.52 INV.(E)=-0.96 INV.(W)=-0.76 INV.(S)=-0.48	DI 18	DROP INLET T.O.C.=-1.49 INV.=-3.44 FULL OF DEBRIS	DI 30	DROP INLET T.O.C.=0.49 INV.=-2.29 FULL OF DEBRIS
DI 9 6"RCP(N)	DROP INLET T.O.C.=1.69 INV.(N)=0.43	DI 19 24"RCP(E) 24"RCP(W)	DROP INLET T.O.C.=-1.03 INV.(E)=-7.63 INV.(W)=-7.03	DI 31	DROP INLET T.O.C.=2.64 NOT FIELD LOCATED
DI 10 18"PVC(N) 8"PVC(S)	DROP INLET T.O.C.=1.52 INV.(E)=-0.90 INV.(W)=-0.96	DI 20 24"RCP(E) 24"RCP(W)	DROP INLET T.O.C.=-0.28 INV.(E)=-6.10 INV.(W)=-5.41	DI 32 12"RCP(N) 12"RCP(E)	DROP INLET T.O.C.=-0.11 INV.(N)=-4.21
		DI 21 24"RCP(E) 24"RCP(NE) 24"RCP(W)	DROP INLET T.O.C.=0.12 INV.(E)=-6.01 INV.(W)=-6.06	DI 33 12"RCP(N) 12"RCP(E)	DROP INLET T.O.C.=-0.20 INV.(N)=-4.64 INV.(E)=-4.58
		DI 22 12"PVC(N)	DROP INLET T.O.C.=-0.01 INV.(N)=-4.63		

DI 34 12"RCP(W) 12"RCP(S)	DROP INLET T.O.C.=0.22 INV.(W)=-5.40 INV.(S)=-4.13	DI 43	DROP INLET T.O.C.=-0.95 INV.=-2.10 FULL OF DEBRIS	DI 53 12"CPP(N) 10"CPP(S)	DROP INLET T.O.C.=0.57 INV.(N)=-1.53 INV.(S)=-1.53
DI 35 18"PVC(N) 12"RCP(SE) 18"X30"RCP ARCH(SW)	DROP INLET T.O.C.=1.25 INV.(N)=-6.55 INV.(SE)=-4.45 INV.(SW)=-6.65	DI 44	DROP INLET T.O.C.=-1.54 INV.=-3.34 FULL OF DEBRIS	DI 54 12"CPP(N) 12"CPP(S)	DROP INLET T.O.C.=-0.78 INV.(N)=-3.06 INV.(S)=-2.96
DI 36 12"RCP(NW)	DROP INLET T.O.C.=1.09 INV.(NW)=-4.01	DI 45 8"RCP(W) 8"RCP(E)	DROP INLET T.O.C.=-1.45 INV.(E)=-3.55 INV.(W)=-3.55	DI 55 12"CPP(N) 12"CPP(S)	DROP INLET T.O.C.=-1.40 INV.(N)=-3.96 INV.(S)=-4.10
DI 37 8"PVC(N) 8"PVC(S) 12"PVC(E)	DROP INLET T.O.C.=1.28 INV.(N)=-1.72 INV.(S)=-1.72 INV.(E)=-1.77	DI 46 10"PVC(N)	DROP INLET T.O.C.=-0.95 INV.=-2.80	DI 56 10"PVC(N) 12"CPP(S)	DROP INLET T.O.C.=-1.59 INV.(N)=-4.99 INV.(S)=-4.44
DI 38 12"PVC(W)	DROP INLET T.O.C.=1.32 INV.(W)=-2.18 INV.(S)=-2.08	DI 47 10"PVC(N) 10"PVC(S) 10"PVC(W)	DROP INLET T.O.C.=-1.43 INV.(N)=-3.23 INV.(S)=-3.23 INV.(W)=-3.18	DI 57 10"PVC(N) 10"PVC(S) 18"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-2.26 INV.(N)=-6.06 INV.(S)=-6.06 INV.(E)=-5.96 INV.(W)=-5.96
DI 39 12"PVC(N) 12"PVC(S) 12"PVC(E)	DROP INLET T.O.C.=1.36 INV.(N)=-2.29 INV.(S)=-2.29 INV.(E)=-2.34	DI 48 10"PVC(N) 10"PVC(NW) 10"PVC(SW)	DROP INLET T.O.C.=0.86 INV.(E)=-2.68 INV.(NW)=-2.53 INV.(SW)=-2.78	DI 58 10"PVC(S) 18"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-2.31 INV.(S)=-6.31 INV.(E)=-6.36 INV.(W)=-6.31
DI 40 12"PVC(S) 10"PVC(W)	DROP INLET T.O.C.=1.36 INV.(S)=-2.44 INV.(W)=-2.44	DI 49 10"PVC(N) 10"PVC(NW) 10"PVC(SW)	DROP INLET T.O.C.=-1.01 INV.(E)=-2.91 INV.(W)=-2.91 INV.(SW)=-2.91	DI 59	DROP INLET T.O.C.=-2.00 OVERALL INVERT=-4.05 HOLDING WATER COULDN'T SEE PIPES
DI 41 12"PVC(N) 12"PVC(S) 10"PVC(W)	DROP INLET T.O.C.=1.42 INV.(N)=-2.28 INV.(S)=-2.33 INV.(S)=-2.33 INV.(W)=-2.38	DI 50 10"PVC(N) 10"PVC(S) 10"PVC(W)	DROP INLET T.O.C.=-1.65 INV.(N)=-4.05 INV.(S)=-4.15 INV.(W)=-4.15	6"RCP(N)	DROP INLET T.O.C.=-1.39 INV.(N)=-2.79 OVERALL INV.=-3.19
DI 42 12"PVC(N) 12"PVC(E) 12"PVC(W)	DROP INLET T.O.C.=1.09 INV.(N)=-2.61 INV.(E)=-2.61 INV.(W)=-2.61	DI 51 10"PVC(S)	DROP INLET T.O.C.=-1.25 INV.(S)=-3.55	DI 61 6"RCP(N)	DROP INLET T.O.C.=-1.61 INV.(N)=-2.71 OVERALL INV.=-3.11
		DI 52 10"PVC(SW)	DROP INLET T.O.C.=-0.73 INV.(SW)=-2.58	DI 62 15"PVC(N) 6"PVC(S) 15"PVC(W)	DROP INLET T.O.C.=-1.79 INV.(N)=-4.59 INV.(S)=-4.24 INV.(W)=-4.59

DI 63 12"PVC(NE) 15"PVC(S) 18"RCP(E)	DROP INLET T.O.C.=-2.15 INV.(NE)=-4.60 INV.(S)=-4.80 INV.(E)=-4.90	DI 73 10"CPP(N)	DROP INLET T.O.C.=-2.12 INV.(N)=-3.97	DI 84 12"CCP(N) 12"CPP(SW)	DROP INLET T.O.C.=-2.45 INV.(N)=-6.35 INV.(SW)=-6.25
DI 64 18"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-2.49 INV.(E)=-6.54 INV.(W)=-6.59	DI 74 12"CPP(N) 10"CPP(S) 10"CPP(W)	DROP INLET T.O.C.=-2.39 INV.(N)=-4.84 INV.(S)=-4.74 INV.(W)=-4.79	DI 85 12"RCP(N)	DROP INLET T.O.C.=-2.09 INV.(N)=-5.84
DI 65 18"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-2.68 INV.(E)=-6.28 INV.(W)=-6.24	DI 75 10"CCP(N)	DROP INLET T.O.C.=-2.31 INV.(N)=-4.21	DI 86 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.98 INV.(E)=-7.30 INV.(W)=-7.48
DI 66 24"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-2.19 INV.(E)=-6.89 INV.(W)=-6.69	DI 76 6"CPP(E) 18"RCP(E) 18"RCP(W)	DROP INLET T.O.C.=-1.77 INV.(N)=-3.87 INV.(E)=-3.92 INV.(W)=-3.84	DI 87 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.85 INV.(E)=-7.67 INV.(W)=-7.70
DI 67 8"PVC(N) 8"PVC(S) 8"PVC(E)	DROP INLET T.O.C.=-2.25 INV.(N)=-6.55 INV.(S)=-6.50 INV.(E)=-6.25	DI 77 6"RCP(S) 6"RCP(E)	DROP INLET T.O.C.=-1.95 INV.(S)=-3.30 INV.(E)=-3.27	DI 88 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.82 INV.(E)=-7.62 INV.(W)=-7.67
DI 68 8"PVC(NW)	DROP INLET T.O.C.=-1.60 INV.(NW)=-4.90	DI 78 6"RCP(W)	DROP INLET T.O.C.=-1.94 INV.(W)=-3.39	DI 89 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.87 INV.(E)=-7.77 INV.(W)=-7.77
DI 69 24"RCP(E) 24"RCP(SW)	DROP INLET T.O.C.=-1.49 INV.(E)=-6.69 INV.(SW)=-6.59	DI 79 12"CPP(S) 12"RCP(W)	DROP INLET T.O.C.=-2.37 INV.(S)=-5.22 INV.(W)=-5.37	DI 90 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.90 INV.(E)=-7.75 INV.(W)=-7.70
DI 70 24"RCP(N) 24"RCP(W)	DROP INLET T.O.C.=-1.65 INV.(N)=-6.10 INV.(W)=-6.15	DI 80 12"CPP(E) 15"CPP(NW)	DROP INLET T.O.C.=-2.20 INV.(E)=-5.45 INV.(W)=-6.32	DI 91 15"RCP(NE)	DROP INLET T.O.C.=-2.83 INV.(NE)=-7.48
DI 71 10"CPP(N) 12"CPP(S) 10"CPP(E)	DROP INLET T.O.C.=-2.15 INV.(N)=-4.70 INV.(S)=-4.75 INV.(E)=-4.70	DI 81 12"CPP(S) 12"CPP(SE) 15"CPP(W)	DROP INLET T.O.C.=-2.10 INV.(S)=-5.75 INV.(SE)=-5.60 INV.(W)=-5.80	DI 92 15"RCP(NE) 15"RCP(SW)	DROP INLET T.O.C.=-2.96 INV.(NE)=-7.41 INV.(SW)=-7.31
DI 72 10"CPP(S) 10"CPP(E) 10"CPP(W)	DROP INLET T.O.C.=-2.10 INV.(S)=-4.55 INV.(E)=-4.70 INV.(W)=-4.65	DI 82 12"CPP(W)	DROP INLET T.O.C.=-2.28 INV.(NE)=-6.63 INV.(W)=-6.78	DI 93 15"RCP(NE) 15"RCP(W) 15"RCP(SW)	DROP INLET T.O.C.=-2.96 INV.(NE)=-5.46 INV.(W)=-5.26 INV.(SW)=-5.36
		DI 83 12"CPP(E)	DROP INLET T.O.C.=-2.32 INV.(NE)=-5.62	DI 94 15"RCP(N)	DROP INLET T.O.C.=-2.89 INV.(N)=-9.24

DI 95	DROP INLET T.O.C.=-3.77 HDG.DING WATER OVERALL INV.=-8.47	DI 106 16"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-2.80 INV.(N)=-5.75 INV.(S)=-5.80	DI 115 18"X30"RCP ARCH(SE)	DROP INLET T.O.C.=-1.92 INV.(N)=-5.38 INV.(SE)=-5.50
DI 96 15"RCP(N) 15"RCP(SW) 15"RCP(SE)	DROP INLET T.O.C.=-3.05 INV.(N)=-6.05 INV.(SW)=-6.07 INV.(SE)=-6.08	DI 107 16"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-2.29 INV.(N)=-5.84 INV.(S)=-5.84	DI 116 18"X30"RCP ARCH(NW) 12"RCP(NE) 36"RCP(S)	DROP INLET T.O.C.=-2.14 INV.(NW)=-5.49 INV.(NE)=-5.34 INV.(S)=-5.79
DI 97 15"RCP(NW)	DROP INLET T.O.C.=-3.77 INV.(NW)=-8.27	DI 108 16"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-2.38 INV.(N)=-6.53 INV.(S)=-6.53	DI 117 6"PVC(S)	DROP INLET T.O.C.=0.64 INV.(S)=-1.48
DI 98 30"RCP(N) 15"RCP(S)	DROP INLET T.O.C.=-2.85 INV.(N)=-7.95 INV.(S)=-7.95	15"RCP(SE)	INV.(E)=-6.12	DI 118 18"X30"RCP ARCH(SE) 24"RCP(NE)	DROP INLET T.O.C.=-0.09 INV.(S)=-3.11 INV.(NE)=-5.99
DI 99 30"RCP(N) 30"RCP(S)	DROP INLET T.O.C.=-2.85 INV.(N)=-7.05 INV.(S)=-7.05	DI 109 15"RCP(W)	DROP INLET T.O.C.=-2.59 INV.(NW)=-5.69	DI 119 8"PVC(N) 8"PVC(SE)	DROP INLET T.O.C.=-1.65 INV.(N)=-5.85 INV.(SE)=-5.65
DI 100 30"RCP(N) 30"RCP(S)	DROP INLET T.O.C.=-3.50 INV.(N)=-7.20 INV.(S)=-6.68	DI 110 15"RCP(NW)	DROP INLET T.O.C.=-2.78 INV.(N)=-6.53 INV.(S)=-6.48 INV.(E)=-6.48	DI 120 8"PVC(W)	DROP INLET T.O.C.=-2.25 INV.(W)=-5.80
DI 101 12"RCP(S)	DROP INLET T.O.C.=-3.18 INV.(S)=-6.38	DI 111 18"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-3.38 INV.(N)=-7.15 INV.(S)=-7.23	DI 121 18"X30"RCP ARCH(S) 18"X30"RCP ARCH(N)	DROP INLET T.O.C.=-2.30 INV.(N)=-6.85 INV.(S)=-6.85
DI 102 10"RCP(N) 12"RCP(S) 12"RCP(E)	DROP INLET T.O.C.=-2.80 INV.(N)=-5.40 INV.(S)=-5.30 INV.(E)=-5.35	DI 112 12"RCP(E) 12"RCP(W)	DROP INLET T.O.C.=-2.76 INV.(W)=-5.46	DI 122 24"RCP(N) 24"RCP(S)	DROP INLET T.O.C.=-2.10 INV.(N)=-6.75 INV.(S)=-6.60
DI 103 12"RCP(W)	DROP INLET T.O.C.=-2.76 INV.(W)=-5.46	DI 113 18"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-2.19 INV.(N)=-5.57 INV.(S)=-5.54	DI 123 36"RCP(N) 15"RCP(SE)	DROP INLET T.O.C.=-2.68 INV.(N)=-5.33 INV.(S)=-5.18
DI 104 15"RCP(N)	DROP INLET T.O.C.=-2.83 INV.(N)=-5.83	DI 114 18"X30"RCP ARCH(N) 18"X30"RCP ARCH(S)	DROP INLET T.O.C.=-1.16 INV.(N)=-5.61 INV.(S)=-5.51	DI 124 36"RCP(N) 24"RCP(S)	DROP INLET T.O.C.=-2.30 INV.(N)=-7.35 INV.(S)=-7.25
DI 105 18"X30"RCP ARCH(NE) 18"X30"RCP ARCH(W) 15"RCP(S)	DROP INLET T.O.C.=-2.89 INV.(NE)=-6.04 INV.(W)=-6.19 INV.(S)=-6.13			DI 125 36"RCP(N) 36"RCP(S)	DROP INLET T.O.C.=-3.51 INV.(N)=-7.11 INV.(S)=-7.11
				DI 126 36"RCP(N) 36"RCP(S)	DROP INLET T.O.C.=-3.16 INV.(N)=-7.16 INV.(S)=-7.16
				DI 127 6"CPP(N) 15"PVC(E)	DROP INLET T.O.C.=-1.71 INV.(N)=-4.31 INV.(E)=-4.36
				DI 128 12"RCP(N) 12"PVC(S)	DROP INLET T.O.C.=-2.37 INV.(N)=-5.37 INV.(S)=-5.37
				DI 129 12"PVC(N) 10"PVC(E)	DROP INLET T.O.C.=-1.65 INV.(N)=-4.85 INV.(S)=-4.65

CB 1 12"RCP(E)	CATCH BASIN T.O.C.=-0.15 INV.(E)=-2.10	CB 11 15"RCP(S)	CATCH BASIN T.O.C.=-0.10 INV.(S)=-2.80	CB 20 10"RCP(W)	CATCH BASIN T.O.C.=-1.50 INV.(W)=-3.65
CB 2	CATCH BASIN T.O.C.=-0.44 INV.=-2.94 FULL OF DEBRIS	CB 12 12"RCP(SW) 12"RCP(SE)	CATCH BASIN T.O.C.=-2.92 INV.(SW)=-5.12 INV.(SE)=-5.10	CB 21 24"RCP(NE) 24"RCP(SW)	CATCH BASIN T.O.C.=-3.12 INV.(NE)=-7.07 INV.(SW)=-7.02
CB 3	CATCH BASIN T.O.C.=-0.75 INV.=-3.05 FULL OF DEBRIS	CB 13 12"RCP(NW) 12"RCP(S)	CATCH BASIN T.O.C.=-3.05 INV.(NW)=-5.25 INV.(S)=-5.15	CB 22 12"RCP(E) 10"RCP(W)	CATCH BASIN T.O.C.=0.15 INV.(E)=-2.10 INV.(S)=-2.10
CB 4 12"RCP(E) 10"RCP(W)	CATCH BASIN T.O.C.=-0.93 INV.(E)=-3.53 INV.(W)=-3.33	CB 14 12"CCP(N) 12"CCP(S)	CATCH BASIN T.O.C.=-2.62 INV.(N)=-6.62 INV.(S)=-6.57	CB 23	CATCH BASIN T.O.C.=-0.48 OVERALL INV.=-2.63 FULL OF DEBRIS
CB 5 10"RCP(E)	CATCH BASIN T.O.C.=-0.79 INV.(E)=-1.91	CB 15 15"RCP(NW) 15"RCP(S)	CATCH BASIN T.O.C.=-1.65 INV.(NW)=-5.00 INV.(S)=-4.85	CB 24	CATCH BASIN T.O.C.=-0.65 OVERALL INV.=-2.95 FULL OF DEBRIS
CB 6 6"RCP	CATCH BASIN T.O.C.=-0.71 INV.=-2.56 FULL OF DEBRIS	CB 16 15"RCP(NW) 10"RCP(E)	CATCH BASIN T.O.C.=-1.39 INV.(NW)=-3.89 INV.(E)=-3.64	CB 25 10"RCP(E)	CATCH BASIN T.O.C.=-0.86 INV.(E)=-3.06
CB 7 12"RCP(E)	CATCH BASIN T.O.C.=-1.24 INV.(E)=-2.96	CB 17 24"RCP(S)	CATCH BASIN T.O.C.=-3.54 INV.(S)=-6.94	CB 26 10"RCP(E) 10"RCP(S)	CATCH BASIN T.O.C.=-0.56 INV.(E)=-2.86 INV.(S)=-3.21
CB 8 12"RCP(N)	CATCH BASIN T.O.C.=-0.23 INV.(N)=-3.17	CB 18 24"RCP(N)	CATCH BASIN T.O.C.=-3.34 INV.(N)=-7.14		
CB 9 12"RCP(S)	CATCH BASIN T.O.C.=0.15 INV.(S)=-3.85				
CB 10 18"PVC(N) 8"PVC(S)	CATCH BASIN T.O.C.=-0.18 INV.(N)=-3.08 INV.(S)=-2.68	CB 19 24"RCP(NE) 24"RCP(SW)	CATCH BASIN T.O.C.=-3.22 INV.(NE)=-7.28 INV.(SW)=-7.22		

DMH 1 24"RCP(E) 24"RCP(S)	DRAIN MANHOLE T.O.C.=-0.79 INV.(E)=-7.79 INV.(S)=-6.73	DMH 11 18"PVC(N) 18"PVC(S) 12"PVC(W)	DRAIN MANHOLE T.O.C.=1.29 INV.(N)=-4.01 INV.(S)=-3.96 INV.(W)=-3.31	DMH 21 12"RCP(N) 12"RCP(S) 12"RCP(E)	DRAIN MANHOLE T.O.C.=-2.97 INV.(N)=-7.67 INV.(S)=-7.47 INV.(E)=-7.55
DMH 2 24"RCP(N) 24"RCP(E) 24"RCP(W)	DRAIN MANHOLE T.O.C.=-0.76 INV.(N)=-6.01 INV.(E)=-7.26 INV.(W)=-6.01	DMH 12 12"PVC(E) 12"PVC(W)	DRAIN MANHOLE T.O.C.=1.35 INV.(E)=-3.05 INV.(W)=-2.95	DMH 22 30"RCP(N) 30"RCP(S)	DRAIN MANHOLE T.O.C.=-3.83 INV.(N)=-8.68 INV.(S)=-8.71
DMH 3 24"RCP(SW) 24"RCP(E) 12"PVC(NW)	DRAIN MANHOLE T.O.C.=0.81 INV.(SW)=-5.09 INV.(E)=-5.09 INV.(NW)=-4.04	DMH 13 18"PVC(N) 18"PVC(S) 12"PVC(W)	DRAIN MANHOLE T.O.C.=0.58 INV.(N)=-3.77 INV.(S)=-4.02 INV.(W)=-3.82	DMH 23 6"PVC(N) 15"PVC(S) 15"PVC(W)	DRAIN MANHOLE T.O.C.=-1.31 INV.(N)=-4.96 INV.(S)=-5.16 INV.(W)=-5.21
DMH 4 18"PVC(E) 24"RCP(W) 12"PVC(S) 18x24"ARCH RCP(N)	DRAIN MANHOLE T.O.C.=0.38 INV.(E)=-4.22 INV.(W)=-5.12 INV.(S)=-5.04 INV.(N)=-4.17	DMH 14 18"RCP(E) 18"RCP(W) 18"PVC(S)	DRAIN MANHOLE T.O.C.=0.53 INV.(E)=-4.62 INV.(W)=-4.62 INV.(S)=-4.02	DMH 24 18"RCP(N) 18"RCP(S) 12"RCP(W)	DRAIN MANHOLE T.O.C.=-0.18 INV.(N)=-3.28 INV.(S)=-3.43 INV.(W)=-3.23
DMH 5 18"PVC(E) 18"PVC(N)	DRAIN MANHOLE T.O.C.=0.25 INV.(E)=-3.55 INV.(N)=-3.60	DMH 15 18"RCP(E) 18"RCP(W)	DRAIN MANHOLE T.O.C.=0.58 INV.(E)=-4.17 INV.(W)=-4.12	DMH 25 8"PVC(S) 24"RCP(E) 18"RCP(W)	DRAIN MANHOLE T.O.C.=-3.45 INV.(S)=-7.90 INV.(E)=-8.30 INV.(W)=-8.05
DMH 6 12"PVC(N) 12"PVC(S)	DRAIN MANHOLE T.O.C.=1.25 INV.(N)=-3.19 INV.(S)=-3.45	DMH 16 18"PVC(E) 18"PVC(W)	DRAIN MANHOLE T.O.C.=0.40 INV.(E)=-3.10 INV.(W)=-3.00	DMH 26 24"RCP(N) 24"RCP(S)	DRAIN MANHOLE T.O.C.=-3.64 OVERALL DEPTH=-7.79 COULD NOT SEE PIPES SYSTEM HOLDING WATER
DMH 7 12"PVC(N) 12"PVC(W)	DRAIN MANHOLE T.O.C.=1.11 INV.(N)=-3.29 INV.(W)=-2.24	DMH 17 15"RCP(N) 18"PVC(S) 18"PVC(E)	DRAIN MANHOLE T.O.C.=-0.24 INV.(N)=-3.84 INV.(S)=-3.64 INV.(E)=-4.14	DMH 27 51"X31" ARCH RCP(N) 36"RCP(S)	DRAIN MANHOLE T.O.C.=-3.74 OVERALL DEPTH = -8.54 MANHOLE HOLDING WATER.
DMH 8 6"PVC(SW) 6"PVC(SE) 12"RCP(E)	DRAIN MANHOLE T.O.C.=2.84 INV.(SW)=-1.96 INV.(SE)=-1.76 INV.(E)=-4.71	DMH 18 8"PVC(N) 8"PVC(S)	DRAIN MANHOLE T.O.C.=0.52 INV.(N)=-2.48 INV.(S)=-2.38		
DMH 9 18"PVC(N) 18"PVC(S)	DRAIN MANHOLE T.O.C.=2.35 INV.(N)=-4.32 INV.(S)=-5.85	DMH 19 18"RCP(E) 18"RCP(W)	DRAIN MANHOLE T.O.C.=-1.96 INV.(E)=-6.81 INV.(W)=-6.56		
DMH 10 12"RCP(N) 12"RCP(S) 24"RCP(E) 18"RCP(W)	DRAIN MANHOLE T.O.C.=0.00 INV.(N)=-3.90 INV.(S)=-3.95 INV.(E)=-4.65 INV.(W)=-4.55	DMH 20 12"RCP(N) 12"RCP(S)	DRAIN MANHOLE T.O.C.=-2.88 INV.(N)=-6.88 INV.(S)=-6.88		

OUTFALL INVERTS

INV. 1 6"PVC(S)	INV.(S)=-2.10
INV. 2 6"PVC(S)	INV.(S)=-1.53
INV. 3 51"X31" ARCH RCP(N)	INV.(N)=-8.42

NATHAN J. JUNIUS, PE, PLS

NOVEMBER 27, 2013

LH&J JOB No. 13-129

100% DESIGN PLANS
NOT FOR CONSTRUCTION

LINFIELD, HUNTER & JUNIUS, INC.
CONSULTING ENGINEERS AND ARCHITECTS
3608 18th Street / Suite 200
Metairie, Louisiana 70002
PHONE: 504-833-5300

SHEET NUMBER 10

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600, NEW ORLEANS, LA 70130

DESIGNED MCS | SCALE NOT TO SCALE | DATE 10/2015 | SHEET 10

CHECKED | DETAILED | CHECKED

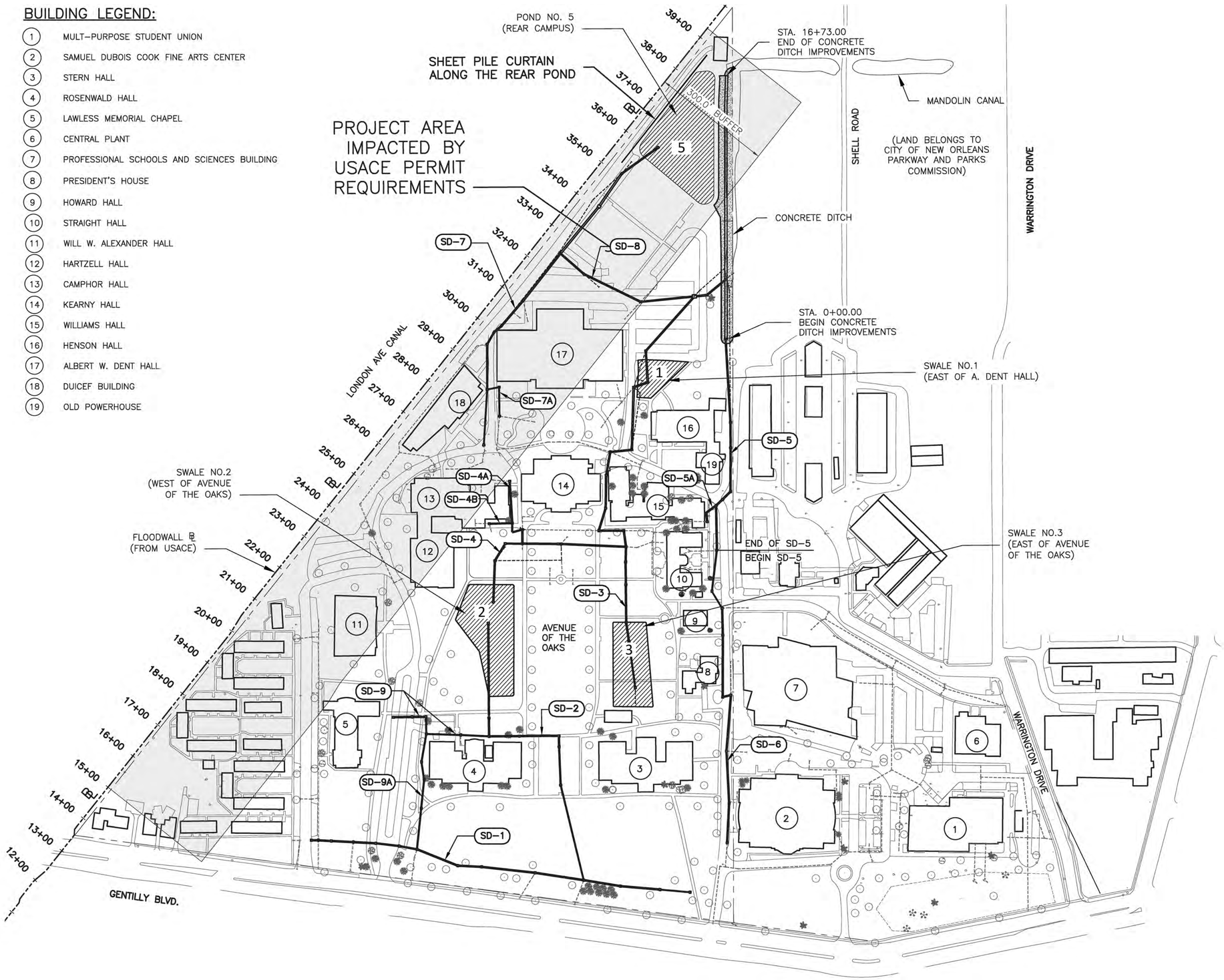
DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603m-071-0036

SITE PLAN SURVEY
(2 OF 2)

100% DESIGN PLANS

BUILDING LEGEND:

1. MULT-PURPOSE STUDENT UNION
2. SAMUEL DUBOIS COOK FINE ARTS CENTER
3. STERN HALL
4. ROSENWALD HALL
5. LAWLESS MEMORIAL CHAPEL
6. CENTRAL PLANT
7. PROFESSIONAL SCHOOLS AND SCIENCES BUILDING
8. PRESIDENT'S HOUSE
9. HOWARD HALL
10. STRAIGHT HALL
11. WILL W. ALEXANDER HALL
12. HARTZELL HALL
13. CAMPHOR HALL
14. KEARNY HALL
15. WILLIAMS HALL
16. HENSON HALL
17. ALBERT W. DENT HALL
18. DUICEF BUILDING
19. OLD POWERHOUSE



LEGEND:

- ℄ — — — BASELINE OF SURVEY OF LONDON AVENUE CANAL EAST FLOODWALL
- ℄ — - — CENTERLINE OF CONSTRUCTION
- ---------- EXISTING STORM DRAIN
- ———— PROPOSED STORM DRAIN
- PROPOSED SWALE/DETENTION POND
- PROPOSED CONCRETE DITCH IMPROVEMENTS
- SD-1 — STORM DRAIN ALIGNMENT

DRAINAGE IMPROVEMENTS

0 48 120
FEET

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 30

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 1600B
NEW ORLEANS, LA 70130
PH: 504-581-3200
FAX: 504-581-3288

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	1" = 120'
CHECKED		DATE	10/2015
DETAILED		SHEET	30
CHECKED			

MARC SCALLY
License No. 38754
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

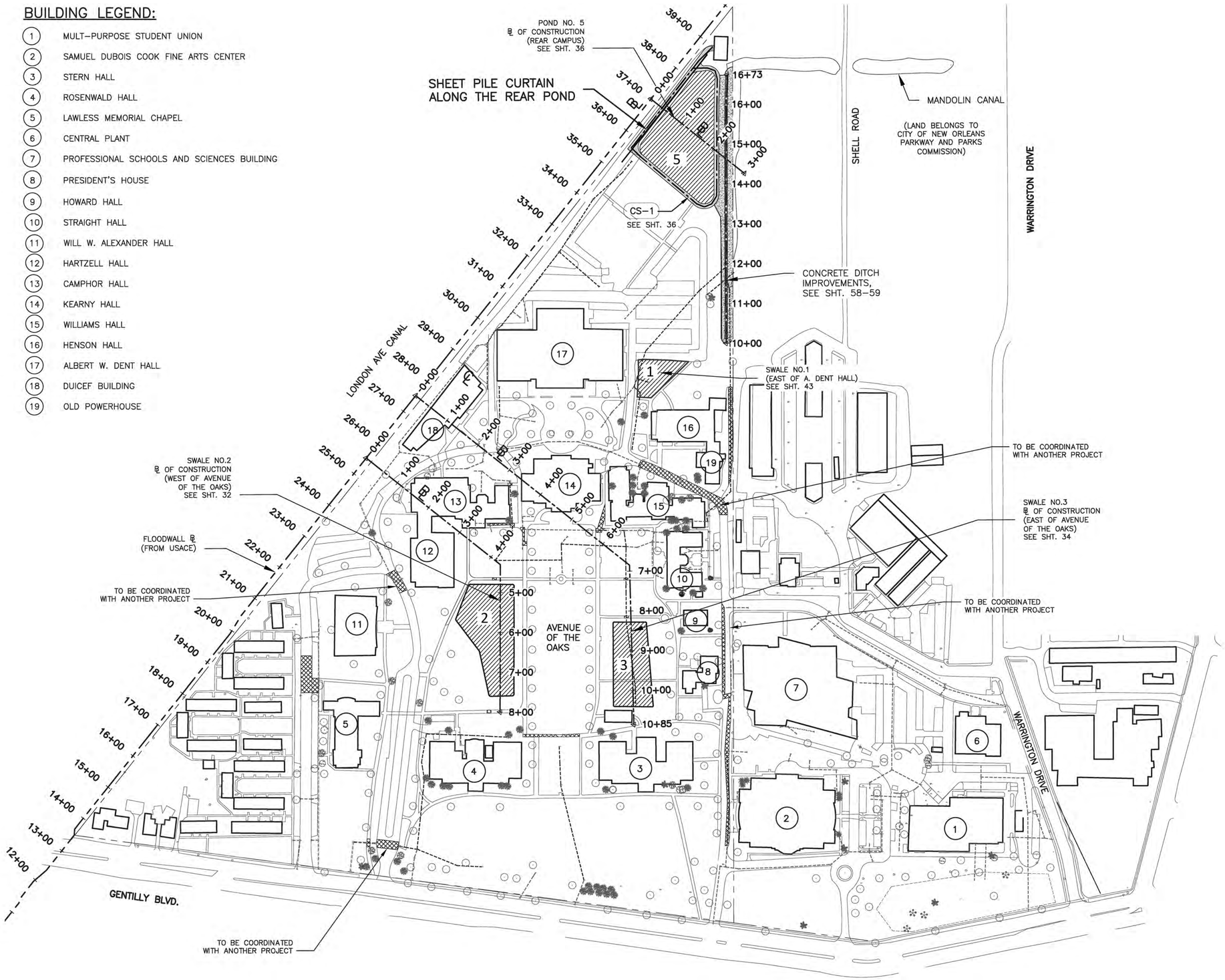
DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

DRAINAGE IMPROVEMENTS LAYOUT PLAN

100% DESIGN PLANS

BUILDING LEGEND:

1. MULT-PURPOSE STUDENT UNION
2. SAMUEL DUBOIS COOK FINE ARTS CENTER
3. STERN HALL
4. ROSENWALD HALL
5. LAWLESS MEMORIAL CHAPEL
6. CENTRAL PLANT
7. PROFESSIONAL SCHOOLS AND SCIENCES BUILDING
8. PRESIDENT'S HOUSE
9. HOWARD HALL
10. STRAIGHT HALL
11. WILL W. ALEXANDER HALL
12. HARTZELL HALL
13. CAMPHOR HALL
14. KEARNY HALL
15. WILLIAMS HALL
16. HENSON HALL
17. ALBERT W. DENT HALL
18. DUICEF BUILDING
19. OLD POWERHOUSE



LEGEND:

- ℄ ——— – BASELINE OF SURVEY OF LONDON AVENUE CANAL EAST FLOODWALL
- ℄ – – – – BASELINE OF CONSTRUCTION
- ---------- – EXISTING STORM DRAIN
- ——— – PROPOSED STORM DRAIN
- – PROPOSED SIDEWALK/ CONCRETE PAVEMENT ENHANCEMENT/REPAIR
- – PROPOSED SWALE/DETENTION POND
- – PROPOSED CONCRETE DITCH IMPROVEMENTS
- – PROPOSED ASPHALT PAVEMENT
- (CS-1) – ACCESS ROAD ALIGNMENT

BASELINE CONTROL PLAN

0 48 120
FEET

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 31

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 1600B
NEW ORLEANS, LA 70130
PH: 504-581-3888
FAX: 504-581-3886

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	1" = 120'	DATE	10/2015
CHECKED				SHEET	31
DETAILED					
CHECKED					

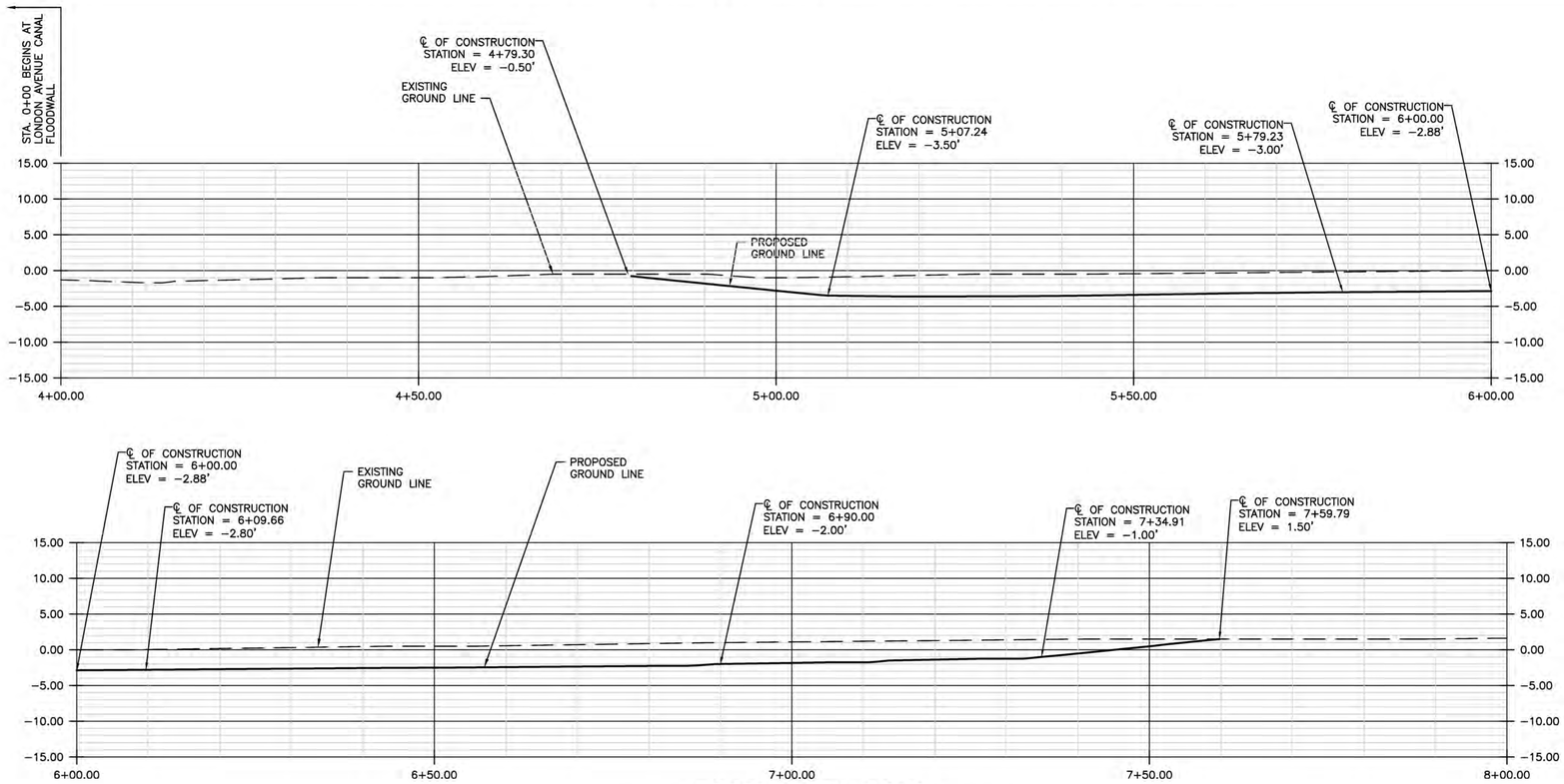
MARK SCALLY
Louisiana No. 33764
PROFESSIONAL ENGINEER

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

BASELINE CONTROL PLAN

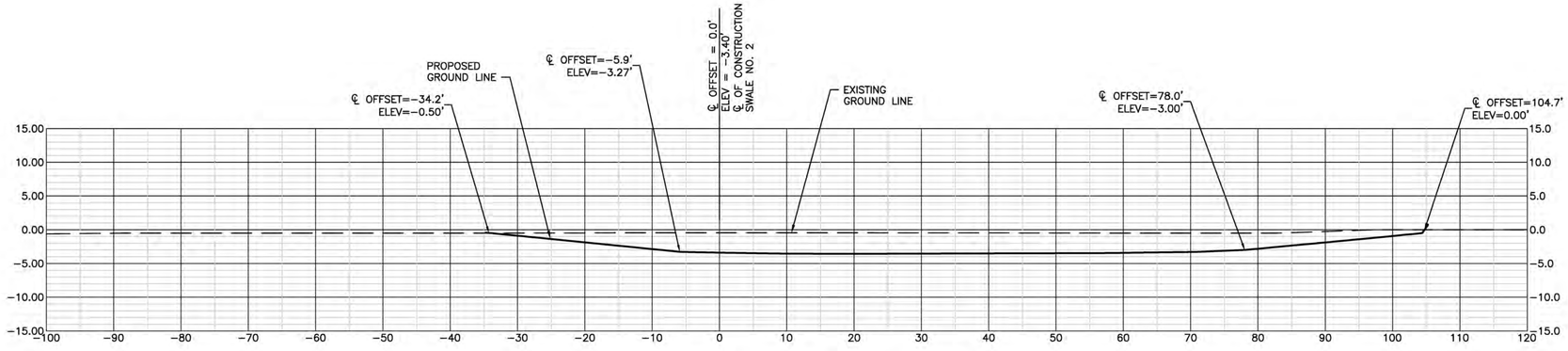
100% DESIGN PLANS

STATE OF LOUISIANA
REGISTERED PROFESSIONAL ENGINEER



PROFILE VIEW ALONG SWALE NO. 2 ℄ OF CONSTRUCTION

VERTICAL SCALE: 1"=10'
HORIZONTAL SCALE: 1"=10'
0 2 4 6 8 10 FEET



SECTION "A" AT STA. 5+50.00

VERTICAL SCALE: 1"=10'
HORIZONTAL SCALE: 1"=10'
0 2 4 6 8 10 FEET

SWALE NO.2 (WEST OF AVENUE OF THE OAKS)

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 33

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 16008
NEW ORLEANS, LA 70130
PH: 504-581-3588
FAX: 504-581-3588

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE. 16008, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	1" = 10'
CHECKED		DATE	10/2015
DETAILED		SHEET	33
CHECKED			

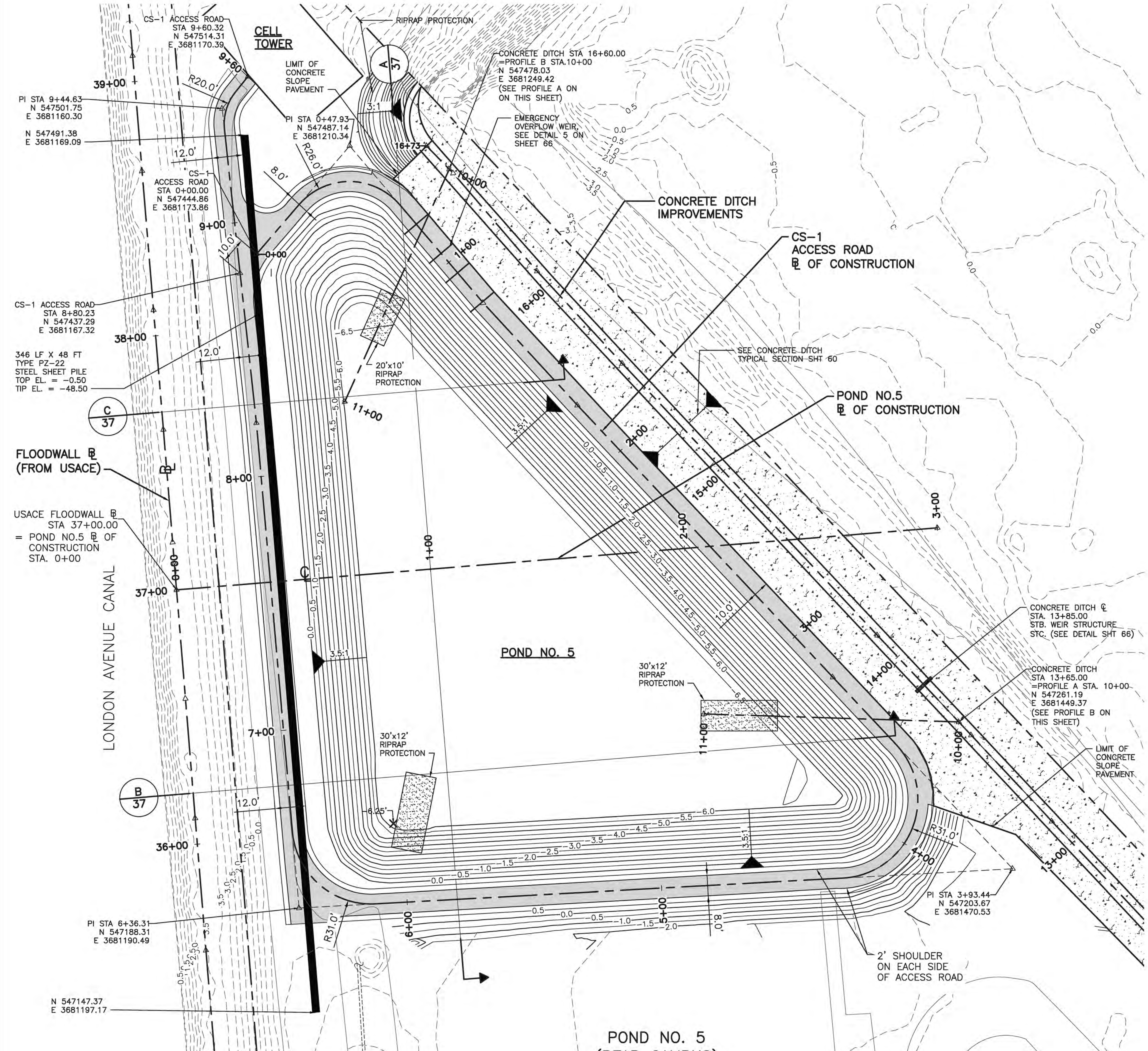
MARK SCALLY Louisiana No. 33794 PROFESSIONAL ENGINEER

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

SWALE NO.2 – PROFILE AND SECTION
(WEST OF AVENUE OF THE OAKS)

100% DESIGN PLANS

STATE OF LOUISIANA

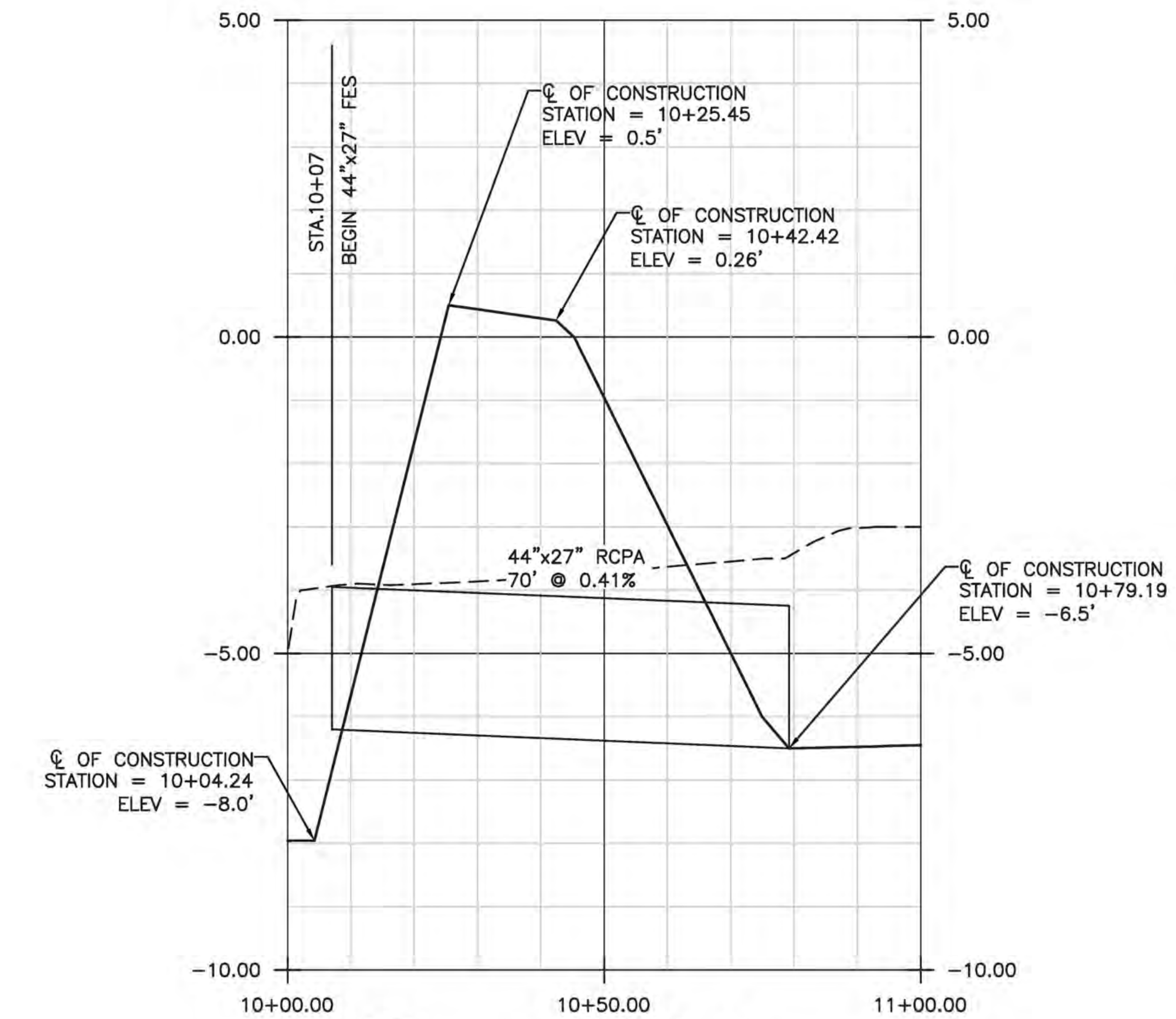


POND NO. 5
(REAR CAMPUS)

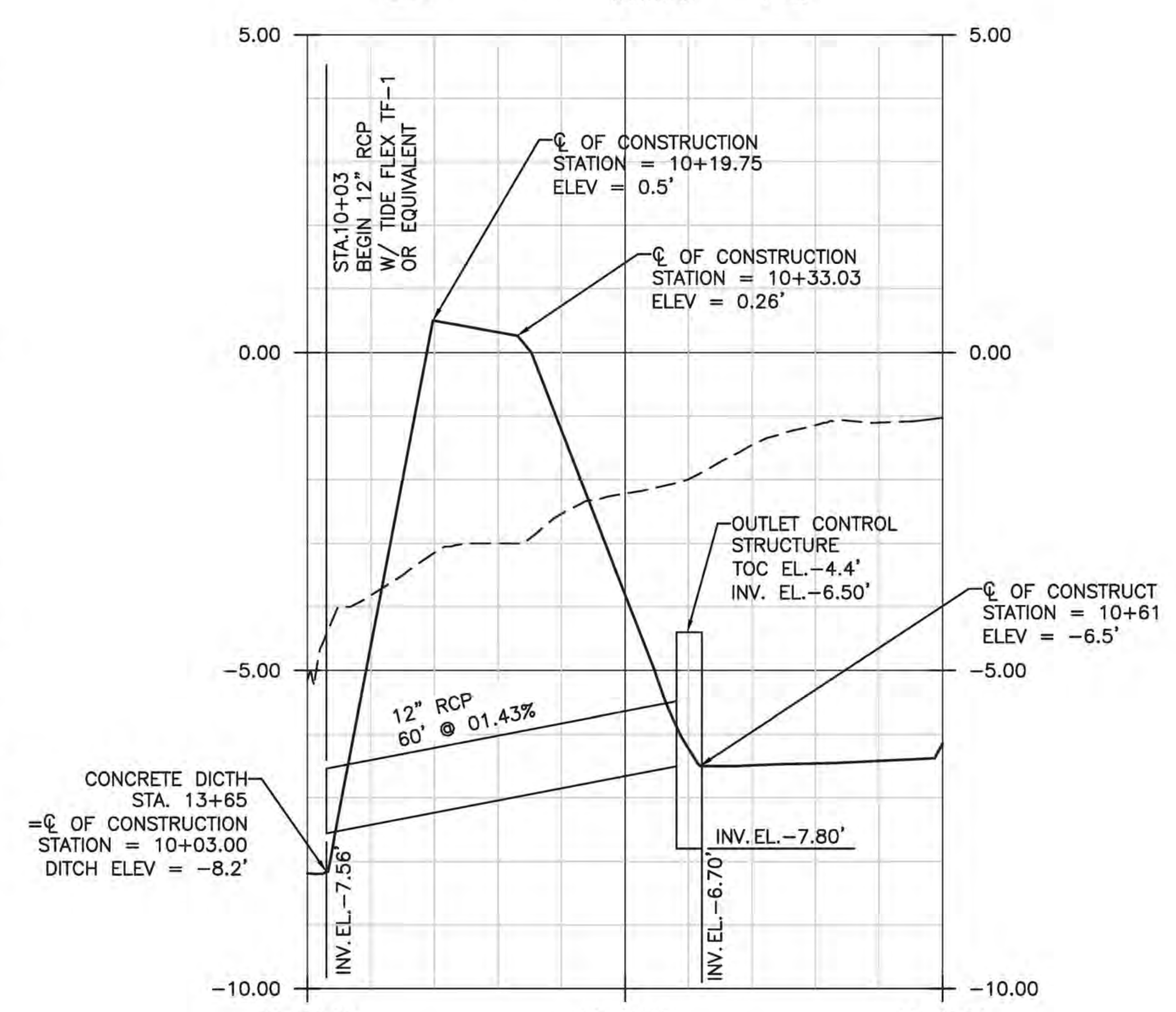
0 5 10 20 FEET

GENERAL LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING PIPE
- PRZ (DRIPLINE)
- TREE NUMBER
- PROPOSED SIDEWALK/ CONCRETE PAVEMENT ENHANCEMENT AND REPAIR
- PROPOSED ACCESS ROAD



1/36 PROFILE A
SCALE: HORIZONTAL 1"=20' VERTICAL 1"=2'



2/36 PROFILE B
SCALE: HORIZONTAL 1"=20' VERTICAL 1"=2'

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 36

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

DESIGNED	MGS	SCALE	1" = 20'
CHECKED			
DETAILED		DATE	10/2015
CHECKED		SHEET	36

MARK SCALLY License No. 38704 PROFESSIONAL ENGINEER STATE OF LOUISIANA

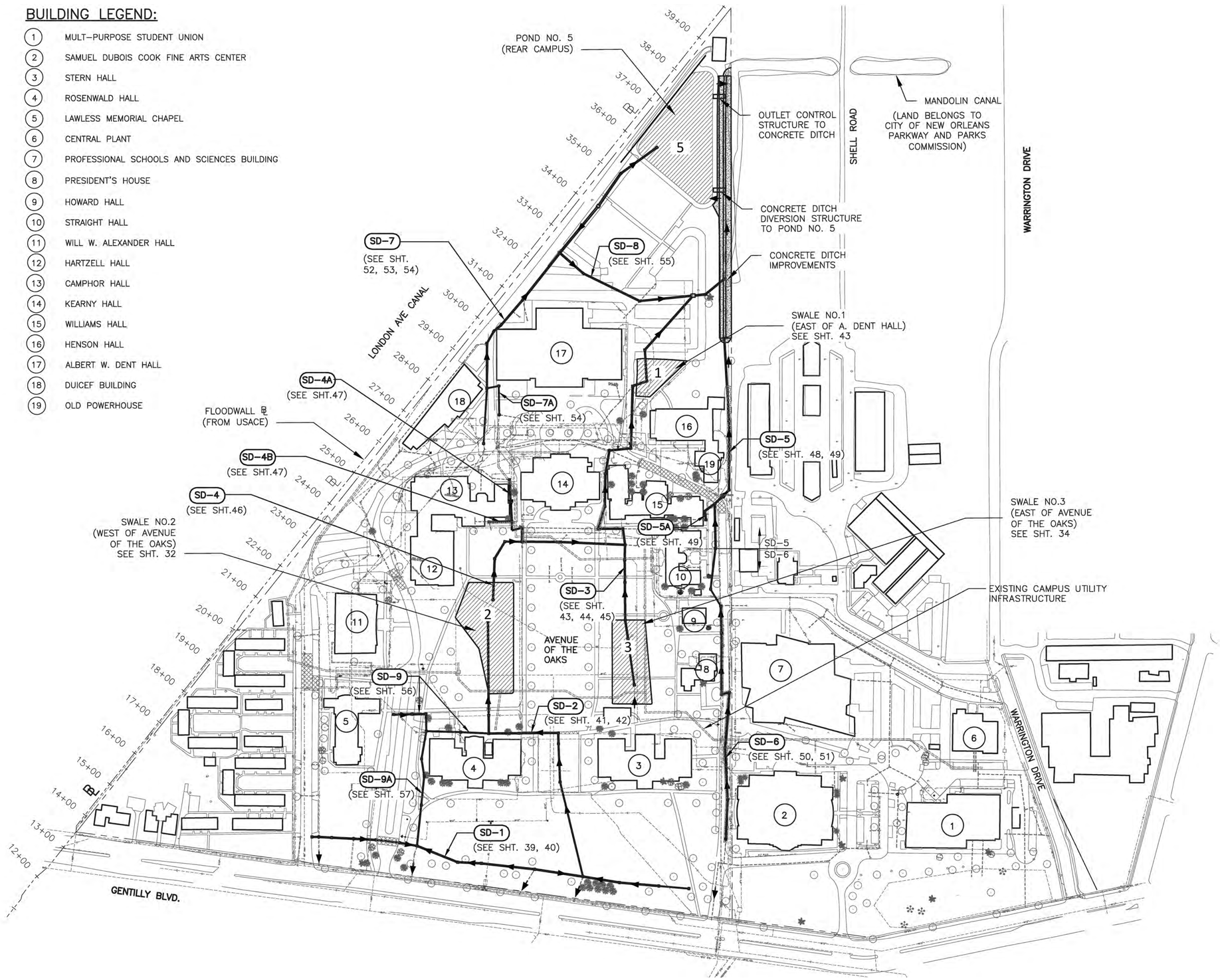
DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

POND NO. 5 – PLAN
(REAR EAST CAMPUS)

100% DESIGN PLANS

BUILDING LEGEND:

1. MULT-PURPOSE STUDENT UNION
2. SAMUEL DUBOIS COOK FINE ARTS CENTER
3. STERN HALL
4. ROSENWALD HALL
5. LAWLESS MEMORIAL CHAPEL
6. CENTRAL PLANT
7. PROFESSIONAL SCHOOLS AND SCIENCES BUILDING
8. PRESIDENT'S HOUSE
9. HOWARD HALL
10. STRAIGHT HALL
11. WILL W. ALEXANDER HALL
12. HARTZELL HALL
13. CAMPHOR HALL
14. KEARNY HALL
15. WILLIAMS HALL
16. HENSON HALL
17. ALBERT W. DENT HALL
18. DUICEF BUILDING
19. OLD POWERHOUSE



LEGEND:

- BASELINE OF SURVEY OF LONDON AVENUE CANAL EAST FLOODWALL
- CENTERLINE OF CONSTRUCTION
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- DIRECTION OF FLOW (THROUGH PIPELINE)
- PROPOSED SIDEWALK/ CONCRETE PAVEMENT ENHANCEMENT/REPAIR
- PROPOSED SWALE/DETENTION POND
- PROPOSED CONCRETE DITCH IMPROVEMENTS
- PROPOSED ACCESS ROAD
- PROPOSED MANHOLE
- PROPOSED CATCH BASIN/ DROP INLET
- SD-1 – STORM DRAIN ALIGNMENT

STORM DRAIN IMPROVEMENTS KEY MAP

0 48 120
FEET

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 38

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 16008
NEW ORLEANS, LA 70130
TEL 504-581-3000
FAX 504-581-3088

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 16008, NEW ORLEANS, LA 70130

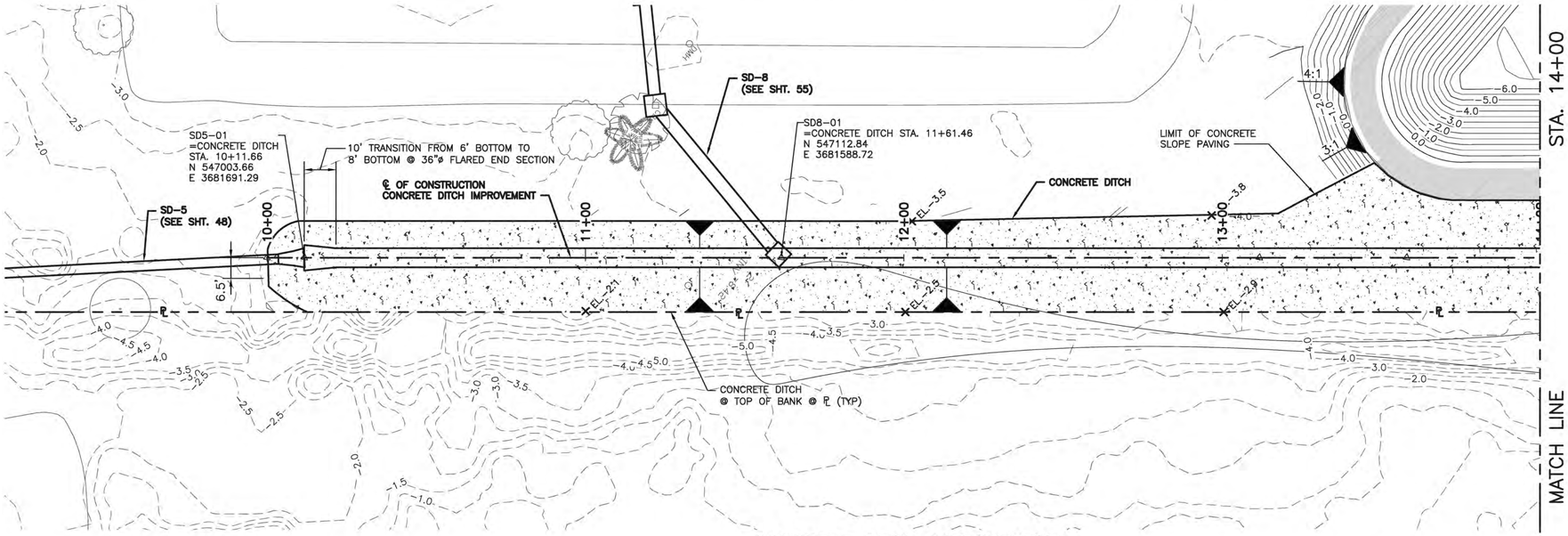
DESIGNED	MGS	SCALE	1" = 120'	DATE	10/2015
CHECKED				SHEET	38
DETAILED					
CHECKED					

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 18035-071-0036

STORM DRAIN IMPROVEMENTS
KEY MAP

100% DESIGN PLANS

MARK SCULLY
License No. 38754
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

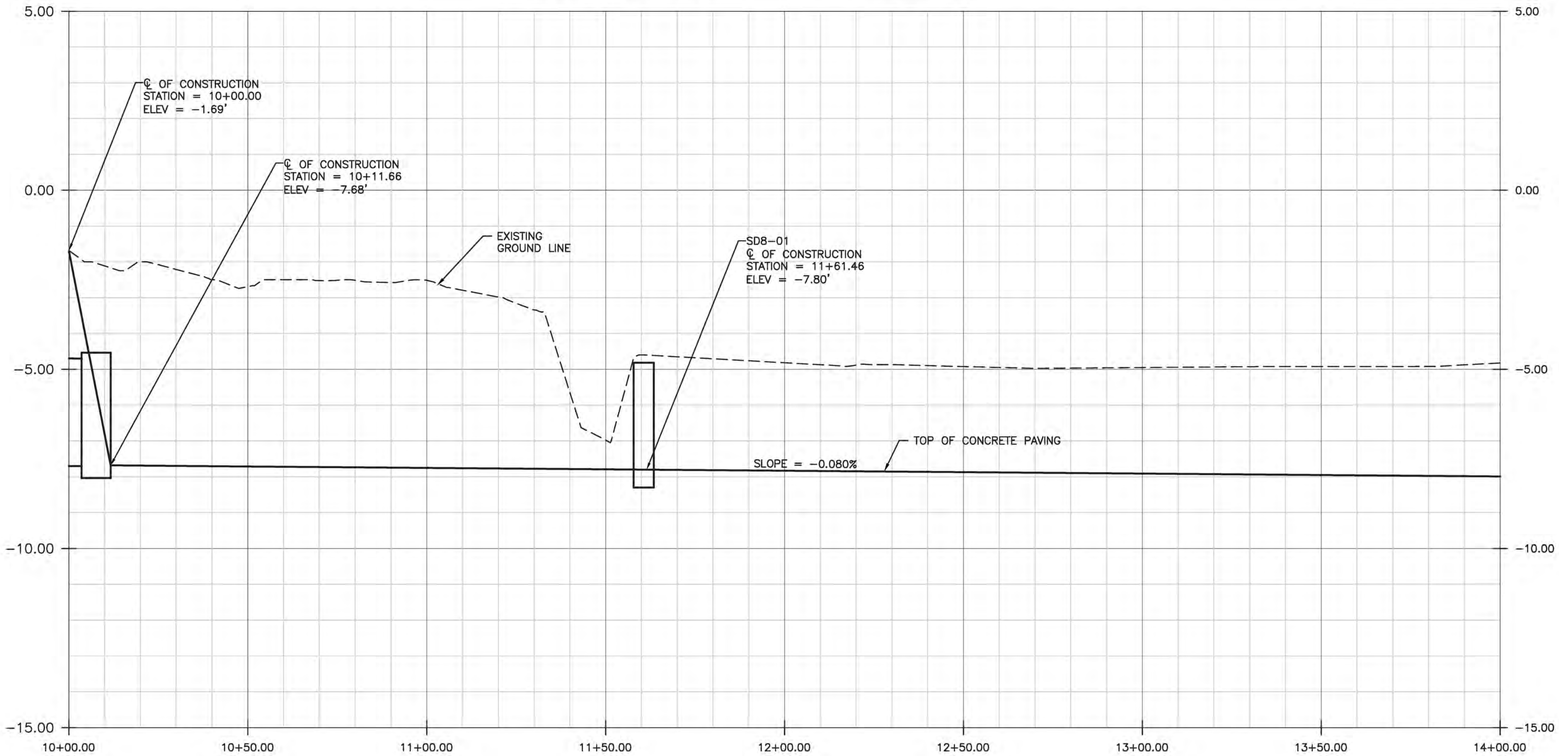


CONCRETE DITCH IMPROVEMENT
STA. 10+00 THROUGH STA. 14+00

0 5 10 20 FEET
HORIZONTAL SCALE: 1"=20'

0 1 2 FEET
VERTICAL SCALE: 1"=2'

NOTE:
CONCRETE DITCH SIDE SLOPES VARY.
SEE DITCH CROSS-SECTION SHT 60.



NOTE:
CONTRACTOR SHALL VERIFY ALL ELEVATIONS SHOWN ON THIS DRAWING PRIOR TO CONSTRUCTION.

100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER 58

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 1600B
NEW ORLEANS, LA 70130
Tel: 504-581-3588
Fax: 504-581-3588

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

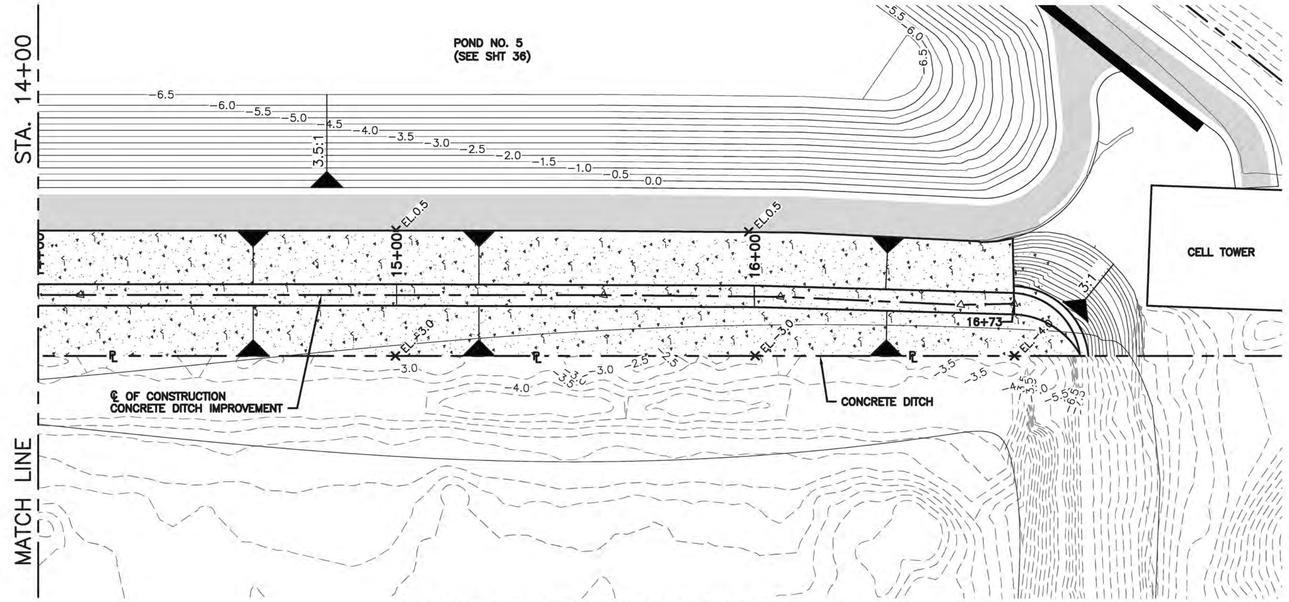
DESIGNED	MCS	SCALE	1" = 20'
CHECKED		DATE	10/2015
DETAILED		SHEET	58
CHECKED			

MARK SCALLY
License No. 32634
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0036

CONCRETE DITCH IMPROVEMENT PLAN AND PROFILE
1 OF 2

100% DESIGN PLANS

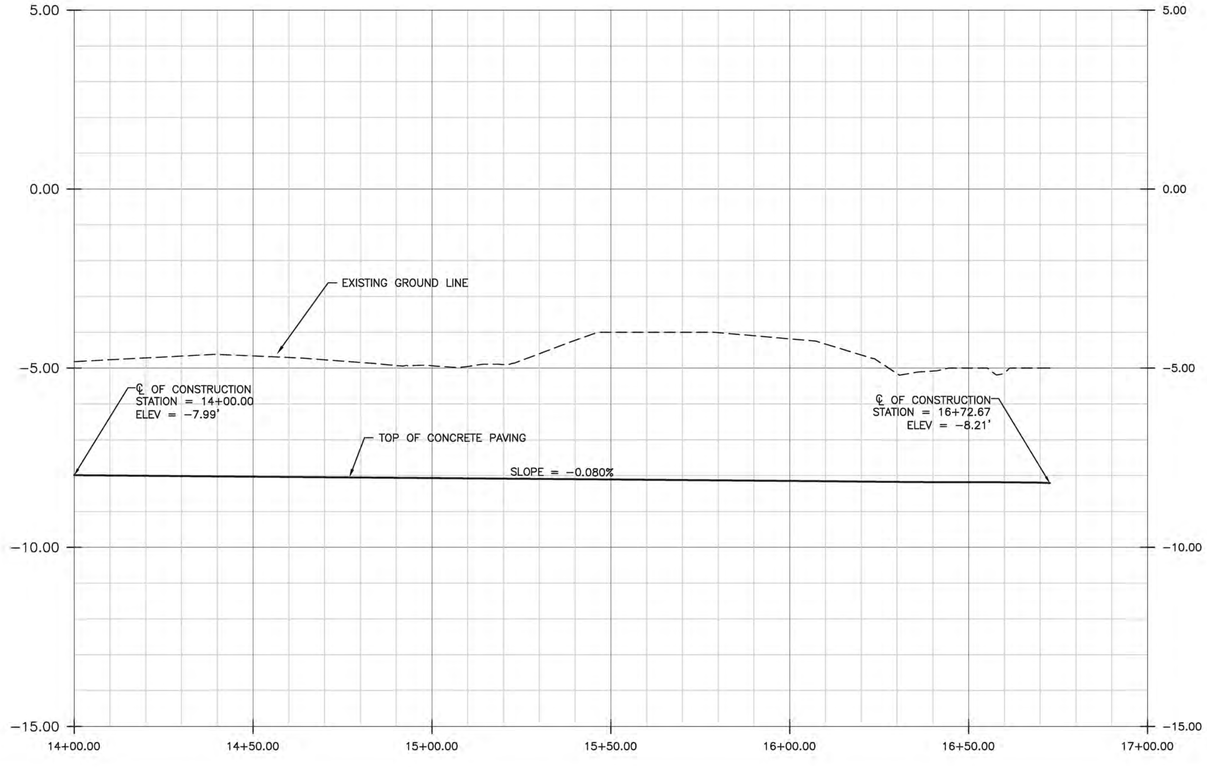


CONCRETE DITCH IMPROVEMENTS
STA. 14+00 THROUGH STA. 16+73

0 2 4 6 8 10
FEET
HORIZONTAL SCALE: 1"=10'

0 1 2
FEET
VERTICAL SCALE: 1"=2'

NOTE:
CONCRETE DITCH SIDE SLOPES VARY.
SEE DITCH CROSS-SECTION SHT 60.



100% DESIGN PLANS
NOT FOR CONSTRUCTION

SHEET NUMBER
59

NO.	DATE	REVISION DESCRIPTION	BY

CHESTER ENGINEERS
601 POYDRAS STREET, STE 1600B
NEW ORLEANS, LA 70130
Tel: 504-581-3588
Fax: 504-581-3588

CHESTER ENGINEERS, INC.
601 POYDRAS ST., STE 1600B, NEW ORLEANS, LA 70130

DESIGNED	MCS	SCALE	1" = 20'
CHECKED		DATE	10/2015
DETAILED		SHEET	59
CHECKED			

MARK SCALLY
License No. 32704
PROFESSIONAL ENGINEER
STATE OF LOUISIANA

DILLARD UNIVERSITY HAZARD MITIGATION GRANT PROGRAM
PROJECT NO. 1603.0320 FEMA 1603-DR-LA
STATE PROJECT NO. 1603n-071-0038

CONCRETE DITCH IMPROVEMENTS PLAN AND PROFILE
2 OF 2

100% DESIGN PLANS

Appendix C

External Agency Correspondence

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
P. O. BOX 60267
NEW ORLEANS, LA 70160-0267

April 22, 2016

REPLY TO
ATTENTION OF

Operations Division
Operations Manager,
Completed Works

Mr. Gerard J. Gillen III, P.E.
Director of Hurricane & Flood Protection
Orleans Levee District
6920 Franklin Avenue
New Orleans, Louisiana 70122

Dear Mr. Gillen:

We have received a letter request dated December 9, 2015, from Chester Engineers, on behalf of Dillard University, concerning permission to perform subsurface infrastructures, excavations and to install sheet pilings as part of the Dillard University Stormwater Improvement Project Hazard Mitigation Grant Program approximately 41 feet landward of the Lake Pontchartrain & Vicinity, London Avenue Canal East floodwall, between baseline stations 27+00 and 40+00, at New Orleans, Louisiana, in Orleans Parish.

We have no objection to your Office's issuance of a permit for the proposed work provided:

a. The work is accomplished in accordance with the above referenced letter, vicinity map and accompanying drawings.

b. There is no order of work in the project specifications as to the sequence of the installation of the sheetpile wall and the excavation of the detention pond. The sheetpile should be installed prior to the excavation of the retention pond to avert any complications from seepage concerns. The applicant must have a mandatory order of work in which the installation of the sheetpile should precede any work on the excavation of the detention pond.

c. Any damage to the floodwall and/or levee right-of-way resulting from the applicant's activities is repaired at the applicant's expense.

d. That should changes in the location or section of the existing floodwall, or in the generally prevailing conditions in the vicinity, be required in the future in the public interest, the applicant shall make changes in the project concerned, or in the arrangement thereof, as may be necessary to satisfactorily meet the situation and shall bear the cost thereof.

e. The applicant must provide written notification to this office of the construction timeline to include the proposed start and end dates. Additionally, the applicant must notify this office prior to commencement and upon completion of the work permitted herein.

This letter of no objection is based upon engineering criteria, and no interpretation or comments regarding local laws, zoning, or ordinances concerning property rights, etc., have been made. Additionally, this letter of no objection does not obviate the applicant's requirement to obtain federal, state, or local permits required by law.

If you have any questions, please contact me or Albert Terry of my office at 504-862-2241 or 504-862-2311, respectively. Additionally, future correspondence concerning this project should reference our Letter of No Objection number 16-071. This will allow us to more easily locate records of previous correspondence, and thus provide a quicker response.

Please furnish this office a copy of your permit if the applicant's proposal is approved by your Office.

Sincerely,

Amy E. Powell

Amy E. Powell
Operations Manager, Completed Works

cc:

CPRA
Chester Engineers
Attn: Mr. Mark Scally, P.E.

BOBBY JINDAL
GOVERNOR

STEPHEN CHUSTZ
SECRETARY

State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

01/07/2016

FEMA
1500 MAIN STREET
BATON ROUGE, LA 70802

RE: P20160002, Solicitation of Views
FEMA
Description: Proposed drainage improvements on the campus of Dillard University. The existing subsurface drainage infrastructure will be increased in diameter, expanded in length, and realigned where feasible to connect hydraulically as an integrated system. This new subsurface system will also connect with newly designed and/or upgraded storm water surface detention and conveyance features located throughout the University. As a result the drainage system will work more effectively (capturing, storing, and conveying rainfall runoff) as one overall gravity system. The overall system improvements consist of upgrading and realigning the existing collector storm pipes into a network of nine (9) subsurface drainage systems. The existing concrete-lined ditch will be re-sized and three (3) grassed swales and one large dry detention pond will be built integral with the subsurface drainage system.
Location: Lat. 29º 59' 56"N, Long. 90º 04' 06"W; Dillard University, New Orleans, LA
Orleans Parish, LA

Dear Leschina Holmes:

We have received your Solicitation of Views for the above referenced project, which has been found to be inside the Louisiana Coastal Zone. In order for us to properly review and evaluate this project, we require that a complete Coastal Use Permit Application packet (Joint Application Form, locality maps, project illustration plats with plan and cross section views, etc.) along with the appropriate application fee be submitted to our office. Using your complete application, we can provide you with an official determination, and begin the processing of any Coastal Use Permit that may be required for your project. You may obtain a free application packet by calling our office at (225) 342-7591 or (800)-267-4019, or by visiting our website at http://www.dnr.state.la.us/crm/coastmgt/cup/cup.asp.

We recommend that, during your planning process, you make every effort to minimize impacts to vegetated wetlands. As our legislative mandate puts great emphasis on avoiding damages to these habitats, in many cases the negotiations involved in reducing such disturbances and developing the required mitigation to offset the lost habitat values delay permit approval longer than any other factor.

Additionally, the following sensitive features may require additional processing time by the appropriate resource agencies:

-- Chitimacha Tribe of Louisiana (aboriginal homelands)
-- Coastal Protection and Restoration Authority (PO-0057 - SELA; PO-0063 - Lake Pontchartrain & Vicinity)
-- Orleans Levee District

Should you desire additional consultation with our office prior to submitting a formal application, we recommend that you call and schedule a pre-application meeting with our Permit Section staff. Such a preliminary meeting may be helpful, especially if a permit application that is as complete as possible is presented for evaluation at the pre-application meeting.

If you have any questions, would like to request an application packet or would like to schedule a pre-application meeting, please contact Vickie Amedee at (225) 342-3781 or vickie.amedee@la.gov.

Sincerely,

Karl L. Morgan
Administrator

Karl L. Morgan/va

Attachments

Final Plats:

1) P20160002 Final Plats 01/04/2016

cc: Jessica Diez, OCM w/plats
Craig Leblanc, Frank Cole, CMD/FI w/plats
Orleans Parish w/plats

Main Menu

Office of Coastal Management

Permit Tracking System

CUPNO- P20160002
NAME- FEMA

Base Info | Geo Info | Dates & Fees | COE & DEQ | Revisions | Applicant & Agent

CUP NUM:	P20160002	CONCERN:	STATE
COE NUM:		EXEMPT:	NOT EXEMPT
RECEIVED:	01/04/2016	MISC:	OTHER
ACKNOWLEDGE:	01/05/2016	MAJOR/MINOR:	MINOR
OCM ANALYST:	VICKIE AMEDEE	H2O BLOCK:	NO STRUCTURE
WELL NAME:		CUBIC YARD:	0
WELL NUM:		DEVELOPMENT:	NO DEVELOPMENT
STATUS:	SOV Review Complete - CUP Required (No Authorization Granted)	FIELD INV. REQUESTED:	NO
PIPELINE:	NO PIPELINE PRESENT	FI AREA:	2
RIG:	NOT PRESENT	FOLLOWUP:	NO
DREDGE:	NO DREDGING	XREF NUM:	
REVISION NUM:	0	PUBLIC NOTICE:	NO PUBL NOTICE

PRE-DETERMINATIONS:	SOV - APPLICATION REQUIRED	REVISED:	NO
		AMENDED:	NO
FINAL DETERMINATIONS:	SOLICITATION OF VIEW	MODIFIED:	NO
		EXTENDED:	NO

DESCRIPTION TYPE: DRAINAGE IMPROVEMENTS

DESCRIPTION: Proposed drainage improvements on the campus of Dillard University. The existing subsurface drainage infrastructure will be increased in diameter, expanded in length, and realigned where feasible to connect hydraulically as an integrated system. This new subsurface system will also connect with newly designed and/or upgraded storm water surface detention and conveyance features located throughout the University. As a result the drainage system will work more effectively (capturing, storing, and conveying rainfall runoff) as one overall gravity system. The overall system improvements consist of upgrading and realigning the existing collector storm pipes into a network of nine (9) subsurface drainage systems. The existing concrete-lined ditch will be re-sized and three (3) grassed swales and one large dry detention pond will be built integral with the subsurface drainage system.

COMMENTS: Misc: Proposed drainage improvements on the campus of Dillard University

ON-HOLD	OFF-HOLD	PARISH
		ORLEANS

JOHN BEL EDWARDS
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

CHARLIE MELANCON
SECRETARY
JIMMY L. ANTHONY
ASSISTANT SECRETARY

Date	January 22, 2016
Name	Leschina Holmes
Company	FEMA
Street Address	1500 Main St
City, State, Zip	Baton Rouge, LA 70802
Project	Dillard University Drainage Project HMGP 1603-0320
Project ID	
Invoice Number	16012215

Personnel of the Coastal & Nongame Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats within Louisiana's boundary are anticipated for the proposed project. No state or federal parks, wildlife refuges or scenic streams are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

for Amity Bass, Coordinator
Natural Heritage Program

From: Holmes, Leschina
To: King London, Bianca
Cc: Pitts, Melanie
Subject: FW: DEQ SOV 151231/1755 Dillard University-Hazard Mitigation Drainage Project
Date: Friday, January 22, 2016 15:53:04

FYI

From: Linda (Brown) Hardy [mailto:Linda.Hardy@la.gov]
Sent: Friday, January 15, 2016 2:50 PM
To: Holmes, Leschina
Cc: Yasoob Zia
Subject: DEQ SOV 151231/1755 Dillard University-Hazard Mitigation Drainage Project

January 15, 2016

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer, FEMA LRO
1500 Main St
Baton Rouge, LA 70802

RE: 151231/1755 Dillard University-Hazard Mitigation Drainage Project
FEMA Funding
Orleans Parish

Dear Ms. Spann-Winfield:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the Department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

- Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.
- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
- All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.
- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371.
- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
- All precautions should be observed to protect the groundwater of the region.
- Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
- Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, Orleans Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3954 or by email at linda.hardy@la.gov.

Sincerely,

Linda M. Hardy

Louisiana Department of Environmental Quality
Office of the Secretary
P.O. Box 4301
Baton Rouge, LA 70821-4301
Ph: (225) 219-3954
Fax: (225) 219-3971
Email: linda.hardy@la.gov

King London, Bianca

Subject: EPA Response: Dillard University, Hazard Mitigation (1603-0320)

From: Gutierrez, Raul [mailto:Gutierrez.Raul@epa.gov]
Sent: Wednesday, February 10, 2016 6:20 PM
To: Holmes, Leschina
Subject: RE: Dillard University, Hazard Mitigation (1603-0320)

The U.S. Environmental Protection Agency (EPA) has completed your request for a review for a solicitation of views concerning the Hazard Mitigation Project at Dillard University. The comments that follow are being provided relative to the EPA's *404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230)* and *Executive Order 11990.*

Our preliminary review revealed that jurisdictional waters of the U.S. may occur on the proposed sites. At this time, the EPA does not object to the project and recommends coordination with the U.S. Army Corps of Engineers at the New Orleans District Office to verify which permits, if any, are needed. Thanks for the opportunity to review the proposed project.

Raul Gutierrez, Ph.D.
Wetlands Section (6WQ-EM)
US EPA Region 6
(504) 862-2371

Office:
US Army Corps of Engineers
New Orleans District
CEMVN-OD-SC
Post Office Box 60267
New Orleans, Louisiana 70160-0267

King London, Bianca

Subject: Dillard University, Hazard Mitigation (1603-0320)
Attachments: 1603-0320 Dillard SOW and site photos.docx

From: Holmes, Leschina
Sent: Thursday, December 31, 2015 1:28 PM
To: 'Linda.Hardy@LA.GOV'; 'Amy.E.Powell@usace.army.mil'; 'gutierrez.raul@epa.gov'; 'cmichon@wlf.la.gov'; 'Karl.Morgan@la.gov'
Cc: Spann, Tiffany
Subject: Dillard University, Hazard Mitigation (1603-0320)

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA-DR 1603/1607 LA
Louisiana Recovery Office
1500 Main St., Baton Rouge, LA 70802

MEMORANDUM TO: See Distribution

December 31, 2015

SUBJECT: Scoping Notification/Solicitation of Views
Dillard University, Hazard Mitigation, (1603-0320) Dillard University Drainage Project
FEMA-1603-DR-LA

To Whom It May Concern:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. The Stafford Act authorizes FEMA's Hazard Mitigation Program to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing Hazard Mitigation Grant Program funding for the attached project in relation to Hurricanes Katrina and Rita (FEMA-1603/1607-DR-LA). The scope of work and attached drawings correspond to the proposed hazard mitigation project.

As requested by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) and Dillard University (Applicant), FEMA proposes to fund drainage improvements on the campus

of Dillard University. The existing subsurface drainage infrastructure will be increased in diameter, expanded in length, and realigned where feasible to connect hydraulically as an integrated system. This new subsurface system will also connect with newly designed and/or upgraded storm water surface detention and conveyance features located throughout the University. As a result the drainage system will work more effectively (capturing, storing, and conveying rainfall runoff) as one overall gravity system.

The overall system improvements consist of upgrading and realigning the existing collector storm pipes into a network of nine (9) subsurface drainage systems. The existing concrete-lined ditch will be re-sized and three (3) grassed swales and one large dry detention pond will be built integral with the subsurface drainage system. The attached Scope of Work (SOW) summary illustrates the low-impact mitigation measures to be constructed.

To ensure compliance with the National Environmental Policy Act (NEPA), Executive Orders (EOs), and other applicable Federal regulations, FEMA-EHP will be preparing an Environmental Assessment (EA). To assist us in preparation of the EA, we request that your office review the attached documents for a determination as to the requirements of any formal consultations, regulatory permits, determinations, or authorizations.

Please respond within thirty (30) calendar days of the date of this scoping notification. If our office receives no comments at the close of this period, we will assume that your agency does not object to the project as proposed.

Comments may be emailed to leschina.holmes@fema.dhs.gov or mailed to the attention of LeSchina Holmes, Environmental/Historic Preservation Department, at the address above.

For questions regarding this matter, please contact LeSchina Holmes, Lead Environmental Protection Specialist at (504) 235-6512.

Sincerely,

Tiffany Spann-Winfield,
Environmental Liaison Officer, FEMA LRO
FEMA 1603/1607-DR-LA

Attachments: SOW, site photos

Distribution: LDEQ, USEPA, LDWF, LDNR, USACE

Louisiana Ecological Services Office

ESA Technical Assistance Form

General Information

Name: FEMA

Point of Contact: Bianca King London

Address: 1500 Main Street

City: Baton Rouge **State:** Louisiana **Zip Code:** 70802

Phone Number 1: _____ **Phone Number 2:** _____

Email Address: _____

Proposed Project Information

Project Reference ID: 6504

Project Latitude: 29.998972 **Project Longitude:** -90.068181

Project Parish(es): Orleans

Project Description: Proposed drainage improvements on the campus of Dillard University: The existing subsurface drainage improvements would be increased in diameter and length, and realigned where feasible to connect hydraulically as an integrated system. The existing concrete-lined ditch would be re-sized and 3 grassed swales and 1 dry detention pond would be built integral with the subsurface drainage system. The new subsurface system would also connect with the newly designed and/or upgraded storm water surface detention and conveyance features located throughout the University.

Based on the information provided, the proposed project is not an activity that would affect a federally listed threatened or endangered species or designated critical habitat.

No further ESA coordination with the Service is necessary for the proposed action, unless there are changes in the scope or location of the proposed project or the project has not been initiated one year from the date of this letter.

If the proposed project has not been initiated within one year, follow-up coordination via this website should be accomplished prior to making expenditures because our threatened and endangered species information is updated periodically. If the scope or location of the proposed project is changed, coordination via this website should occur as soon as such changes are made.

If your project is located adjacent to a wildlife management area, refuge, or other area that is managed as a bird preserve, we recommend that you contact the adjacent land management office.

This finding completes project review by the Service for effects to Federal trust resources under our jurisdiction and currently protected by the ESA.

Please keep a copy of this pre-development coordination for your records. Do not send it to the Lafayette ES Office.

If you have additional questions, please contact Louisiana ES Office Biological Science Technician at 337/291-3100 for further assistance.

Louisiana Ecological Services Office

ESA Technical Assistance Form

Project Type: Non-Emergency FEMA Project

Does the project propose to obtain, remodel, refurbish, or rehabilitate existing structures in such a way that does not significantly alter the present capacity or use, and does not alter surrounding land areas that were previously undisturbed? **Yes**

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA-1603/1607-DR-LA
FEMA Louisiana Recovery Office
Environmental/Historic Preservation
1500 Main Street
Baton Rouge, LA 70802

January 20, 2016

Phillip E. Boggan II
State Historic Preservation Officer
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge LA 70804

RE: Section 106 Review Consultation, Hurricane Katrina, FEMA-1603-DR-LA

Applicant: City of New Orleans
Undertaking: Gentilly-Dillard University Drainage System Improvements
2601 Gentilly Boulevard, New Orleans, Orleans Parish, Louisiana
(HMGP Project # 1603-0320, GAR Request May 2015)
Determination: **Adverse Effect to Historic Properties**

Dear Mr. Boggan II:

The Federal Emergency Management Agency (FEMA) will be providing funds authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended, in response to the following major Disaster Declaration:

FEMA-1603-DR-LA, dated August 29, 2005, as amended.

FEMA, through its 404 Hazard Mitigation Grant Program (HMGP), proposes to fund subsurface storm drainage system improvements, swale/detention pond and sheet pile construction (Undertaking) as requested by the City of New Orleans (Applicant). FEMA is initiating Section 106 review for the above referenced properties in accordance with the Programmatic Agreement among FEMA, FEMA is initiating Section 106 review for the above referenced properties in accordance with the "Programmatic Agreement among FEMA, the Louisiana State Historic Preservation Officer, the Louisiana Governor's Office of Homeland Security and Emergency Preparedness, the Alabama-Coushatta Tribe of Texas, the Caddo Nation, the Chitimacha Tribe of Louisiana, the Choctaw Nation of Oklahoma, the Coushatta Tribe of Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Quapaw Tribe of Oklahoma, the Seminole Nation of Oklahoma, the Seminole Tribe of Florida, the Tunica-Biloxi Tribe of Louisiana, and the Advisory Council on Historic Preservation" executed on August 17, 2009 and amended on July 22, 2011 (2009 Statewide PA as amended) and providing the State Historic Preservation Office with the opportunity to consult on the proposed Undertaking. Documentation in this letter is consistent with the requirements in 36 CFR §800.11(e).

Project Background

The Dillard University campus is located on a wedge shaped parcel of approximately 57 acres in the Gentilly Community of New Orleans, and is bounded by the London Avenue Canal to the west, and Gentilly Boulevard to the south (Figure 1). The University is situated on relatively flat topography

with low-lying areas notably at the front and rear portions of the campus. During moderate to severe rain events, the campus experiences localized flooding. The source of the flooding is primarily due to insufficient drainage infrastructure, which has been negatively impacted by subsidence from excessive storm water ponding, which is unable to convey stormwater runoff to the City's limited capacity storm drainage system during high discharges.

Dillard University has undertaken a progressive initiative with FEMA to address the campus drainage issues by professionally analyzing and designing drainage improvements to reduce the risk of future negative impacts caused by flooding of the campus.

Description of the Undertaking

The primary objective of the proposed Undertaking is to construct mitigation measures and enhance the existing campus drainage system's ability to capture, store, and transfer storm water runoff during moderate to severe rain events. To achieve these objectives, the applicant is proposing to upgrade and realign the existing subsurface storm drainage infrastructure into a network of nine (9) subsurface drainage systems, in addition to upgrading the existing concrete-lined ditch, constructing three (3) grassed swales, one (1) large dry detention pond, and a sheet pile wall adjacent to the dry detention pond. All of the following project improvements are to protect Dillard University from flooding and are proposed as part of this project which is detailed below.

Storm Drain 1 (SD-1)

SD-1 is located along Gentilly Boulevard and connects to the Sewerage and Water Board (S&WB) storm drainage system. Approximately 260' linear feet of 6" – inch and 12" –inch diameter lines would be replaced with 970' linear feet of 15" –inch diameter pipes. It is important to note that the connecting pipe sizes and locations to the Sewerage and Water Board (S&WB) system along Gentilly Boulevard will not be changed from what currently exists. Nonetheless, a change from the existing drainage system will be that SD-1 would have the ability to convey stormwater toward the rear of the campus through new connections to be constructed via storm drains SD-9A and SD-2. As a result, drainage from the front entrance of the campus entering SD-1 would also have access to the mitigation features located at the rear of the campus, including the new grassed swales (Numbers 1-3), concrete-lined ditch and the dry detention pond (Number 5).

Storm Drain 2 (SD-2)

SD-2 is connected to SD-2 along Gentilly Boulevard but flows in a northerly direction into proposed Swale Number 2, which would ultimately discharge into the concrete-lined ditch at the rear of campus (which discharges to the dry detention pond Number 5). Approximately 340' linear feet of 10" –inch diameter pipes would be increased to approximately 800' linear feet of 18" –inch and 24" – inch equivalent pipes.

Storm Drain 3 (SD-3)

SD-3 would collect stormwater from Swale Number 3 and discharge from SD-4 which connects into SD-8 that conveys flow into the existing concrete-lined ditch and would be contained within the proposed dry detention pond (Number 5). Approximately 970' linear feet of 10"-inch, 12"-inch, 15"-inch and 30"-inch storm drain would be expanded with over 1,200' linear feet of 15" –inch and 36"-inch equivalent pipes.

Storm Drain 4 and 4A (SD-4, SD-4A)

SD-4 would collect stormwater from Swale Number 2 and the Avenue of the Oaks, and SD-4A would collect stormwater runoff from the campus area south of Kearny Hall, and between Camphor Hall and Kearny Hall. Approximately 500' linear feet of 12"-inch, 15"-inch, and 18" -inch storm drain would be improved with over 470' linear feet of 24"-inch and 30" -inch equivalent pipe sizes.

Storm Drain 5, 5A and 6 (SD-5, SD-5A, SD-6)

SD-5, SD-5A and SD-6 collect runoff from the campus areas west of the Cook Fine Arts Center and the Professional Schools and Sciences Building and the areas east of Straight Hall, Williams Hall and Henson Hall. Approximately 800' linear feet of 12"-inch, 24"-inch, and 30"-inch equivalent pipes would be upgraded with over 1,300 linear feet of 18"-inch, 24"-inch and 36"-inch pipes. Collected runoff would discharge into the concrete-lined ditch and would be diverted to the proposed dry detention pond (Number 5).

Storm Drains 7 and 7A (SD-7A)

SD-7 and SD-7A would collect runoff from the western area of the campus north of Camphor Hall, east of the DUICEF Building, the area west of Dent Hall, and the tennis courts. Approximately 800' linear feet of 12"-inch storm drain would be expanded with over 464' linear feet of 24"-inch, 36"-inch, and 42"-inch equivalent pipe sizes. Discharge from SD-8 would enter the concrete-lined ditch and would be diverted into the proposed dry detention pond (Number 5).

Storm Drain 8 (SD-8)

SD-8 would convey stormwater from SD-7 and SD-3 to the concrete-lined ditch. SD-8 would collect stormwater runoff from the rear campus parking areas north of Dent Hall. Approximately 130' linear feet of 12"-inch storm drain would be expanded with over 465' linear feet of 24"-inch, 36"-inch and 42"-inch equivalent pipe sizes. Discharge from SD-8 would enter the concrete-lined ditch and would be diverted into the proposed dry detention pond (Number 5).

Storm Drain 9 and 9A (SD-9, SD-9A)

SD-9 and SD-9A would collect runoff from the area south and west of Rosenwald Hall including Virgil Boulevard. SD-9 flows in a northerly direction and would discharge into proposed Swale Number 2. SD-9A connects SD-1 with SD-9 and also flows by gravity in the northerly direction. SD-9 and SD-9A would include replacing approximately 500' linear feet of 10"-inch and 18"-inch diameter storm drain with over 1,600 linear feet of 24"-inch storm pipes.

Concrete-Lined Ditch

The existing concrete-lined ditch located in the rear of campus would be expanded in width and length to maximize storage capacity and improve conveyance to the Mandolin Canal. The existing concrete-lined ditch is approximately 550' feet in length and has a 2'-foot wide bottom and is approximately 4'-feet deep. The improvements to the existing concrete-lined ditch would be increased to 660'-feet in length with a 6'-foot wide bottom and would retain the same existing depth (4 feet).

Grassed Swales (Numbers 1-3)

Three (3) depressed grassed swale containment areas would be constructed within the campus to increase storage capacity within the existing campus drainage system and to reduce the peak discharge rate to the downstream public stormwater system. The three (3) swales would be constructed to help detain stormwater before reaching the underground stormwater drainage system.

Swale grading would be moderate, (with maximum slopes not to exceed 10:1). Swale Number 1 to be located near the southeast corner of Dent Hall would cover an approximate area of 4,000 square feet and have a depth of approximately 1'-foot. Swale Number 2, to be located east of the Avenue of Oaks, west of the Alumni house, would cover an approximate area of 21,000 square feet and have a depth of about 4'-feet. Swale Number 3, would be located west of the Avenue of Oaks and north of Rosenwald Hall would cover an approximate area of 11,000 square feet and have a depth of roughly 1.5 feet.

Dry Detention Pond (Number 5)
The planned triangular shaped dry detention pond would be located in the northwest corner of the campus boundary would cover a surface area of approximately 37,000 square feet and provide around 176,000 cubic feet of storage volume for stormwater runoff.

Sheet Pile Wall
The proposed sheet pile wall to be constructed would be located adjacent to the dry detention pond and would be constructed 40'-feet below the ground. Construction of the new sheet pile wall will satisfy the US Army Corps of Engineers (USACE's) geotechnical element of safety requirements while minimizing the possibility of ground water interaction with the neighboring London Avenue Canal.

Area of Potential Effects (APE)
In accordance with Stipulation VII.B of the *2011 Statewide LA HMGP PA*, the APE for standing structures is continuous and includes the areas that will be materially and visually affected by the undertaking (Figure 2). The APE was expanded or tapered based on visibility and the possibility of impact of the undertaking on properties within the viewshed. The archaeological APE is discontiguous, totaling 5.07 acres (2.06 ha) in four separate locales for swale/detention pond and sheet pile construction and 2,504 linear meters for storm drain construction. The archaeological APE takes into account all ground disturbing activities and staging areas associated with the Undertaking (Figure 3).

Identification and Evaluation
On September 21, 2015, FEMA Historic Preservation Staff consulted the National Register database and the Louisiana Cultural Resources Map and determined that the APE for the grassed swales 1-3 is a contributing feature of a listed National Register Historic District (NRHD). A review of the Louisiana Cultural Resources Database provided by the Louisiana Division of Archaeology did not indicate the presence of any previously recorded archaeological sites within the APEs.

Standing Structures - Identification and Evaluation
Dillard Historic District
The Dillard Historic District is located within a portion of the Dillard University campus. The district was listed in the NRHP on April 10, 2003, under Criterion A, for its association with education and African-American heritage, at both the state and local level of significance, considering that the university has provided a quality education to thousands of African-Americans, principally from New Orleans and southern Louisiana for several decades. Dillard played a critical role in educating what at the time would have been considered the black elite. As it was widely believed that private colleges and universities were the very best institutions African-Americans could receive a respectable education in the segregated south.

The period of significance for the listed NRHD is from 1935-1952. Nine buildings (that include the President's House, four dormitories, two academic buildings, two administrative buildings) and one power plant encompass the boundaries of the listed historic district which consists of approximately 22 acres (1,215 square meters). The school opened in 1935 with the completion of four major campus buildings designed by New Orleans native architect and colonial American Architecture enthusiast, Moise Goldstein. The campus was originally planned in the Beaux Arts tradition, with ten classical brick buildings painted entirely white and oriented around an extensive open grassed quadrangle with a central lawn separated into two rows of mature live oak trees, or "avenue of oaks" as they are often referred to. Thoughtfully placed sidewalks divide "the avenue" and connect each of the buildings. As typical of the Beaux Arts tradition, Goldstein's design is anchored by a broad central axis with a secondary cross axis (evident in plan view). It was not until 1945, that prominent Landscape Architect William Wiedorn began implementing his vision on the campus grounds with the women's housing and vehicle circulation that later carried over into the landscape design which has become a prominent feature of the campus in addition to its pristine white architecture.

Henson Hall

Constructed in 1950, partially reconstructed in the 1960s, and later renovated in 1990, Henson Hall is Dillard University's old gymnasium. The building was named in honor of Mathew Alexander Henson, an African American explorer and co-discoverer of the North Pole. It is reported that the building burned during an electrical fire sometime in the 1960s, which prompted the construction of Dent Hall in 1969. Today, the building operates as the campus bookstore.

Although Henson Hall was constructed during the historic district's period of significance, it is sited outside of the historic core of the university and has undergone a reconstruction and renovation which have compromised this resources integrity; therefore for the purpose of this review, FEMA is treating this building as an ineligible individual resource and non-contributing element to the Dillard Historic NRHD.

Dent Hall

Dent Hall serves as Dillard University's gymnasium and is named in honor of Dr. Albert W. Dent, the university's third president. Constructed in 1969, the building houses the Athletic Department as well as Career Services, Student Development, Student Government Association, offices, and classroom space.

The gymnasium was constructed after the historic district's period of significance and does not meet the 50-year-criterion or Criteria Consideration G of the National Register guidelines to be considered eligible for the NRHP; therefore, for the purpose of this review, FEMA is treating this building as an ineligible individual resource and non-contributing element to the Dillard Historic NRHD.

DUICEF Building (Dillard University International Center for Economic Freedom)

The DUICEF Building is the university's newest building, dedicated in 2004. Located on the northwestern end of the campus, the building rises two full stories from a steel pile driven frame, and consists of a glass curtain wall façade with a thin upsweeping roofline. The first floor of the building houses classroom space, a theatre style lecture hall and a computer lab. The second floor

houses a state-of-the-art remote learning lab, departmental offices, conference rooms and a boardroom.

The DUICEF Building was constructed after the historic district's period of significance and does not meet the 50-year-criterion of Criteria Consideration G of the National Register guidelines to be considered eligible for the NRHP; therefore, for the purpose of this review, FEMA is treating this building as an ineligible individual resource and a non-contributing element to the Dillard NRHD.

Archaeology – Identification and Evaluation

Upon consultation of data provided by SHPO on October 21, 2015, there are three recorded archaeological sites within ½ mile of the archaeological APE: 16OR417, 16OR538, and 16OR539 (Figure 4). Site 16OR417 is a late 19th early 20th century residence, identified by a FEMA walk-over after demolition. 16OR538 and 16OR539 are late 19th early 20th century residence, identified by shovel testing and pedestrian survey. 16OR417 has not been assessed for its eligibility for the NRHP. 16OR538 and 16OR539 have been determined ineligible for inclusion on the NRHP. None of the sites is within the archaeological APE and they will not be affected by the Undertaking.

FEMA archaeologists conducted a site visit that consisted of a pedestrian survey of the APE and excavation of two shovel probes on October 28, 2015. The shovel probes were excavated within the proposed retention swales (Figure 5). These locations afforded an area that will have the most ground disturbance, and the storm lines to be placed further south are mostly re-located in previous storm drains. A single white ware ceramic was identified in the western shovel probe within Layer 1 (20cmbs). A single piece of modern plastic was identified in Layer 2. No other cultural material was identified within either probe. The western probe was excavated to a depth of 110cmbs and the eastern probe to a depth of 95cmbs. The stratigraphy of both probes were similar, with the exception that the eastern probe had a layer of sand fill from 0-10cmbs. The first layer consisted of dark brown loamy clay from 0(10)-25cmbs, the second layer consisted of dark yellowish clay from 25-50cmbs, the third layer consisted of dark gray, sub-soil clay from 50-110cmbs. The depth of the shovel tests exceeded the depth of the proposed swale pond.

The 1723 Newberry Library and 1798 Trudeau maps identify the archaeological APE as being north of Bayou Gentilly/Gentilly Road, in Cypress swamp. The 1878 Hardee map identifies the APE as being north of the Bayou and west of London Avenue Canal. Future neighborhoods are platted adjacent to the APE, but the APE is Cypress Swamp. The Robinson 1883 map does not include the project area. The 1929 Sanborn Fire Insurance Map indicates that the APE is within the Rosehill Cemetery. The Rosehill Cemetery was gridded, but never actually used as a cemetery. The 1937 Sanborn Fire Insurance Map identifies that Dillard University was established. Dillard University is the first historic construction within the APE, and the APE was Cypress Swamp prior.

A portion of the APE was surveyed in 1999 by PF.NET, LLC. The survey was along the right-of-way north of Gentilly Blvd for a fiber optics cable. Two archaeological sites were identified within Orleans parish, neither one of them within the archaeological APE. A second survey was conducted along London Avenue Canal in 2008 by R. Christopher Goodwin and Associates, Inc. for Individual Environmental Report Area 5. No archaeological sites were identified within the APE. The northwestern ¾ of the APE is located within the Orleans Parish Low Archaeological Probability Zone, while the southeastern ¼ of the APE is located within the Orleans Parish High

Archaeological Probability Zone. The soils in the APE are Convent-Commerce-Sharkey, a recent alluvium.

The construction of the swale/retention ponds and sheet piling is new construction. As identified by the shovel probes, the two southern swale ponds closer to Gentilly Ridge will be located in a disturbed context with limited archaeological material. The construction of the storm drains will mostly be in areas that previous storm drains were placed.

Based upon available evidence it is unlikely that intact NRHP-eligible archaeological deposits would be recovered during the drainage construction project as the area was originally backswamp, there has been no historic construction within the APE until the construction of Dillard University, and archaeological testing revealed only one historic sherd in a disturbed context.

Assessment of Effects to Historic Properties

Based on the aforementioned identification and evaluation, FEMA has determined that the Dillard NRHD, Dent Hall, and Henson Hall are contained within the project APE as defined in 36 CFR 800.16(l).

The subsurface storm drainage infrastructure SD-1 through SD-9 will be expanded in length and realigned where feasible to connect hydraulically as an integrated underground system; therefore, resulting in a more cohesive gravity system by capturing, storing, and conveying water runoff during rainfall events. Installation of this upgraded subsurface system will take place underground and will not introduce direct effects to historic resources. Short-term indirect effects would occur as a result of project construction, but these effects would only be brief and would not alter the characteristics of the Dillard NRHD; therefore it will not result in an adverse effect to historic resources.

The concrete lined ditch located along the rear eastern boundary of the campus will be expanded in width and length to maximize storage capacity and improve conveyance to the nearby Mandolin Canal. This proposed improvement is located outside of the Dillard NRHD; therefore, it will not result in a direct effect to historic resources. Short-term indirect effects may occur during this phase of construction, but this effect would only be brief and would not alter the characteristics of the Dillard NRHD; therefore, the improvements to the concrete lined ditch will not result in an adverse effect to historic resources.

The proposed triangular shaped dry detention pond to be located in the northwest corner of the university's campus will cover a surface area of approximately 37, 000 square feet and will provide approximately 176,000 cubic feet of storage volume during high rainfall events. This proposed improvement is located approximately 600' feet outside of the Dillard NRHD, and would not result in a direct effect to historic resources. Short-term indirect effects may occur during construction of the detention pond, but this effect would only be brief and would not alter the characteristics of the Dillard NRHD; therefore the construction of the dry detention pond will not result in an adverse effect to historic resources.

The sheet pile wall proposed for construction will be located adjacent to the dry detention pond. The need for the sheet pile will minimize the possibility of groundwater interaction from the neighboring London Avenue Canal. The sheet pile wall will be constructed -40' feet below the

ground surface. This proposed improvement is located approximately 720' feet outside of the Dillard NRHD, and would not result in a direct effect to historic resources. Short-term indirect effects may occur during construction of the sheet pile wall, but this effect would only be brief and would not alter the characteristics of the Dillard NRHD; therefore, construction of the sheet pile wall will not result in an adverse effect to historic resources.

The depressed grassed swale storage areas numbers 1-3 will be constructed to increase storage capacity within the campus drainage system and to reduce the peak discharge rate to the downstream public storm water system. The construction of swale number 1 will be located near the southwest corner of Dent Hall, which is situated approximately 130' feet outside of the Dillard NRHD boundary, and would not result in a direct effect to historic resources. Short-term indirect effects may occur during construction of swale number 1, but this effect would only be brief and would not alter the characteristics of the Dillard NRHD; therefore, construction of grassed swale number l will not result in an adverse effect to historic resources.

Swale number 2 will be constructed within the Dillard NRHD boundary located east of the Avenue of Oaks, west of the Alumni House and will cover an area of approximately 21, 000 square feet and have a depth of four feet. Swale number 3 will also be constructed within the Dillard NRHD boundary located west of the Avenue of Oaks and north of Rosenwald Hall and will cover an area of approximately11, 000 square feet and have a depth of approximately 1.5 feet. As such, the viewshed along the center most portion of the district would only be somewhat altered as a result of the construction of swales Number 2 and 3. Given the size and scale of the historic properties from the exterior level perspective, the construction of large grassed swales will largely contend with the overall monumental size of the campus buildings. In relationship to the overall campus setting, as one would experience there would be a diminishment in the design, feeling and association of the district's historicity with the introduction of visual elements that are in contrast and out of character with the surrounding landscape. Therefore, FEMA has determined that this undertaking will result in an *Adverse Effect to Historic Properties*, as the essential landscape characteristics and features that illustrate its historic character and significance will be compromised.

Resolution of Adverse Effects

In accordance with Stipulation X of the LA HMGP PA, FEMA recommends that the adverse effects of the Undertaking will be adequately mitigated through implementation of Standard Treatment Measure, X.E.1, Digital Photography. FEMA will record the area of Dillard University in the APE, as described below. A written description of feasible alternatives considered by Dillard University is attached to this letter as required in Stipulation X.C.2 of the LA HMGP PA, Attachment 1.

Implementation of Treatment Measures

Photography: FEMA will record Dillard University within the APE prior to construction. This photographic recordation will be performed by or under the direct supervision of an individual who meets the Secretary of Interior's Professional Qualification Standards set out at 48 FR 44716, September 29, 1983, for History, Architectural History, Architecture, or Historic Architecture. FEMA will create a photo log to accompany photographs. FEMA will take photographs of the following views and print specific images, as indicated by the word "Print" following each view. Note – a reasonable effort will be made to take each photo, if a specific view is impossible, this will be noted in the photo log.

a. Grassed Swales

1. Four to eight general views of the open quadrangle
2. Tight context shot of where swale No. 2 will be constructed –front, both sides, rear (as possible), four photos total
3. Tight context shot of where swale No. 3 will be constructed – front, both sides, rear (as possible), four photos total
4. Additional photos showing areas of interest as determined by photographer

Photographic Specifications: The digital photography and color photographs must comply with the "Best" category of requirements from the National Register Photo Policy Fact Sheet: http://www.nps.gov/Nr/publications/bulletins/photopolicy/index.htm, with the following additional requirements:

1. Image files must be saved as both TIFF and JPEG files.
2. Color images must be produced in RGB (RED/Green/Blue) color mode as 24-bit or 48-bit color files.
3. In addition to the requirements specified by the latest National Register Photo Policy, photographs will be digitally labeled to state the address (name of facility, street number, street name, city, and state); date of photograph; description of view, as specified above, including direction of camera; and name of the photographer/agency.
4. The photographic images will be eight inches by ten inches (8 in. x 10 in.) and will be printed on manufacturer recommended archival quality eight inches by ten inches (8 in. x 10 in.) or eight and one - half inches by eleven inches (8.5 in. x 11 in.) paper using manufacturer recommended ink for photographic printing.

Historic Narrative: FEMA will prepare a description of the historic properties within the APE to accompany the photographs following the format found in Historic American Building Survey (HABS) Historical Reports: Short Form.

Professional Qualifications: The recordation materials will be prepared by or under the direct supervision of an individual who, as determined by FEMA, meets the Secretary of the Interior's Professional Qualification Standards set out at 48 FR 44716, September 29, 1983, for History, Architectural History, and /or Historic Architecture, as appropriate.

Draft Review: FEMA will provide SHPO and Dillard University with the Recordation Packet (draft digital photographs and narrative history) for a fifteen day comment period. FEMA will incorporate comments into the finalized document, or provide feedback on the reasons for not incorporating specific comments.

Distribution: FEMA will prepare three archival copies of the recordation materials and shall forward two copies to SHPO and one copy to the Earl K. Long Library, University of New Orleans, Louisiana Special Collections.

Copies or Summaries of Views by consulting Parties and the Public

FEMA is forwarding this letter and the attached documentation to the Preservation Resource Center of New Orleans, Louisiana Landmark Society, Foundation for Historical Louisiana, New Orleans' Historic District Landmarks Commission, Dillard University Alumni Association, Gentilly Sugar Hill Neighborhood Association, Mirabeau Gardens Neighborhood Association, Seventh Ward

Neighborhood Association, Vascoville Neighborhood Association and the Virgil Park Neighborhood Association for their review and comments as required by 36 CFR §800.4(d)(2), and we request that these potential consulting parties comments within the 15 days provided by the *2011 LA HMGP PA.*

Conclusion and Summary

In conclusion, FEMA requests your review and comments regarding:

- FEMA's efforts to identify and evaluate historic properties within the APE;
- FEMA's determination that the construction of the two grassed swales within the Dillard NRHD, will result in an Adverse Effect to Historic Properties;
- FEMA's proposal to address the adverse effects to these contributing elements of the Dillard NRHD through digital photography, as set out in the Standard Treatment Measures, Stipulation X.E. (1) of the *2011 LA HMGP PA.*

FEMA has determined a finding of **an Adverse Effect to Historic Properties** for this Undertaking and is submitting this Undertaking to you for your review and comment. FEMA requests your comments within 15 days.

We look forward to your concurrence with this determination. Should you have any questions or need additional information regarding this Undertaking, please contact me at (504) 218-6800 or tiffany.spann@fema.dhs.gov, or Kathryn Wollan, Lead Historic Preservation Specialist at (504) 289-1941 or kathryn.wollan@fema.dhs.gov Jason Emery, Lead Historic Preservation Specialist at (504) 570-7292 or jason.emery@fema.dhs.gov.

Sincerely,

MEGAN F MYERS

Digitally signed by MEGAN F MYERS
DN: c=US, o=U.S. Government, ou=Department of Homeland Security, ou=FEMA, ou=People, cn=MEGAN F MYERS, 0.9.2342.19200300.100.1.1=0765573635.FEMA
Date: 2016.01.21 10:12:23 -06'00'

Tiffany Spann-Winfield
Acting Environmental Liaison Officer
FEMA-DR-1603-LA, FEMA-DR-1607-LA

CC: File
Division of Archaeology Reviewer
Division of Historic Preservation Reviewer
State Historic Preservation Office
Enclosures

SHPO Liaison Signatures:

The Division of Archaeology Reviewer concurs with the finding that there will be an **Adverse Effect to Historic Properties** as a result of this Undertaking.

Division of Archaeology Reviewer Date

The Division of Historic Preservation Reviewer concurs with the finding that there will be an An Adverse Effect to Historic Properties as a result of this Undertaking.

Division of Historic Preservation Reviewer Date

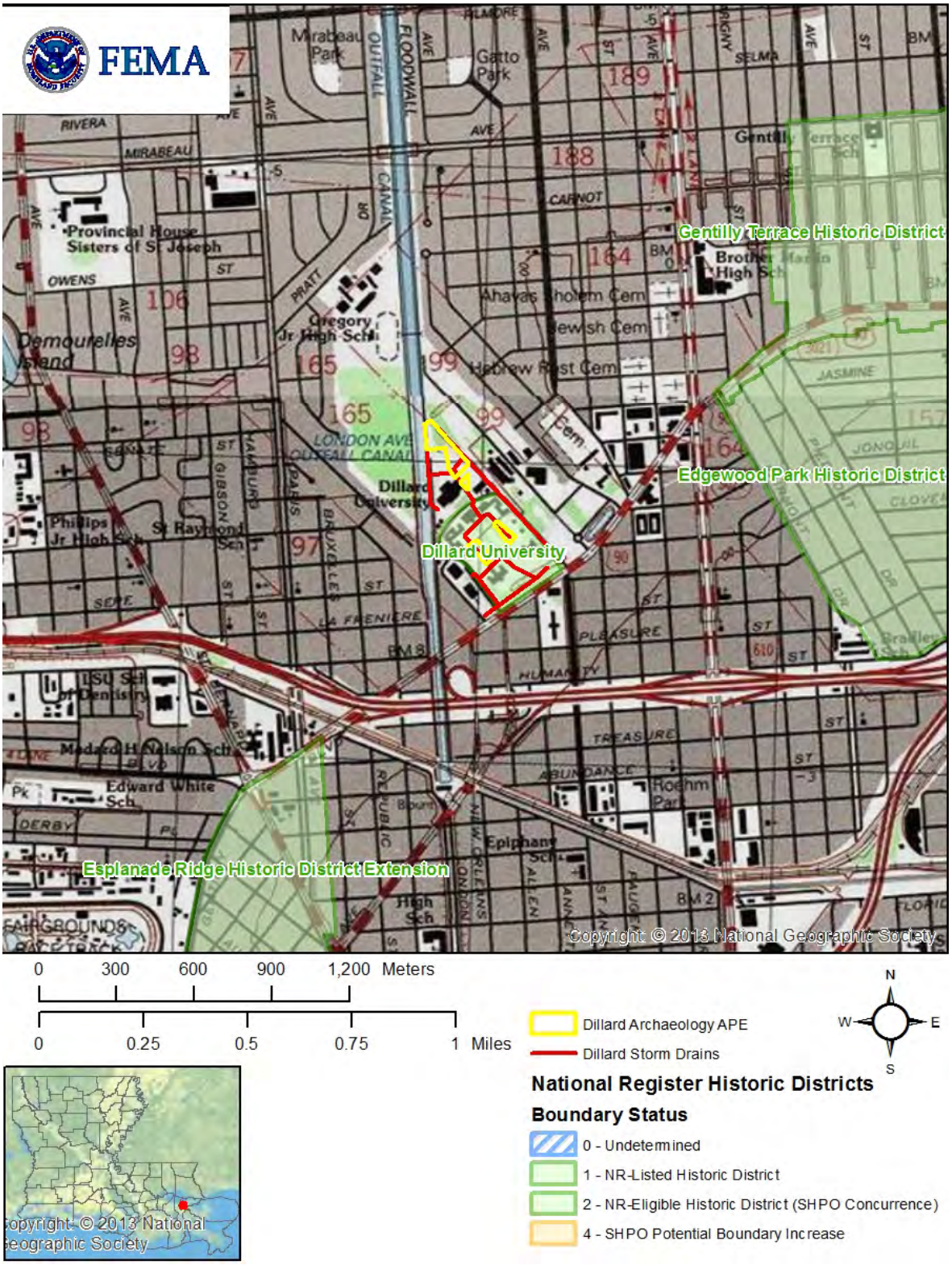


Figure 1. A portion of the New Orleans East and Spanish Fort 7.5' USGS topographic map showing the location of the Dillard University Drainage Project.

Figure 2. Aerial photograph showing the location of the standing Structures APE.

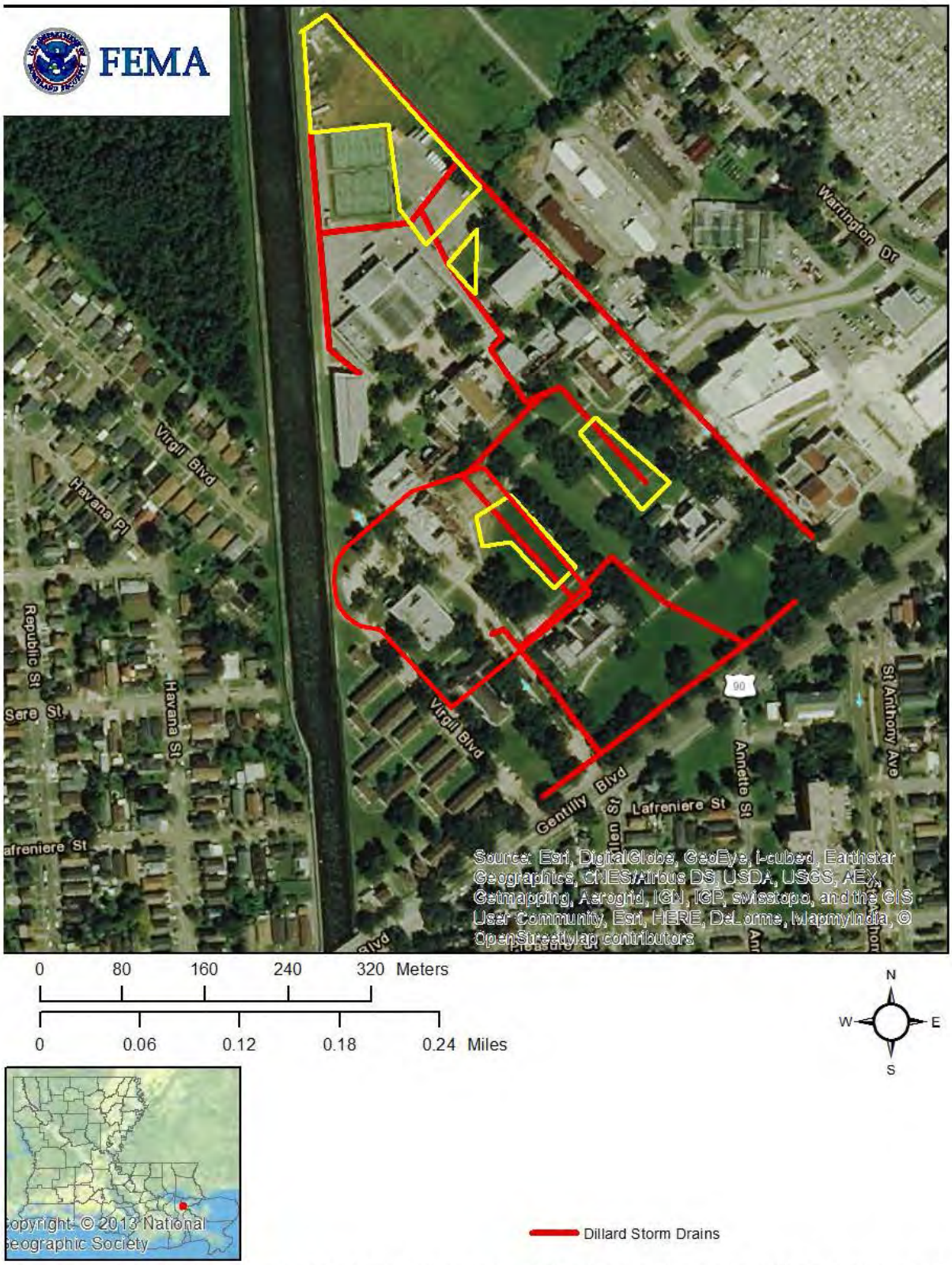


Figure 3. Aerial photograph showing the location of the Archaeological APEs in yellow and red.

Redacted Page
This map is protected from public disclosure in accordance with Section 304 of the National Historic Preservation Act, 16 U.S.C. 470, and 36 CFR 800.11 (c).

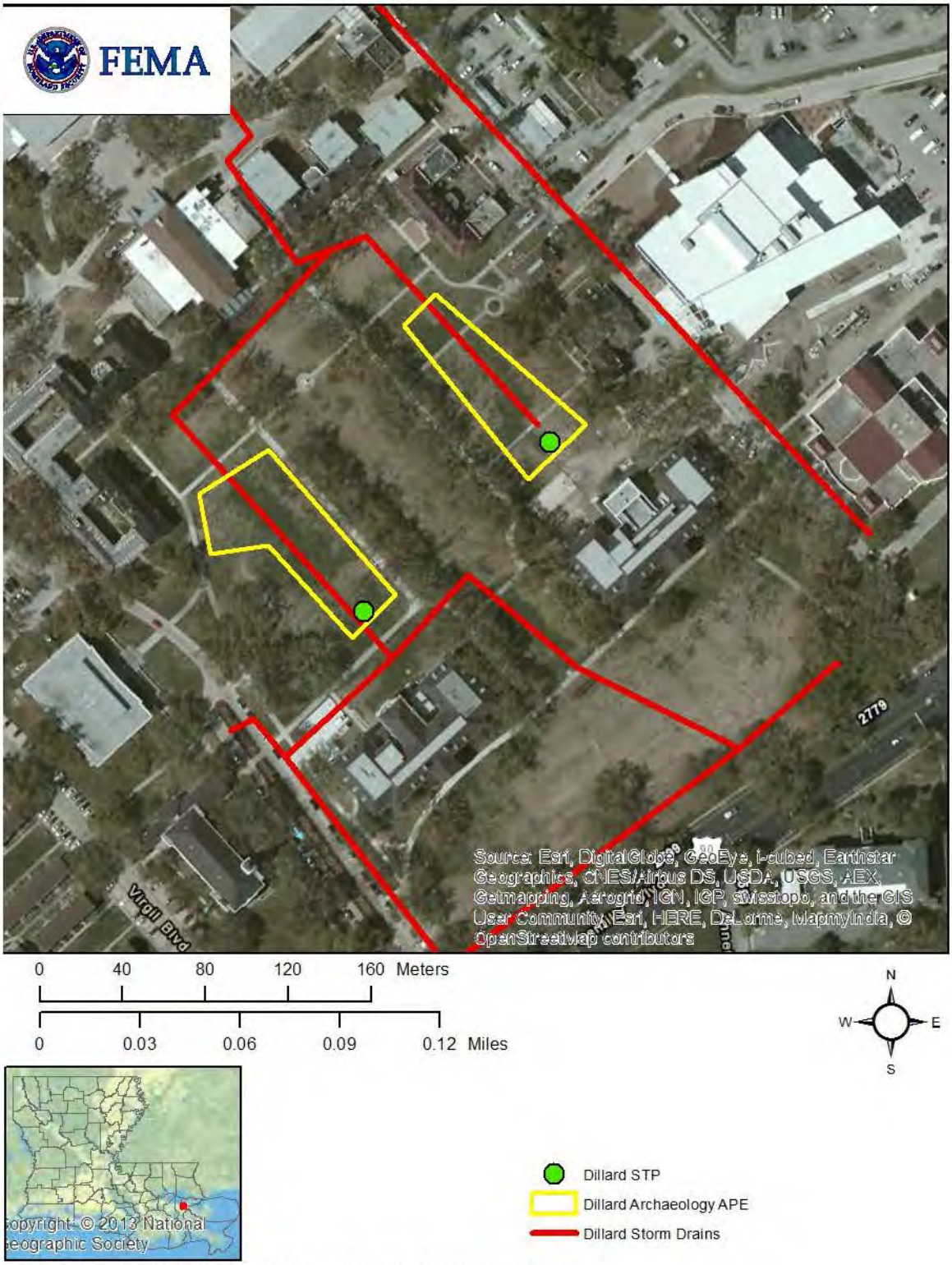


Figure 5. Archaeological Shovel Probe investigations.

Figure 6. Dent Hall looking west. Photo taken by FEMA, January 2016.

Figure 7. Henson Hall looking north. Photo taken by FEMA, January 2016.

Figure 8. DUICEF Building, looking southwest. Photo taken by FEMA, January 2016.

Figure 9. View of the grassed quadrangle in the vicinity of swale 2 looking southwest. Photo taken by FEMA.

Figure 10. View of the grassed quadrangle in the vicinity of swale 3 looking southeast. Photo taken by FEMA.

Figure 11. View of the grassed quadrangle in the vicinity of swale 3 looking northwest. Photo taken by FEMA.

DILLARD UNIVERSITY

December 14, 2015

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer
Region VI – LRO
FEMA Area Field Office
New Orleans, Louisiana

Dear Ms. Spann-Winfield,

This letter is to inform you of the efforts taken by Dillard University to avoid and/or minimize the adverse effects to the historic property at Dillard University. During the planning process of the project much consideration was given to alternatives that would be cost effective and not cause an esthetic impact to the historic landscape of the campus. Several alternatives were evaluated. All but one alternative was dismissed because of factors such as high cost, low effectiveness to control stormwater, or low desirability due to land ownership or neighboring community disapproval. Please see following alternative and rational for actions taken:

Alternative 1 – Grassed Swale in Front of Lawless Chapel
The first alternative included a proposed additional grassed swale in front of the Lawless Chapel. The H&H model indicated that the construction of the grassed swale in this location provided very little to no impact in reducing the flood elevation in the area. Therefore the cost of the swale was not effective enough to carry this alternative forward. This alternative was dismissed.

Alternative 2 – Use of Adjacent Land Owned by Parks and Parkways
The second alternative was the potential use of the adjacent land owned by the City of New Orleans Parks and Parkways. During this evaluation, it was found that conveying stormwater to this location would require mechanical pumping due to higher elevations, which would significantly increase not only construction costs, but also operation and maintenance costs after project completion. Additionally, an agreement between Dillard University and the City of New Orleans Parks and Parkways would be required for this alternative to be carried forward. Therefore, the use of this site was determined not viable.

Alternative 3 – Underground Storage Tank
The third alternative included the use of an underground storage tank below an existing parking area in the rear of the campus in lieu of the dry detention pond. The underground tank was desirable because it could offer multiple benefits, including detention of stormwater plus it could serve as a parking area above the tank. This third alternative was modeled and fully evaluated in the BCA. The model results concluded that the tank was effective in mitigating flooding to some degree but the high capital cost of the tank outweighed the mitigation benefits, resulting in a benefit cost ratio less desirable than the construction of the dry detention pond. In addition, the installation of the huge storage tanks would disturb the natural landscape of the campus. Therefore this alternative was dismissed.

DILLARD UNIVERSITY

Alternative 4 – Temporary Flood Wall and Levee System

The fourth alternative analyzed was to build a temporary modular flood wall and levee system around the perimeter of the campus. This alternative would have incorporated the installation of modular panels around the campus to form a barrier against high water levels. The panels would have to be installed upon alert of potential sever storm threat. The studies and town hall meetings determined that this would not be a viable option. The first con is the high operational cost incurred by the University to install and remove the panels prior to and processed a storm event. The second con and most important that lead to the rejection of this alternative was the impact on the neighboring community. The installation of the temporary flood wall was not only an esthetic impact to neighbors but also a concern that the University would be creating a larger hydronic impact for residents that live on the opposite side of the temporary wall. The neighboring community opposed this alternative. It was concluded that this alternative is not desirable because the University could be at risk for creating potential adverse conditions as a result of the implementation of this mitigation measure.

Alternative 5 – Sheet Pile Adjacent to Dry Detention Pond

The fifth alternative included the installation of a sheet pile wall adjacent to the dry detention pond. The development of the fourth alternative was the result from analyzing the effects of constructing the dry detention pond within 300 feet of the London Ave Canal flood wall. The analysis was documented in a geotechnical study which was submitted to the US Army Corps of Engineers (USACE). Two pre-application meetings were held with the USACE to discuss the project and results of the geotechnical study. Subsequent to these meetings, the need for the sheet pile wall was confirmed and therefore the fourth alternative is included in this project. The sheet pile wall will be constructed 40 feet deep below the ground surface. The construction of the new wall will satisfy USACE's geotechnical factor of safety requirements while further minimizing the possibility of groundwater interaction with the London Ave Canal. In addition, the dry detention pond will be constructed in the rear potion of the property away from any historic buildings and other facilities on campus. This proved to be the most beneficial alternative for cost, historic preservation, and safety considerations. As result the final design by the engineering consultants incorporated the dry detention pond for mitigation efforts.

Please feel free to contact me should you have any questions or concerns in regards to the above stated.

Sincerely

Randy Yeager
Interim Facilities Director
Dillard University

BILLY NUNGESSER
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT

RENNIE S. BURAS, II
DEPUTY SECRETARY

PHIL BOGGAN
ASSISTANT SECRETARY

January 22, 2016

Tiffany Spann-Winfield
Acting Environmental Liaison Officer
FEMA-DR-1603\FEMA-DR-1607-LA
FEMA Louisiana Recovery Office
Environmental/Historic Preservation
1500 Main Street
Baton Rouge, LA 70802

Re: Section 106 Consultation, Hurricane Katrina, FEMA-1603-DR-LA
Adverse Effects to Historic Properties
Gentilly-Dillard University Drainage System Improvements
2601 Gentilly Boulevard, New Orleans, Orleans Parish, LA

Dear Ms. Spann-Winfield:

Thank you for your letter of January 20, 2016, concerning the above-referenced undertaking. We concur with your assessment that the proposed construction of Drainage Swale Numbers 2 and 3 of the Gentilly-Dillard University Drainage System Improvements would constitute an Adverse Effect as defined in the Section 106 Regulations (36 CFR 800.5). Also, we concur with your recommendation of mitigating the Adverse Effect through the implementation of Standard Treatment Measure X.E.1, Digital Photography.

If you have any questions, please contact Mike Varnado in the Division of Historic Preservation at mvarnado@crt.la.gov.

Sincerely,

Phil Boggan
Deputy State Historic Preservation Officer

P.O. BOX 44247 • BATON ROUGE, LOUISIANA 70804-4247
PHONE (225) 342-8200 • FAX (225) 219-9772 • WWW.CRT.LA.GOV

From: Lindsey Bilyeu [mailto:lbilyeu@choctawnation.com]
Sent: Friday, February 05, 2016 2:47 PM
To: Emery, Jason <Jason.Emery@fema.dhs.gov>
Subject: RE: FEMA 106: Gentilly-Dillard University Drainage System Improvements, 2601 Gentilly Boulevard, New Orleans, LA (HMGP# 1603-0320)

Mr. Emery,

The Choctaw Nation of Oklahoma thanks FEMA for the correspondence regarding the above referenced project. Orleans Parish lies in the Choctaw Nation's area of historic interest. As no adverse effects are expected to archaeological sites, the Choctaw Nation Historic Preservation Department respectfully defers to the other Tribes that have been contacted.

If you have any questions, please contact me.

Thank you,

Lindsey D. Bilyeu
Senior Compliance Review Officer
Historic Preservation Department
Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, OK 74702
580-924-8280 ext. 2631

From: Section106 [mailto:Section106@mcn-nsn.gov]
Sent: Monday, February 01, 2016 12:12 PM
To: Jones, Gwendolyn <gwendolyn.jones@fema.dhs.gov>
Subject: RE: FEMA 106: Gentilly-Dillard University Drainage System Improvements, 2601 Gentilly Boulevard, New Orleans, LA (HMGP# 1603-0320)

Ms. Gwen Jones
HP Specialist
U.S. Department of Homeland Security
FEMA LRO - Region 6
504-875-1108

Dear Ms. Jones:

Thank you for the correspondence regarding the Gentilly-Dillard University drainage project. Orleans Parish, LA, is within our historic area of interest. We concur that there should be **no adverse effects to any known historic properties** and that work should proceed as planned. However, as the project is located in an area that is of general historic interest to the Tribe, we request that work be stopped and our office contacted immediately if any Native American cultural materials are encountered. This stipulation should be placed on the construction plans to insure contractors are aware of it. Please feel free to contact me with any further questions or concerns.

Thank You,

David J. Proctor, Cultural Advisor
Cultural Preservation Office
Muscogee (Creek) Nation
PO Box 580
Okmulgee, Ok 74447

Federal and state agencies, museums, and consulting partners, as of October 1, 2015 please send all Section 106 project notices as well as all NAGPRA notices to our new section106@mcn-nsn.gov. Notices concerning these projects will no longer be sent to individual staff member's emails. We will be accepting and responding using the new Section 106 email. If you have any questions, please give us a call at 918-732-7733.

Appendix D

Hydrologic and Hydraulic Study

The following is excerpted documentation relevant to the proposed project. For a full version, the general public can send a request to FEMA-NOMA@dhs.gov, tel: 225-202-5463, fax: 225-346-5848 or by mail to: Department of Homeland Security-FEMA, Louisiana Recovery Office, Attn: EHP-Dillard University Hazard Mitigation Drainage Project, 1500 Main Street, Baton Rouge, LA 70802.

DILLARD UNIVERSITY

Orleans Parish, New Orleans

Hydrologic and Hydraulic Report

Dillard University HMGP

August 2015

Dillard University

Orleans Parish, Louisiana

Hydrologic and Hydraulic Report

August 2015

Prepared by: Jessica L. Watts, P.E., CFM, D.WRE – CDM Smith

Reviewed by: Antolina Diaz, P.E. – Chester Engineers

FEMA Project No.: 1603.0320

HYDROLOGIC AND HYDRAULIC REPORT

DILLARD UNIVERSITY HMGP

ORLEANS PARISH, LOUISIANA

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LIST OF EXHIBITS

ORLEANS PARISH, LOUISIANA

PROJECT TEAM ACKNOWLEDGEMENTS

Dillard University

Erica Boerr, PMP, MBA
Theodore Callier
Keith McKendall, DBA

City of New Orleans

Bradford Case
Katrina Dean

GOHSEP

Kimberly Barnett
Tiedra Clark
Joseph Johnson
Marion Person
Cherie Walber

FEMA

Brandon Badinger
Richard Benton, CFM, LEED Green Associate

Chester Engineers, Inc.

Antolina Michel-Diaz, PE
Mark Scally, PE
Julius Willoughby, PE

CDM Smith

Louis Jackson, PE
Jessica Watts, PE, CFM, D.WRE

HYDROLOGIC AND HYDRAULIC REPORT

DILLARD UNIVERSITY HMGP

ORLEANS PARISH, LOUISIANA

1.0 INTRODUCTION

2.0 STUDY AREA

The Dillard University campus is located in the Dillard neighborhood of New Orleans. It is bounded by the London Avenue Canal to the west, a City of New Orleans owned open green space to the north, the campus ditch leading to the Mandolin Canal to the northeast, Warrington Drive to the southeast, and Gentilly Boulevard to the south.

The campus is hydrologically and hydraulically divided along the Gentilly Ridge and drains into two separate City of New Orleans drainage areas, Drainage Pump Station (DPS) 03 and DPS 04.

See ***Figure 1*** for an image of the study area

3.0 STUDY SCOPE

The Dillard University HMGP Project has the primary goal of identifying and mitigating deficiencies in the University's existing stormwater management system. This will be accomplished through a process of modeling the existing stormwater system, problem identification, modeling the proposed stormwater system, design, and construction.

This technical memorandum describes the work completed for the existing system analysis task. This work included:

1. Selecting of hydrologic and hydraulic (H&H) modeling software
2. Data collection
3. Determining model methodology
4. Existing system modeling
5. Existing system analysis
6. Recommendations for proposed system analysis

Figure 1: Dillard University Study Area

4.0 MODEL SOFTWARE SELECTION

Dillard University (University) and FEMA requested the design team to establish a uniform strategy for conducting analysis and design of its stormwater management system. A key element of this strategy is the computer software programs that will be used to conduct the hydrologic and hydraulic (H&H) analyses needed to complete the system assessments. A selection process was established to ensure that the software selected will meet all of the ongoing needs of the University. This process consisted of the following steps:

1. Identify the minimum features and capabilities that a software program must offer to meet the needs of the University HMGP project
2. Develop criteria for the software that reflect the values and interests of the University
3. Identify available software packages that meet the minimum requirements
4. Evaluate the software packages according to the established criteria
5. Select and recommend a software package to University staff

4.1.1 Minimum Requirements

A suitable software package or program must have the following features or capabilities to meet the minimum needs of the Dillard University HMGP project.

1. Both hydrologic and hydraulic analyses are needed for the HMGP project. The software must be either a complete package including both hydrologic and hydraulic computations or two separate but compatible programs; one for hydrology and one for hydraulics.
2. The H&H calculations must be fully dynamic using full storm hydrograph analysis. This will allow for comprehensive analysis of flow storage effects, and flood peak timing.
3. The software must be capable of modeling all the possible elements of the University stormwater management system including storm sewers, open channels, detention systems, and green infrastructure.
4. The software should be a FEMA approved software and should be a proven technology with a significant United States user base and history of use in similar projects.

4.1.2 Selection Criteria

There are additional model features and characteristics that may make one software product more beneficial to the University than others. These elements were used to differentiate the models and select the best for use in the HMGP project.

1. Initial Cost – cost to obtain one copy of the program
2. Annual Maintenance Cost – mandatory renewal fees to keep software current
3. Technical Support – support provided by vendor to resolve bugs or defects

4. User Support – support provided by vendor at no extra cost to assist users in resolving a specific application problem
5. Quality of User Interface (ease of use)
6. GIS Interface – ability to derive input and produce output compatible with ArcGIS
7. Portability – ease with which a model can be shared among users for development or review
8. Size of Local User Base – number of users in Southern Louisiana

4.1.3 Available Models

Three software programs and packages have been identified that meet the minimum requirements for use in the HMGP project. Brief descriptions of the models are provided below. These descriptions give an overview of each model rather than a comprehensive explanation.

SWMM-5

SWMM-5 is Version 5 of the U.S. Environmental Protection Agency (US EPA) Stormwater Management Model (SWMM). SWMM is a software package that includes both hydrologic and hydraulic analysis as a seamless set of computations. The graphical user interface is simple, but intuitive and easy to manipulate. SWMM was first released in 1969 and is distributed at no charge by the US EPA. It is one of the most widely used models in the United States for analysis of subsurface pipe networks.

XP-SWMM

As a result of the popularity of SWMM, several vendors developed software packages that use the SWMM engine for the H&H calculations but provide added features that facilitate user input or post processing. XP-SWMM used to be in this category but has been changed to their proprietary algorithms.

HSPF/FEQ

HSPF is a surface water hydrologic model developed by Hydrocomp, Inc. and US EPA in 1969. FEQ is a hydraulic model developed by Hydrocomp and Linsley-Kraeger, Inc. in 1976. They are currently maintained and supported by the United States Geological Survey (USGS) and have a small national user base. These models are sophisticated hydrologic and hydraulic models, and they provide a wide range of capabilities. However, they are based on text file input and are considered difficult to use and difficult to check.

Other Models

There are several well-known and popular software programs that were considered and determined as failing to meet the minimum criteria for the stormwater plan.

- HEC-RAS/HEC-HMS – These free and widely used government supported models do not support modeling of primarily subsurface closed conduits.
- StormCAD – This Bentley product does not support unsteady flow or street flow/street ponding.

4.1.4 Evaluation and Recommendation

The candidate programs were evaluated according to the above defined decision criteria. A comparison of the various programs is shown in ***Table 1***. Model costs are based on recent purchases. Pricing is highly variable and depends greatly on the number of licenses purchased, number of features purchased, and annual maintenance cost (AMC). The other criteria are highly subjective and are based on the experiences of project design team.

Table 1: Comparison of Software Product

Model	Cost	AMC	Tech Support	User Support	Interface	GIS Interface	Portability	User Base
SWMM-5	None	None	Limited	User Group	Adequate	None	Very Good	Very Large
XP-SWMM	$13,000	$ 3,000	Good	User Group	Good	Fair	Fair	Large
HSPF/FEQ	None	None	Minimal	User Group	Difficult	None	Good	Small

The software products discussed above and summarized in ***Table 1*** were evaluated with respect to the identified criteria. From a technical perspective, most of the software products evaluated are capable of meeting the minimum requirements necessary for successful development of the HMGP project.

In addition, the available software was evaluated by considering application during development of the HMGP project and the need to establish a legacy for future updates, analyses, and design support. The design team recommended the use of SWMM-5 based models founded on the basis of anticipated complexity of the stormwater management system, collaboration among University consultants, need for a long-lasting, reliable model platform, and implementation cost. Selection of SWMM-5 also provides significant flexibility for the University and its consultants to balance the benefit and cost of available software options while providing a consistent SWMM-5 deliverable.

5.0 DATA COLLECTION

In general, the data collected for the existing system analysis task is either temporal (such as rainfall) and distributed evenly throughout the model, or spatial, and is first added to a Geographical Information System (GIS) dataset as a layer for analysis and distribution over the subbasins of the model. Spatial data includes point layers, such as survey, and linear layers, such as the pipe network, and polygon layers such as soils and impervious area. Since SWMM is a node-link representation of a hydraulic system, point and linear features are often imported from the GIS database into the model. The hydrologic portion of the model is represented by areas (subbasins) at a scale where all hydrologic parameters may be considered constant.

The data for the model was collected in two degrees of relevance, either well-defined for the University campus area or less well-defined for the area outside the campus.

5.1 Campus Data

A survey of the campus for topography, building locations and finished floor elevations, and drainage system elevation and connectivity was conducted. This initial survey was completed by Linfield, Hunter & Junius, Inc. and delivered to Chester Engineers on October 10, 2013. The complete survey is included in ***Appendix A***.

Drainage system design plans were collected for the Student Union Building and vicinity, which has significant green infrastructure. Pertinent sheets of these design plans, completed by Linfield, Hunter & Junius, Inc. in May 2010 and November 2011, are also included for reference in ***Appendix A***.

Site visits to the Dillard University campus were completed on Friday, July 19, 2013, Friday, July 26, 2013, and Friday, August 23, 2013. The technical memorandum, completed and submitted on September 11, 2013, defines what was determined from these site visits and is included in ***Appendix A***.

5.2 Precipitation

Historic rainfall events may be placed in context by comparing them against frequency statistics. For the Eastern United States, including Louisiana, the National Weather Bureau's 1961 TP-40 atlas is the principal official source of rainfall statistics. TP-40 lists the 10-year, 24-hour storm for New Orleans to be 9.1 inches. However, many of the statistics in TP-40 cannot be considered valid today because of the much larger datasets now available. NetSTORM, a computer program developed by CDM Smith, has been used in many studies to compute updated rainfall statistics based on long-term precipitation datasets. ***Table 2*** presents depth-duration-frequency statistics for Orleans Parish using US Historical Climatology Network (USHCN) data and the New Orleans Audubon Station. The data was verified as representative of the area and for spatial and temporal trends using USHCN data for 50 stations in Louisiana and Mississippi. This national dataset includes 18 long-term daily precipitation records for Louisiana and 32 for

Mississippi, with a median record length of 100 years. The table shows, for example, that the 10-year, 24-hour storm for the area is 8.5 inches, which is validated with the NOAA, Atlas 14, Volume 9 (released June 28, 2013) value of 8.43 inches for the 10-year, 24-hour storm.

Table 2: Precip. Depth-Duration-Frequency Estimates for Orleans Parish (Inches)

		Average Recurrence Interval										
		1-Mo	3-Mo	6-Mo	1-Yr	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	500-Yr
Duration	.5 Hour	0.7	1.1	1.4	1.6	2.0	2.3	2.6	3.0	3.4	3.8	5.1
	Hour	0.8	1.3	1.7	2.0	2.5	3.0	3.4	4.0	4.6	5.3	7.4
	Hour	1.0	1.6	2.0	2.5	3.0	3.6	4.2	5.3	6.5	8.1	14.3
	Hour	1.1	1.8	2.3	2.7	3.2	4.0	4.8	6.3	7.9	10.1	19.0
	Hour	1.2	2.0	2.6	3.1	3.9	4.9	5.9	7.8	9.7	12.1	21.5
	2 Hour	1.3	2.3	2.9	3.6	4.6	5.9	7.1	9.1	11.1	13.6	22.3
	4 Hour	1.4	2.5	3.3	4.2	5.4	7.1	8.5	10.9	13.3	16.1	25.9

The average annual precipitation in the past 30 years is 62.3 inches. The largest 24-hour rainfall on record in Louisiana is 22 inches from August 28 and 29, 1962, and occurred in southwest Louisiana near Lake Charles. Monthly rainfall amounts of as much as 20 inches have occurred at most gauged locations across Louisiana and 24-hour rainfall amounts of 10 inches are not a rare occurrence. ***Table 3*** contains values of the monthly mean, median, and highest daily precipitation for the 30-year span from 1971 through 2000, from the NCDC Station at the New Orleans International Airport in Kenner, Louisiana (Coop ID 166660).

Table 3: Monthly Precipitation Averages and Extreme, 1971 to 2001 (Inches)
(National Climatic Data Center)

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
Mean	5.9	5.5	5.2	5.0	4.6	6.8	6.2	6.2	5.6	3.1	5.1	5.1	64.1
Median	4.4	5.1	4.9	3.8	3.7	7.1	5.8	5.5	4.6	2.5	4.1	4.7	60.8
Highest Daily*	4.7	4.9	5.1	6.4	9.9	6.0	4.3	4.8	5.6	4.2	8.5	6.5	
Date*	1998	1983	1973	1983	1995	2001	1996	1975	1998	1985	1975	1990	

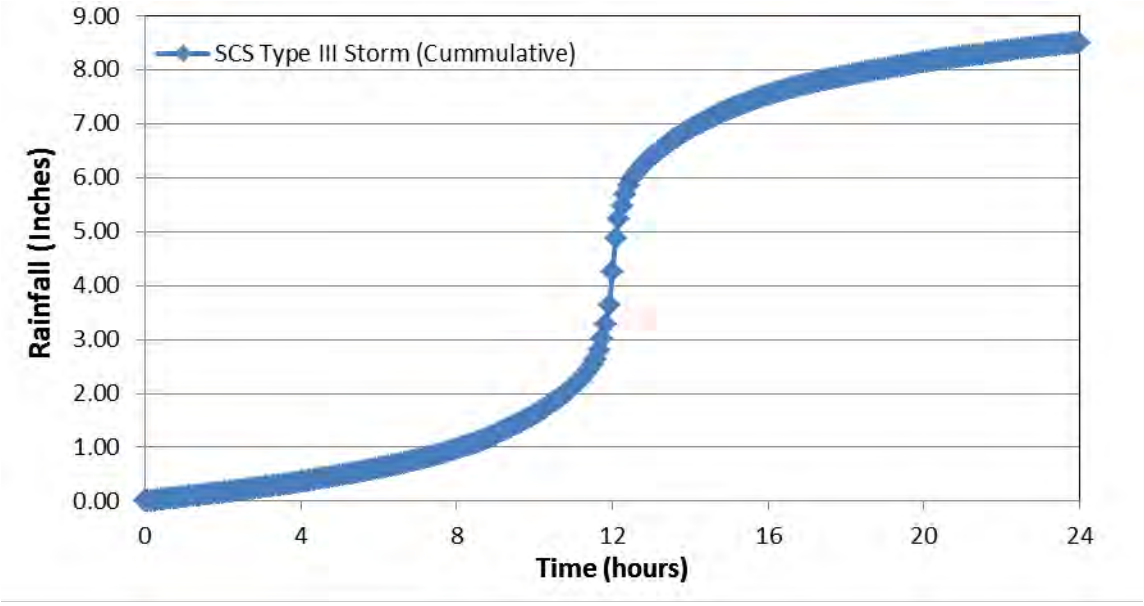
* Year listed is for the highest daily rainfall for the respective month

5.2.1 Design Storm Hyetographs

The depth of the 1-year, 2-year, 5-year, 10-year, 25-year, and 100-year 24-hour storms, highlighted in ***Table 2*** above, were distributed over the 24 hours using a Type III SCS distribution and input into the model as a time series and applied equally across all subbasins.

Figure 2 shows the cumulative distribution of the 8.5 inch 10-year, 24-hour storm over 24 hours.

Figure 2: Cumulative Distribution of the 10-year, 24-hour storm



5.3 Topography

The topography of the study area outside the Dillard campus was defined using the LiDAR data from the Louisiana Statewide LiDAR project. The Louisiana project LiDAR systems being used are accurate to 15 – 30 cm (6 – 12 inches) root mean square error (RMSE), which will support contours of 1-ft to 2-ft vertical map accuracy standards. The data are geo-referenced to the UTM Zone 15 – Meters and converted to Louisiana State Plane South North American Datum (NAD) 83 and North American Vertical Datum (NAVD) 88.

The information was obtained in quarter quadrangle sections as edited points from Atlas: The Louisiana Statewide GIS (atlas.lsu.edu). These points were then converted into a Triangulated Irregular Network (TIN) in GIS.

The topography for the Dillard campus was determined from contours from the survey provided by Linfield, Hunter & Junius, Inc. on October 10, 2013. This data was merged with the LiDAR data to create a study area topographic map.

Figure 3 shows the topography of the University area.

Figure 4 shows the topography of the study area.

The topography data for the Dillard HMGP project model was used primarily for dividing the campus into individual subbasins. It was also used in determining approximate road elevations and inlet elevations for the system where survey was not obtained.

Figure 3: University Area Topography

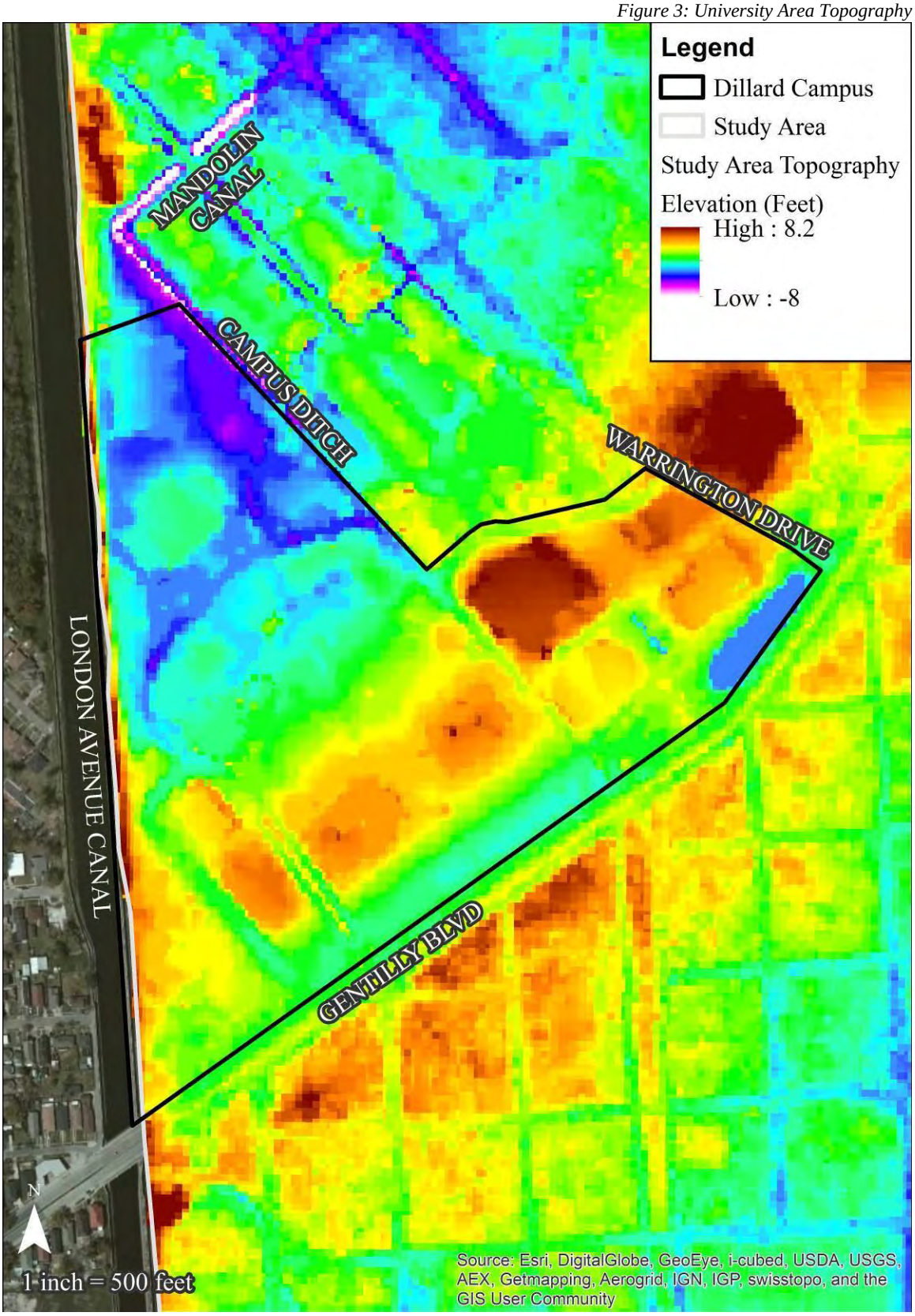
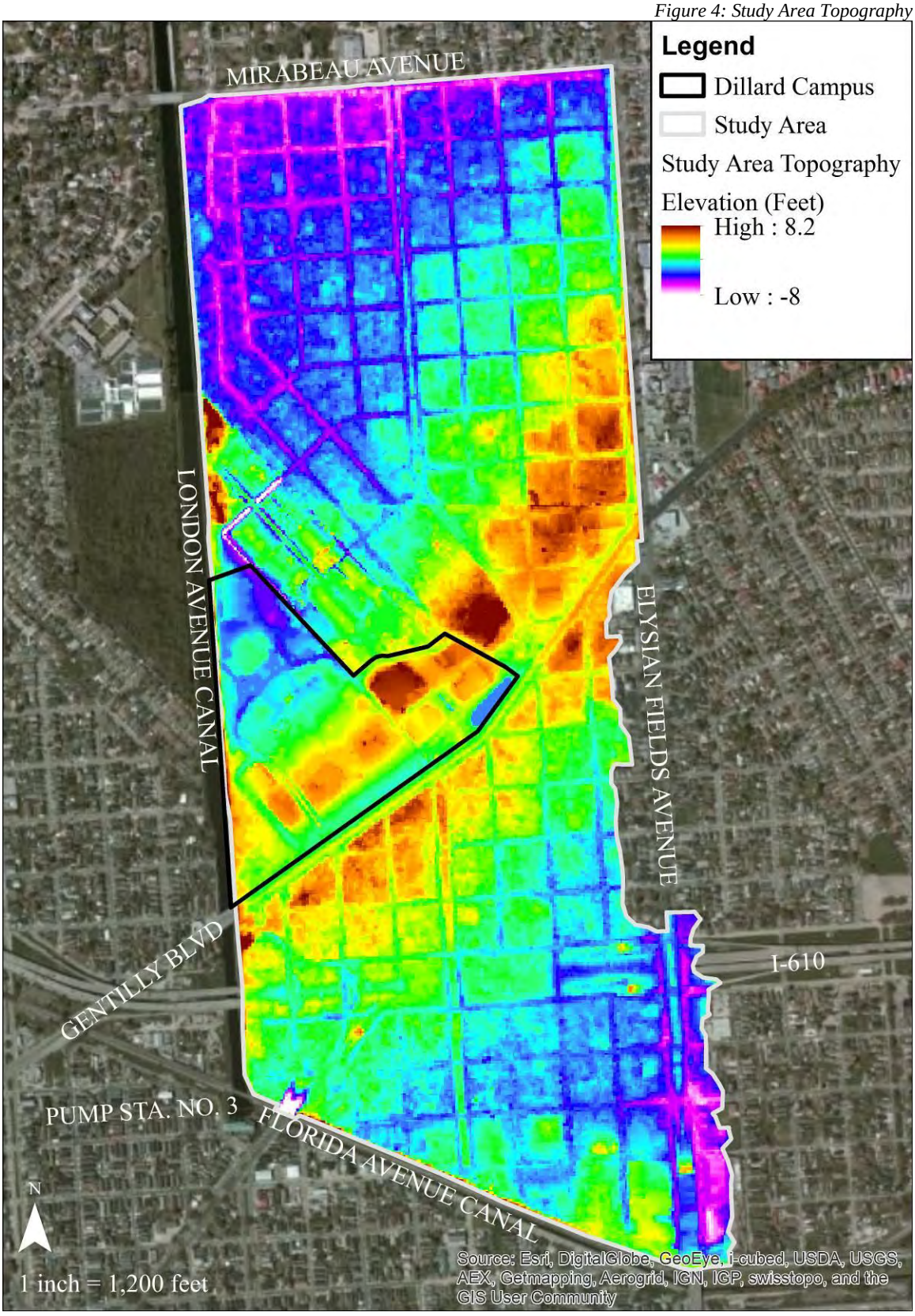


Figure 4: Study Area Topography



5.4 Land Use

5.4.1 Impervious Area

The modeled area outside the University area utilizes the US EPA 2001 National Land Cover Data (NLCD) which consists of measured imperviousness values on a 30-m grid throughout the United States. Each pixel in the imperviousness dataset has a unique imperviousness value (an integer from 0 to 100 percent). The complete NLCD 2001 dataset is described at www.mrlc.gov and is available from the USGS National Map Seamless Server at seamless.usgs.gov. This information was intersected with the subbasin boundary polygons to find the average imperviousness over each subbasin.

For the modeled area inside the University area, this parameter was determined from 2012 aerial photography for each subbasin area.

5.4.2 Soils

The most detailed standardized national soils mapping completed by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) was used to create the Soil Survey Geographic (SSURGO) database. SSURGO soil maps are compiled at scales from 1:12,000 to 1:63,360. Digital versions of SSURGO are available from the NRCS Soil Data Mart (SoilDataMart.nrcs.usda.gov). SSURGO data include soil polygons and extensive attribute data that define soil characteristics, properties, and potential uses.

There are 15 major soil types in the New Orleans area. According to the USDA, Soil Conservation Service's (now the NRCS) 1989 Soil Survey, most of Orleans Parish is comprised of soils containing mostly clay mixed with silt, loam, or muck. Twelve out of the 15 soils in New Orleans have a poor infiltration classification. These soils are considered "functionally impervious." Soils may be functionally impervious due to either high clay content, high compaction from past construction activities, and/or a high groundwater table. All three of these conditions exist in the city. By prohibiting the percolation of rainfall runoff into the subsoil, functionally impervious soils may prevent significant volume reductions with infiltration BMPs.

The University area is located on some of the better draining soils in New Orleans. There are three soil types within the University area: Cancienne Silt Loam, Cancienne Silty Clay Loam, and Schriever Clay.

Cancienne silt loam
This soil is somewhat poorly drained and is located on alluvial plains. It is loamy throughout. Runoff is slow and water moves moderately slowly through the soil. A seasonal high water table is about 1.5 to 4 feet below the surface during December through April. The shrink-swell potential is moderate.

Cancienne silty clay loam
This soil is somewhat poorly drained and is located on alluvial plains. It is loamy throughout. Runoff is slow and water moves moderately slowly through the soil. A seasonal high water table is about 1.5 to 4 feet below the surface during December through April. The shrink-swell potential is moderate.

Schriever clay
This soil is poorly drained and is located on broad flats on the alluvial plain. It is clayey throughout. Runoff is slow to very slow. Water moves very slowly through the soil. The shrink-swell potential is high to very high. A seasonal high water table is within 2 feet of the soil surface during December through April.

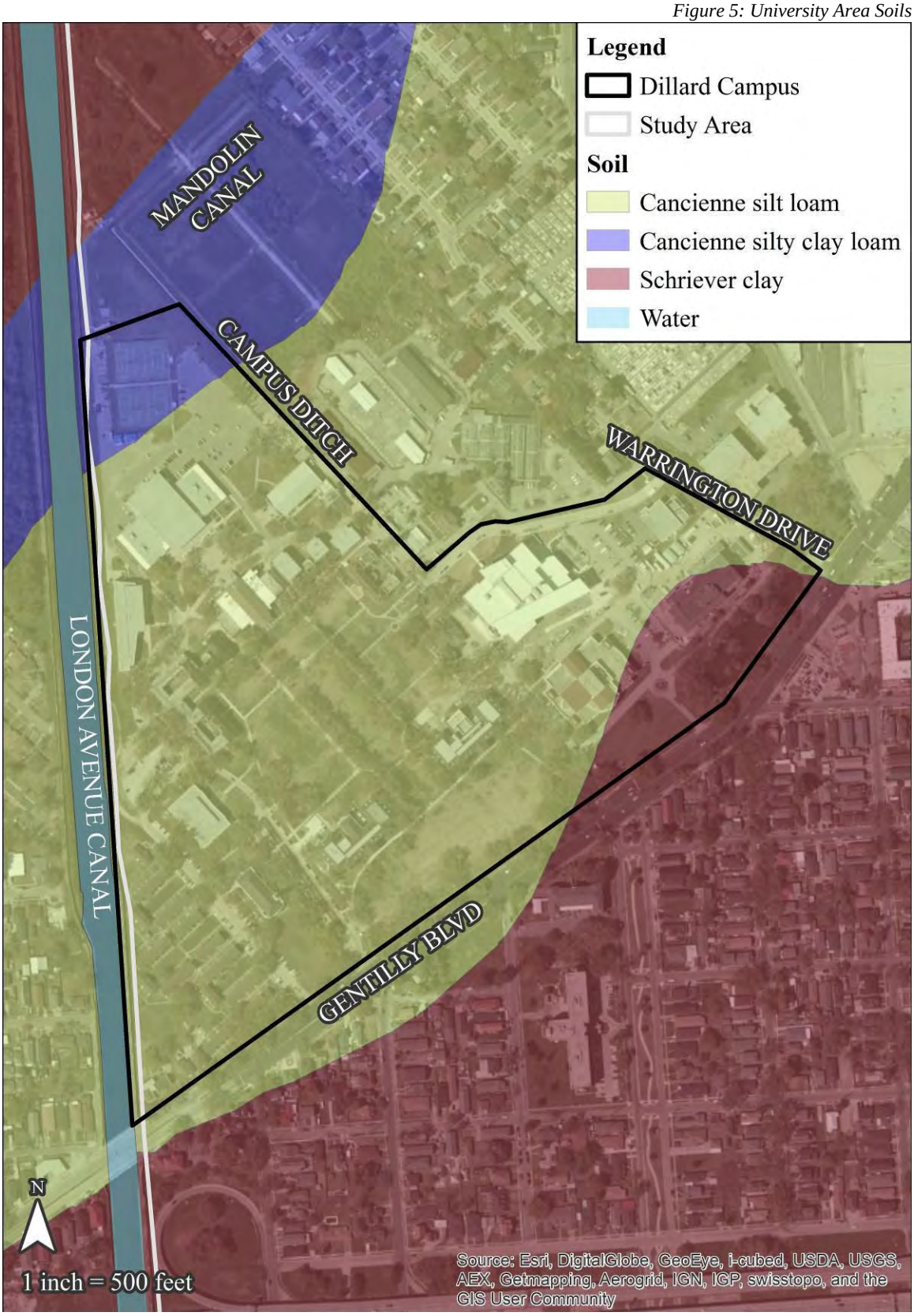
Table 4 lists the University area soils' pertinent characteristics.

Table 4: University Soil Characteristics

Soil	USDA Class	Shrink Swell Potential	Subsidence Potential	Notes
Cancienne silt loam (Cm)	C	Moderate	Negligible	Silty Loam
Cancienne silty clay loam (Co)	C	Moderate	Negligible	Silty Clay Loam
Schriever clay (Sk)	D	High to Very High	Negligible	Clay

Figure 5 shows the soil types within the University area.

Figure 5: University Area Soils



6.0 MODEL DEVELOPMENT

U.S. EPA's Storm Water Management Model (SWMM) is a dynamic hydrologic and hydraulic model capable of performing continuous or event simulations of surface runoff and groundwater base flow, and subsequent hydraulic conveyance in open channel and pipe systems.

The hydrologic system operates by applying precipitation across subbasins, and then through overland flow and infiltration, conveying surface runoff to loading points on the user-defined primary stormwater management system (PSMS). Runoff hydrographs for these loading points provide input for hydraulic routing in the downstream system.

The hydraulic flow routing routine of SWMM uses a link-node representation of the PSMS to dynamically route flows by continuously solving the complete one-dimensional Saint-Venant flow equations. The dynamic flow routing allows for representation of channel storage, branched or looped networks, backwater effects, free surface flow, pressure flow, entrance and exit losses, weirs, orifices, rating curves, and other special structures or links.

The models were created using the vertical datum, NAVD 88, and the geodetic reference system, Louisiana State Plane (NAD 1983, State Plane, Louisiana, South).

6.1 Incorporation with City of New Orleans System Model

Dillard University campus is located within two separate drainage pump station (DPS) service basins, DPS 03 and DPS 04. The model of the DPS 03/04 service area stretches from the Mississippi River to Lake Pontchartrain and includes a total area of 7,874 acres, with 315.5 miles of pipe, of which 216.2 miles is modelled.

The Sewerage and Water Board drainage pump stations and large system was modelled in XP-SWMM by BCG for the S&WB and given to CDM Smith in order to incorporate and analyze the smaller City of New Orleans system. DPS 03and DPS 04are modeled with five pumps each with the characteristics as shown in ***Appendix C***.

Incorporating the Dillard University campus drainage system into the larger total model would be cumbersome and model run times would be unnecessarily long. Therefore it is standard practice to reduce the model to logical boundaries and include outfalls with boundary conditions that represent drainage system responses in the basin beyond that which is specifically modeled for the study area.

The study area selected for this project is bounded by the London Avenue Canal to the west, Mirabeau Avenue to the north, Elysian Fields to the northeast, DPS 03 service area boundary to the southeast, and the Florida Avenue Canal to the south. This study area was determined to allow for possible off campus benefits to be modeled and to minimize the number of outfall boundary conditions.

See ***Figure 6*** for DPS 03/04, study area, and campus boundaries.

The outfalls on the southern boundary of the study area, along the Florida Avenue Canal, are included within the DPS 03/04 City of New Orleans model. The boundary conditions to the north, along Mirabeau Avenue, are along a major S&WB drainage trunk line. These stage (water surface elevation) time series boundary conditions were created for the study area model. Model outfall information is included in ***Section 4.4.5***.

A location map and graphs of the created time series for each Mirabeau Avenue boundary conditions are included in ***Appendix C***.

6.2 Hydrologic Methodology

The study area was sub-divided into hydrologically distinct subbasins. The divisions were based on a combination of topographic information, stormwater routing and catchments, and aerial photographs. The hydrologic parameters assigned to each subbasin include: area, width, slope, directly connected impervious area (DCIA), surface roughness, initial abstraction, and infiltration parameters.

All input parameters are included in the model input, ***Appendix B***.

6.2.1 Area

The tributary areas for each subbasin were determined directly from GIS mapping.

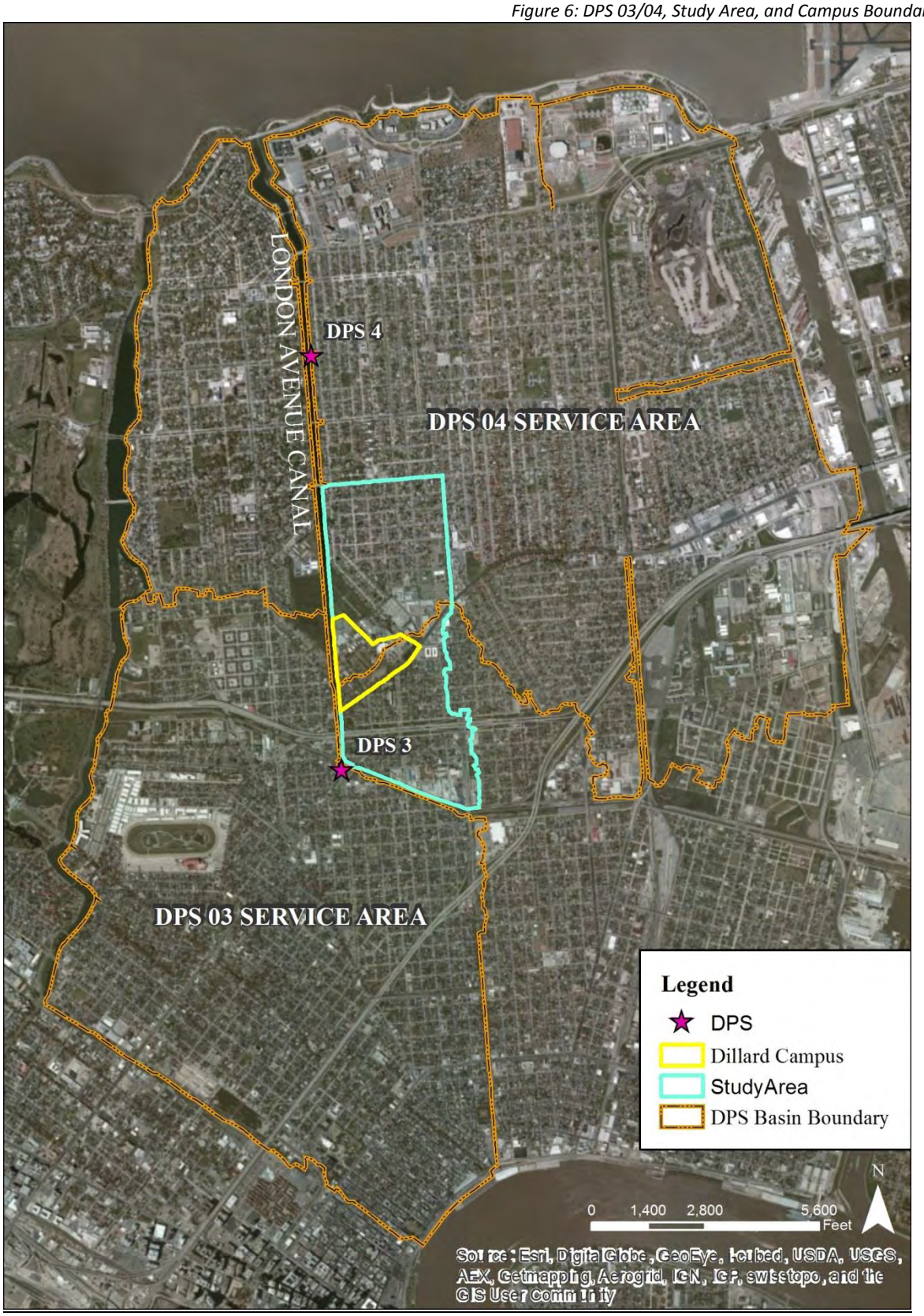
6.2.2 Imperviousness

The percent impervious was developed from 2012 aerial photography for the Dillard University campus and NLCD 2001 dataset for outside the Dillard University area as described above.

Total impervious area was entered as percent impervious and then the ROUTE TO function was used to route a given percentage of the impervious area to the pervious layer.

For the modeled area outside the University area, this ratio was set at 33% in the initial model setup and then checked for sensitivity during calibration. This estimate of 33% was used to take into account the roof and drive areas in residential parcels that drain onto yard. For the University area this parameter was set as determined from aerial photography and network knowledge for each subbasin.

Figure 6: DPS 03/04, Study Area, and Campus Boundaries



6.2.3 Width

The width of each subbasin within the University area was computed by measuring multiple flow path lengths per subbasin and dividing the area by the average length to get width. The widths of the subbasins, outside the University area, were determined by finding the square root of the area. In urban areas with approximately square subbasins, these calculations will typically result in widths within a factor of two (less than double, more than half) of the square root of the area. The sensitivity analysis, described below, indicates that the model is not very sensitive to changes in widths within this range.

6.2.4 Slope

The slope of each subbasin was determined using GIS to define slopes across the area and then determining the mean slope within each subbasin. As with Width, the model is not sensitive to this parameter under variations that occur in this relatively flat terrain.

6.2.5 Evaporation

The evaporation default value of 0.1 inches per day was used in this model. The model is not sensitive to evaporation for design storm applications.

6.2.6 Overland Roughness and Depression Storage

The overland Manning's roughness values were set to 0.013 for impervious areas and 0.2 for pervious areas. The pervious area roughness values are higher than those used for a channel bottom because the depth of flow is much shallower for surface runoff. The model is not sensitive to changes in these values, within ranges that are physically reasonable.

Depression storage, also known as initial abstraction, represents the volume of water that does not flow off the surface into the PSMS due to ponding. The values are set to 0.05 inches over impervious areas and 0.1 inches over pervious areas. Again, the model is not sensitive to changes in these values, within ranges that are physically reasonable.

6.2.7 Infiltration

The SWMM infiltration function uses soil characteristics to define infiltration parameters. The Horton soil infiltration method was selected for this project.

A single set of infiltration characteristics were assigned to each subbasin based on the predominant soil classification in that catchment, see ***Table 4***. The soil information was collected from the SSURGO dataset as described above. The composite soil make-up was then used to determine weighted Horton soil characteristics including maximum (initial) and minimum (final) infiltration rates, and soil storage. Soil storage varies depending on antecedent moisture conditions (AMCs). This model uses average antecedent moisture

conditions (AMCII), which may be defined as the soil condition when the previous 5-day rainfall volume totals between 1.4 and 2.1 inches.

Table 5 below displays the soil parameters by soil type for the AMCII conditions.

Table 5: Global Soil Parameters

Soil Type	Max Infiltration Rate (in/hr)	Min Infiltration Rate (in/hr)	Decay Rate (1/sec x 10-4)	Dry Time (days)	Soil Storage (in)
A	12.0	1.00	5.56	1.0	5.4
B	9.0	0.50	5.56	1.0	4.0
C	6.0	0.25	5.56	1.0	3.0
D	4.0	0.10	5.56	1.0	1.3

6.3 Hydraulic Methodology

In general, the primary stormwater management system (PSMS) may be comprised of canals, rivers, streams, lakes, bridges, culverts, pipes, pump stations, weirs, and other hydraulic structures. Most of these types of hydraulic elements are part of the larger, New Orleans system but are not present in the University system. For the University model, the PSMS is almost entirely made up of pipe 12 inches and greater.

All input parameters are included in the model input, ***Appendix B***.

6.3.1 Model Resolution

In many some areas within the University, there are roof drains, inlets, and smaller pipes leading to the PSMS. It is the objective of this study to determine whether the PSMS is sized properly to meet desired level of service (LOS) goals. The inlets and smaller connecting pipes are considered secondary systems and are not always explicitly modeled. The local surface runoff is directed to the upstream end of the PSMS.

6.3.2 Model Nodes

Model nodes may be in the form of junctions, storage junctions, or outfalls. Storage junctions are used to define a stage – storage area relationship above the top of an inlet. These help determine depths of flooding. For the design model, stage-storage relations are confined to areas that include detention areas or other areas of excessive storage. Outfalls are placed at the boundaries of the model where flow is out of the model space. Outfalls will be discussed in detail in the paragraph on boundary conditions below. All other model nodes are labeled as junctions. Junctions are located at:

1. The ends of pipes which are part of the larger PSMS (secondary systems of lesser diameter are coupled with surface runoff in the hydrologic layer);
2. Intersections of drainage systems;
3. Locations of pipe diameter change; and
4. Points representing the subbasin low point.

The loading from the hydrologic layer may be input to any node in the PSMS however, all junctions representing the upstream end of a pipe system should have hydrologic loading in order that "dry" pipes not be created. Dry pipes are those pipes that have no flow from an upstream element (either link or loading) and therefore are not useful in the system analysis. Dry pipes may also cause instabilities in this type of model.

Model node inverts were set to the lowest pipe invert intersecting the given node.

6.3.3 Model Links

Model links may be conduits, pumps, orifices, weirs, or outlets. In these models, as noted above, all of the links are conduits. A conduit may be an irregular channel, a trapezoid, a circular pipe, a box culvert, or of a special shape. With few exceptions, all the conduits in this model are circular pipes or overland flow irregular channels.

Pipe size and length were determined based upon as-built and GIS information supplied by Dillard University as well as field survey. Pipe inlet and outlet inverts were determined using the survey data. Since the pipe invert survey did not cover all model elements, the remainder of the inverts were interpolated or extrapolated from neighboring node surveys. Under design storm conditions when pipes are flowing full, minor changes to pipe invert elevations have little effect on model results. It is not expected that the actual pipe inverts would vary significantly from these estimates, such that it would impact model results or findings.

Minor entrance and exit losses were uniformly set to values of 0.2 and 0.3, respectively for the Dillard University system.

The sensitivity analysis indicates that the model is not very sensitive to minor losses for the intense storms where flooding is prevalent.

Pipe roughness (Manning's n) was uniformly set at 0.013 in the model outside the University area and with roughness to match pipe material within University area.

All Manning's roughness assumptions correspond to clean, well-maintained pipes. ***Maintenance issues are not included in the model. All pipes and inlets were modeled as well maintained, with no siltation included***. The sensitivity of the model to a maintenance condition was tested as documented below; however, in general, a routine maintenance program will be required to meet the estimated level of service that the model predicts. Without maintenance, the likelihood of flooding cannot be predicted as any pipe or inlet in the system may act as a constraint.

6.3.4 Above Ground Hydraulic Elements

As discussed above, the model has above ground elements in order to accurately estimate flood depths and to hydraulically connect flooding between nodes. These elements include road conduits, equalizer conduits, and storage junctions.

A road conduit is a trapezoidal or irregular conduit representing the road above a pipe. Road conduits allow for a hydraulic connection along the road surface when pipes are surcharged. In flat areas, where adjacent nodes are surcharging, the volume in the link also provides above ground storage at these locations. Inside the University area the roads were delineated as irregular sections with the roughness either estimated as 0.025 or with road roughness defined as 0.013 and the overbank roughness defined as 0.04 for cut grass. Outside the University area, the Manning's n value of the road was estimated to be 0.02, which represents a combination of asphalt and grassy areas.

The inverts of these conduits were determined from survey and as-built data, where available, and estimated from the LiDAR topographic surface, where survey and as-built data were not available. The lengths were measured from GIS. The road conduits were defined from TIN data and road structure knowledge. Since road or pavement conduits are parallel to most pipes in the system, they cover nearly all of the model area. In some areas, there are roads without underground pipes, where flooding is likely to occur. These areas were connected with road conduits, as appropriate, to connect adjacent systems above ground.

An equalizer conduit is another above ground irregular conduit, but one that does not include significant storage and is used to "equalize" the above ground HGL (or stage) between two nodes. This is often used where there is no pipe connection between two neighboring systems. Without equalization, one side of the system could potentially surcharge to a higher level than the other. The equalizer acts as a weir from one side to the other, with the weir crest at the crown of the topography.

6.3.5 Model Outfalls

Outfall nodes are used to represent connections to boundary conditions. SWMM has a limitation that only one link may be connected to each outfall.

Table 6: Model Outfalls

Name	Invert Elevation (Ft)	Outfall Type		Name	Invert Elevation (Ft)	Outfall Type
OUT_0049	-11.43	FIXED, -4.8		OUT_DPS04_33028	-9.56	TIMESERIES
OUT_0050	-15.49	FIXED, -5.2		OUT_DPS04_33030	-10.44	TIMESERIES
OUT_0051	-16.16	FIXED, -5.9		OUT_DPS04_36377	-11.87	TIMESERIES
OUT_0138	-11.21	FIXED, -4.2		OUT_DPS04_33119	-12.63	TIMESERIES
OUT_0140	-10.8	FIXED, -4.2		OUT_DPS04_33017	-7.49	TIMESERIES
OUT_0142	-11.38	FIXED, -4.2		OUT_DPS04_32223	-11.82	TIMESERIES
OUT_0144	-9.46	FIXED, -5.3		OUT_DPS04_36754	-11.3	TIMESERIES
OUT_0145	-9.7	FIXED, -4.2		OUT_DPS04_32211	-10.1	TIMESERIES
OUT_0147	-14.19	FIXED, -4.2		OUT_DPS04_32184	-10.05	TIMESERIES

6.3.6 Sensitivity Analysis

A sensitivity analysis was performed on selected hydrologic and hydraulic parameters. The City of New Orleans Drainage Pump Station 03/04 model was run for the 10-year,

24-hour design storm and the 1-year, 24-hour design storm. The results of this analysis are presented in ***Table 7***.

Table 7: Model Sensitivity to Selected Hydrologic and Hydraulic Parameters

Hydrology	**1-year, 24-Hour Storm Differences (ft)**				**10-Year, 24-Hour Storm Differences (ft)**			
	Ave	**STD**	**Max**	**Min**	**Ave**	**STD**	**Max**	**Min**
Pervious Area / 2	0.20	0.26	2.19	-0.25	0.04	0.05	0.57	-0.38
Impervious / 2	-0.49	0.47	0.27	-3.88	-0.09	0.09	0.44	-1.26
DCIA Route to 50%	0.01	0.06	0.81	-2.00	0.00	0.03	0.78	-0.28
DCIA Route to 15%	0.01	0.07	1.16	-0.41	0.00	0.02	0.40	-0.21
Width x 2	0.14	0.16	1.21	-0.26	0.03	0.04	0.44	-0.78
Width / 2	-0.26	0.26	0.28	-2.23	-0.06	0.06	0.58	-0.99
Slope x 2	0.08	0.09	1.08	-0.16	0.02	0.02	0.37	-0.24
Slope / 2	-0.11	0.12	0.24	-1.09	-0.03	0.03	0.08	-0.46
Overland x 2	-0.29	0.29	0.63	-2.53	-0.06	0.06	0.71	-1.00
Overland / 2	0.14	0.16	1.49	-0.31	0.04	0.04	0.48	-0.51
Soil Storage x 2	-0.18	0.22	0.22	-1.99	-0.03	0.04	0.06	-0.94
Soil Storage / 2	0.09	0.17	2.18	-0.39	0.01	0.02	0.17	-0.54
Hydraulics	**1-year, 24-hour Storm**				**10-year, 24-hour Storm**			
	Ave	**STD**	**Max**	**Min**	**Ave**	**STD**	**Max**	**Min**
Zero Entrance/Exit Losses	-0.02	0.14	1.06	-1.19	-0.01	0.06	0.38	-0.77
(Lack of) Maintenance	0.11	0.82	3.76	-2.15	0.09	0.22	2.94	-0.70

Ave: Average of nodes – peak stage deltas between scenarios versus base model
STD: Standard deviation of same

It should be noted that the model is more sensitive to these parameters for smaller storms. This is because small changes in runoff may produce large differences in peak stage as a system is very near capacity and about to surcharge. Since there is very little volume above a pipe until the stage reaches ground elevation where the ponding may spread out, stages may increase rapidly at the upstream ends of pipe where the runoff is loaded. This is also why, in some cases, the maximum or minimum differences may be on the order of a few feet as the particular location may be on the precipice of surcharging although the average change may be small.

It should also be noted that while increased runoff and/or increased pipe flows increases stages in one area, they may decrease stages in another and vice versa. This is particularly true of the hydraulic parameters where increased flows tend to decrease stages upstream while potentially increasing them downstream. This tends to skew the averages closer to zero; therefore, the standard deviation has been added for clarification. A low average with a relatively high standard deviation would indicate more sensitivity than the same average with a low standard deviation.

6.3.6.1 Hydrologic Parameters

Nearly all the hydrologic parameters that are input to the model were tested for sensitivity. The soil infiltration rates and decay rates were not tested as previous projects have shown that models are more sensitive to soil storage than the maximum and minimum rates (over reasonable ranges of values). Additionally, the overland roughness and depression storage parameters were lumped together, again due to previous sensitivity analysis performed by CDM Smith. An attempt was made to keep the variations uniform but also within physical limits. However, the physical range of the

parameters varies greatly. For instance, doubling the slope of a catchment is not that large of a variation, whereas doubling the roughness of the overland flow is. Although the slope may locally vary beyond this range, it is not expected that the physical range model-wide is beyond this range, so the range was not expanded. For impervious area, doubling the area would create areas with greater than 100%; therefore, halving the pervious area was used instead. The model input for impervious area is directly connected impervious area (DCIA) as some impervious precipitation runs off to pervious areas before reaching the PSMS.

The sensitivity analysis indicates that the model is most sensitive to impervious area, followed by overland parameters (pervious and impervious areas roughness values and depression storage), subbasin width, and soil storage. These are typical results, although generally the overland parameters have less sensitivity. The range on these parameters is extreme and likely causes this result.

6.3.6.2 Hydraulic Parameters

The hydraulic parameters tested were entrance and exit losses and a maintenance condition. The losses chosen for use in the Study area model (0.2 entry, 0.3 exit) were roughly estimated based on the likely losses in the system.

The maintenance condition is tested because the model is based on a clean, well-maintained system with low roughness values (0.013 for concrete) and full capacity. This test evaluates a condition where pipes are silted to 30% of the diameter and the roughness is increased to 0.025. The model is more sensitive to this condition than for any other for the larger storm. This test provides some indication of the need for routine maintenance in the system as stages may rise as much as 3 feet even when most of the cross-sectional area remains. In cases where pipes and/or inlets are completely clogged, the increases may be much worse.

The sensitivity analysis shows that the model is not overly sensitive to any one parameter, especially for the larger storms. For the larger storms, precipitation overwhelms the soil storage in the pervious areas and becomes runoff despite the percentage of pervious area. Additionally, much of the model area has surcharged pipes and street flooding, therefore, minor hydraulic changes have little effect on peak stages.

7.0 EXISTING SYSTEM ASSESSMENT

Stormwater runoff was modeled using SWMM's rainfall-runoff module (i.e., RUNOFF). The tributary areas for each subbasin were determined directly from GIS mapping of topography and inlet locations. The model area of Dillard University, 55.4 acres, was delineated into 83 subbasins for this model. The average subbasin area is 0.71 acre. The minimum and maximum subbasin areas delineated for this model are 0.03 and 3.25 acres, respectively.

The stormwater runoff, received as hydrograph input to specific nodal locations on the PSMS, was hydraulically routed using SWMM's hydraulic engin module. The University area modeled drainage system is 25,900 feet of pipes and contains 121 subsurface conduits, 95 overland conduits, 115 junctions, 18 outfalls (all outside Dillard Campus), and 11 storage units.

Figure 7 shows a schematic of the sub-catchments, nodes, and conduits included in the University area of the model.

7.1 Flooding Assessment

The existing conditions model simulations represent the subsurface drainage system throughout the service area. The subsurface drainage network was simulated for the following events:

7.1.1 1-Year Rainfall Event

For this storm, 35% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 8*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

7.1.2 2-Year Rainfall Event

For this storm, 59% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 9*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

7.1.3 5-Year Rainfall Event

For this storm, 73% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 10*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

7.1.4 10-Year Rainfall Event

For this storm, 84% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 11*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

7.1.5 25-Year Rainfall Event

For this storm, 85% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 12*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

7.1.6 100-Year Rainfall Event

For this storm, 90% model nodes are simulated to be flooded above estimated ground surface elevation. ***Figure 13*** shows an estimated flood map of the existing conditions model built using the predicted peak flood stages and LiDAR topography.

Figure 7: Model Schematic, University Area

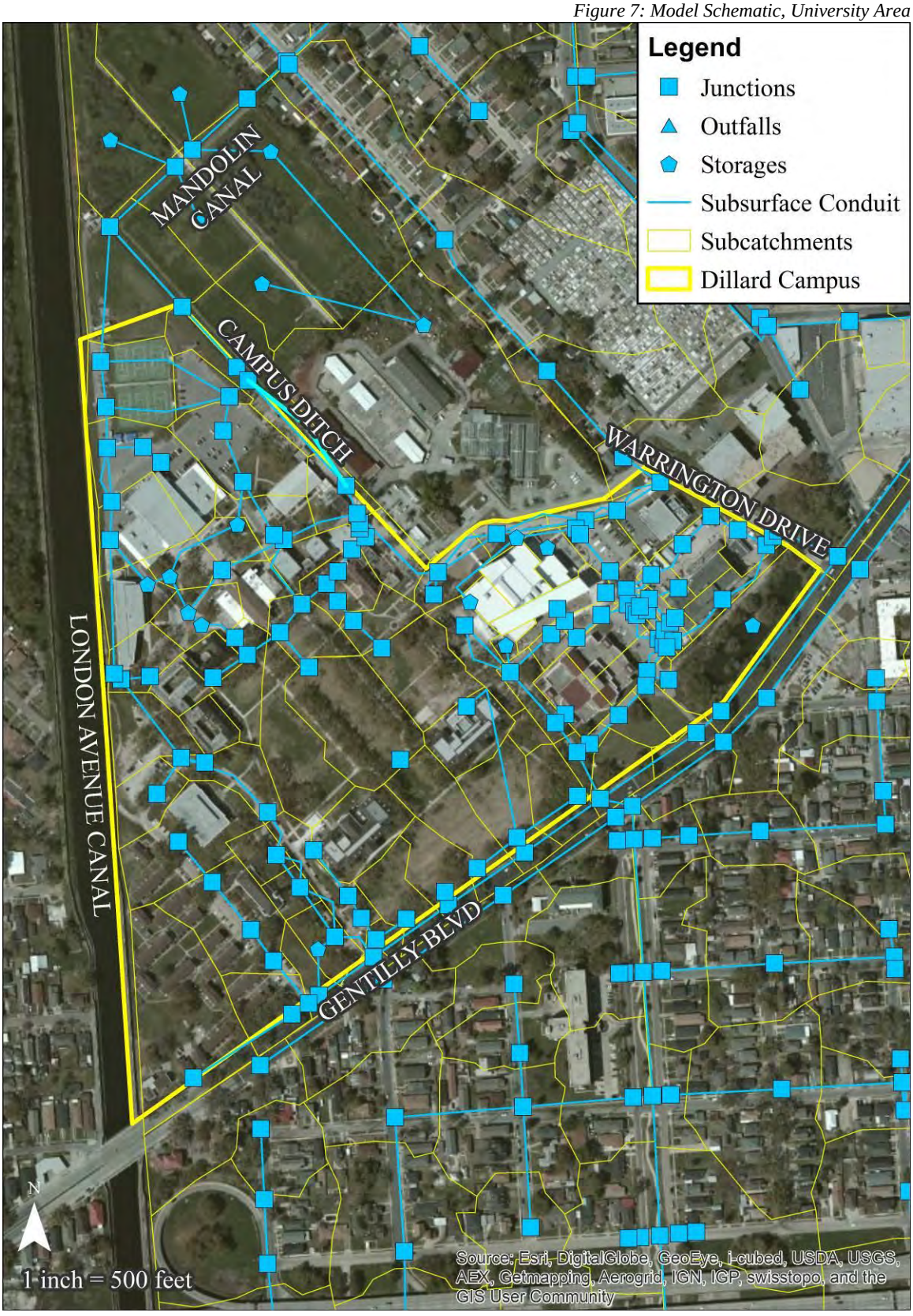


Figure 8: 1-Yr Existing Conditions Peak Flood Depth

Figure 9: 2-Yr Existing Conditions Peak Flood Depth

Figure 10: 5-Yr Existing Conditions Peak Flood Depth

Figure 11: 10-Yr Existing Conditions Peak Flood Depth

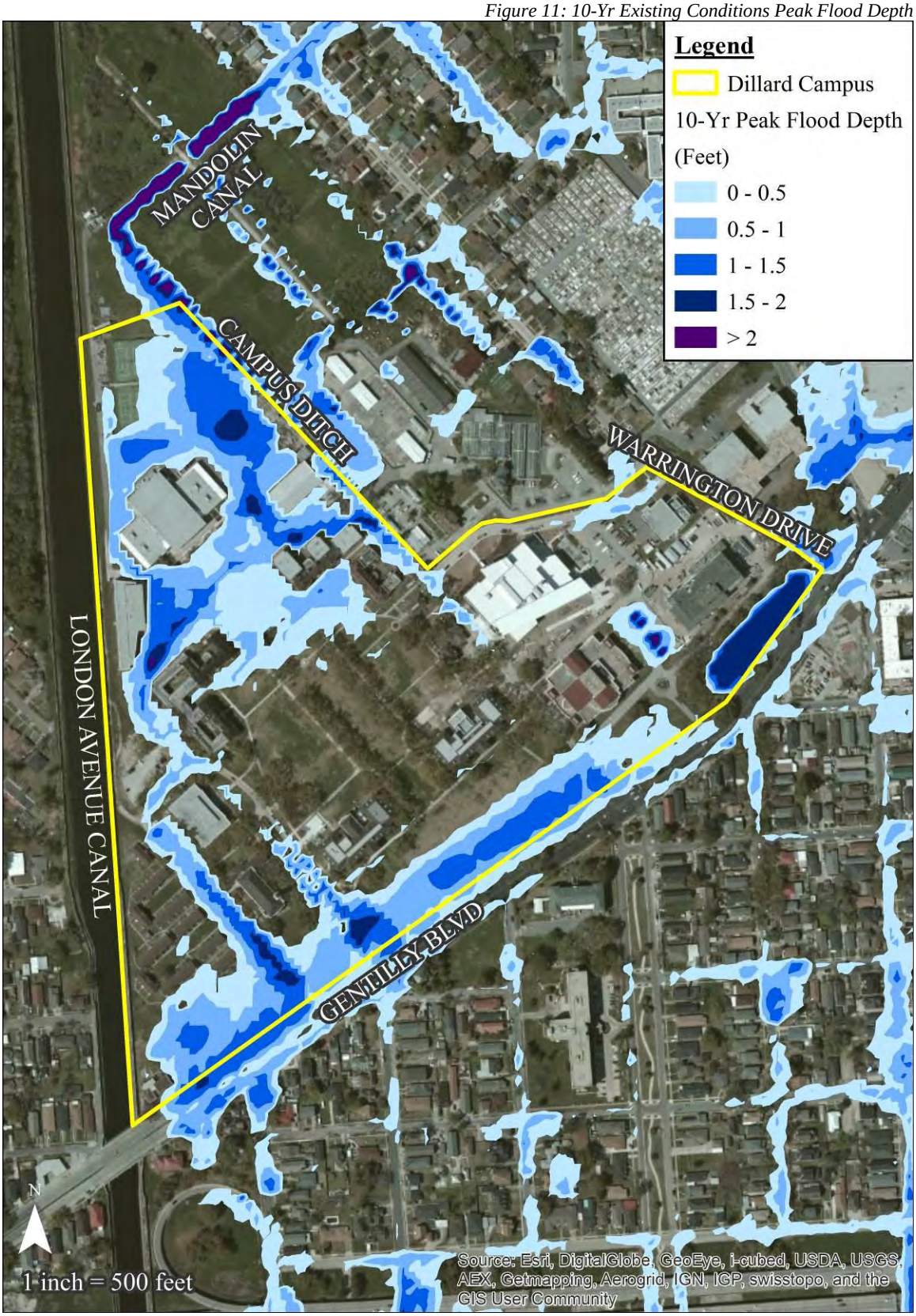


Figure 12: 25-Yr Existing Conditions Peak Flood Depth

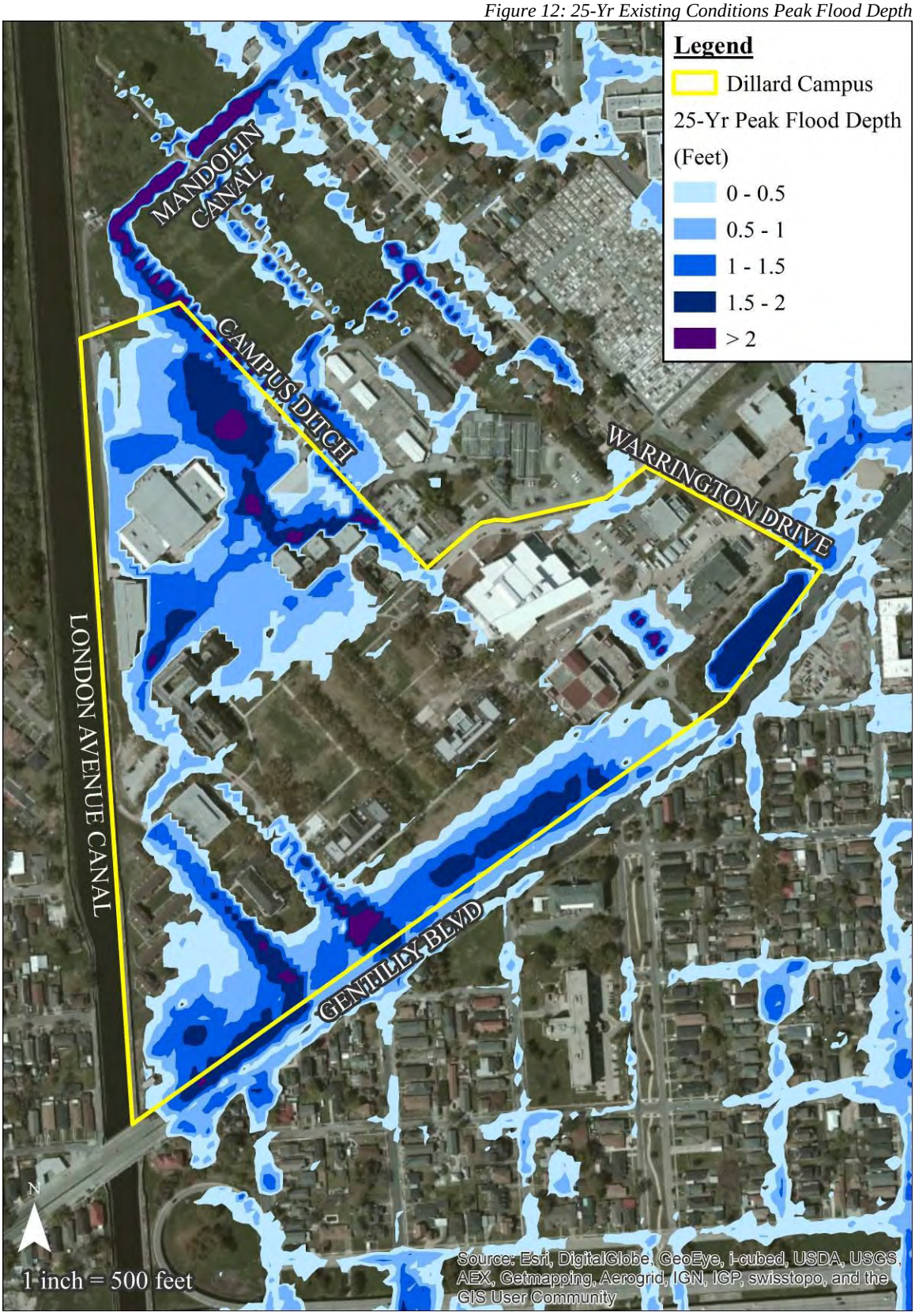
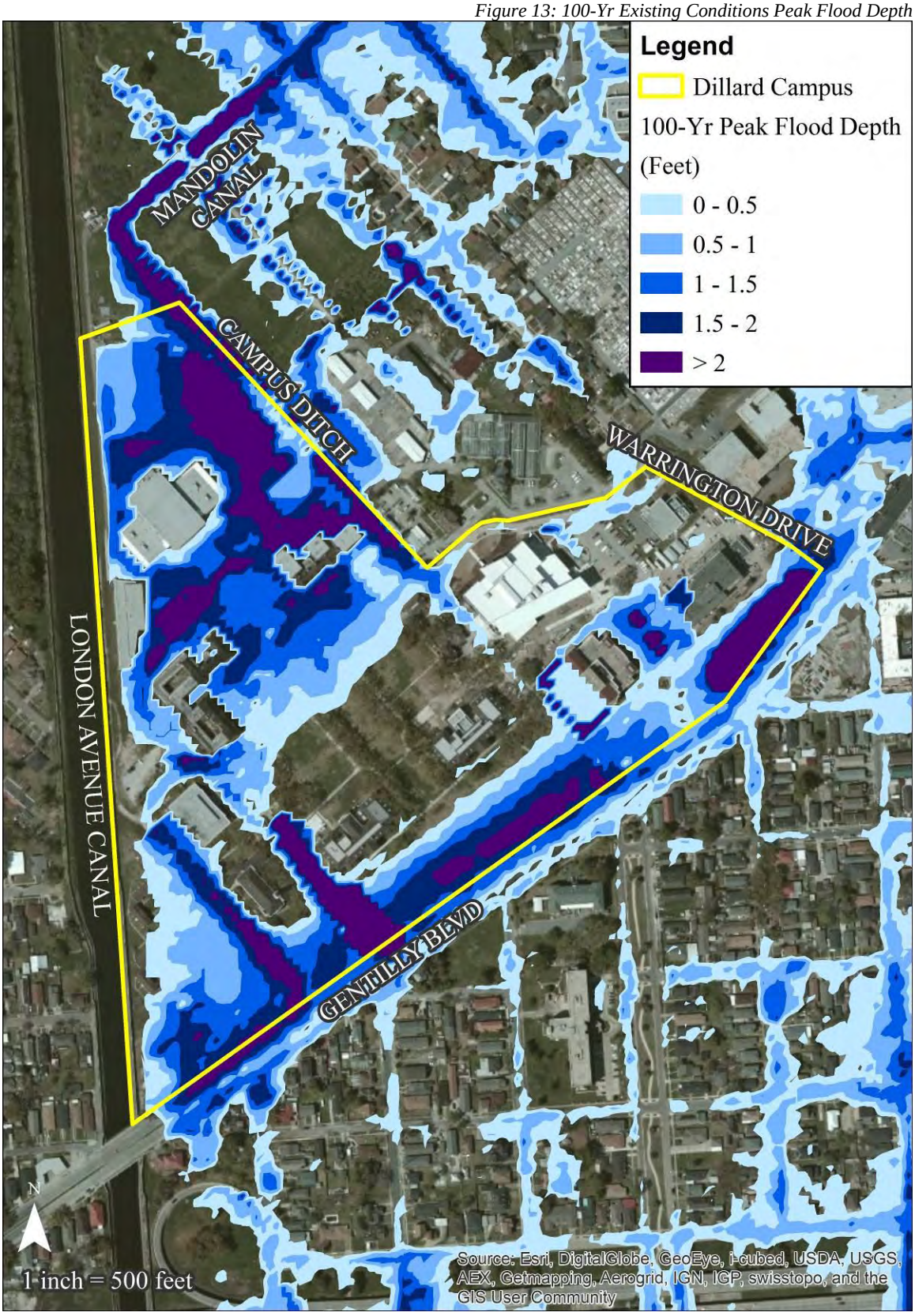


Figure 13: 100-Yr Existing Conditions Peak Flood Depth



8.0 PRELIMINARY RECOMMENDATIONS

The stormwater management strategy proposed for the Dillard University campus is to first create detention basins to hold runoff uphill so that it does not collect and flood to such a high peaks in the lower elevations of the campus, especially around Kearny Hall. Second, pipes will be added or increased to facilitate drainage in the lower areas. Third a detention basin will be created in the rear campus area to reduce the peak flow leaving the campus so that downstream peak stages at the boundary are not negatively impacted.

The following strategies were initially proposed in the Existing Conditions Technical Memorandum and they were either included in the proposed design, or not, based on analysis of their mitigation potential.

Detention Basins:

1. Duck Pond enlargement with additional flow from parking lot.

   This was not included due to the University not having rights to the land adjacent to the existing Duck Pond.

2. Dry detention added in front of Chapel.

   This was evaluated in the proposed system but not included in the final design due to lack of benefit versus cost.

3. In line storage along campus ditch to Mandolin Canal.

   This was changed to an offline detention basin to reduce the peak flow leaving the campus.

4. Dry detention west of Avenue of the Oaks.

   Holds runoff uphill.

5. Dry detention east of Avenue of the Oaks.

   Holds runoff uphill.

Green Infrastructure:

1. Parking changed to porous pavement north parking area.

   Pervious pavement and small detention areas were proposed and evaluated for the space between Kearny Hall and Dent Hall. These improvements were removed due to physical restrictions in the area.

Pipes were improved as required to convey the excess runoff not attenuated by the proposed detention basins.

See ***Appendix D*** for overall map of the proposed stormwater management strategy.

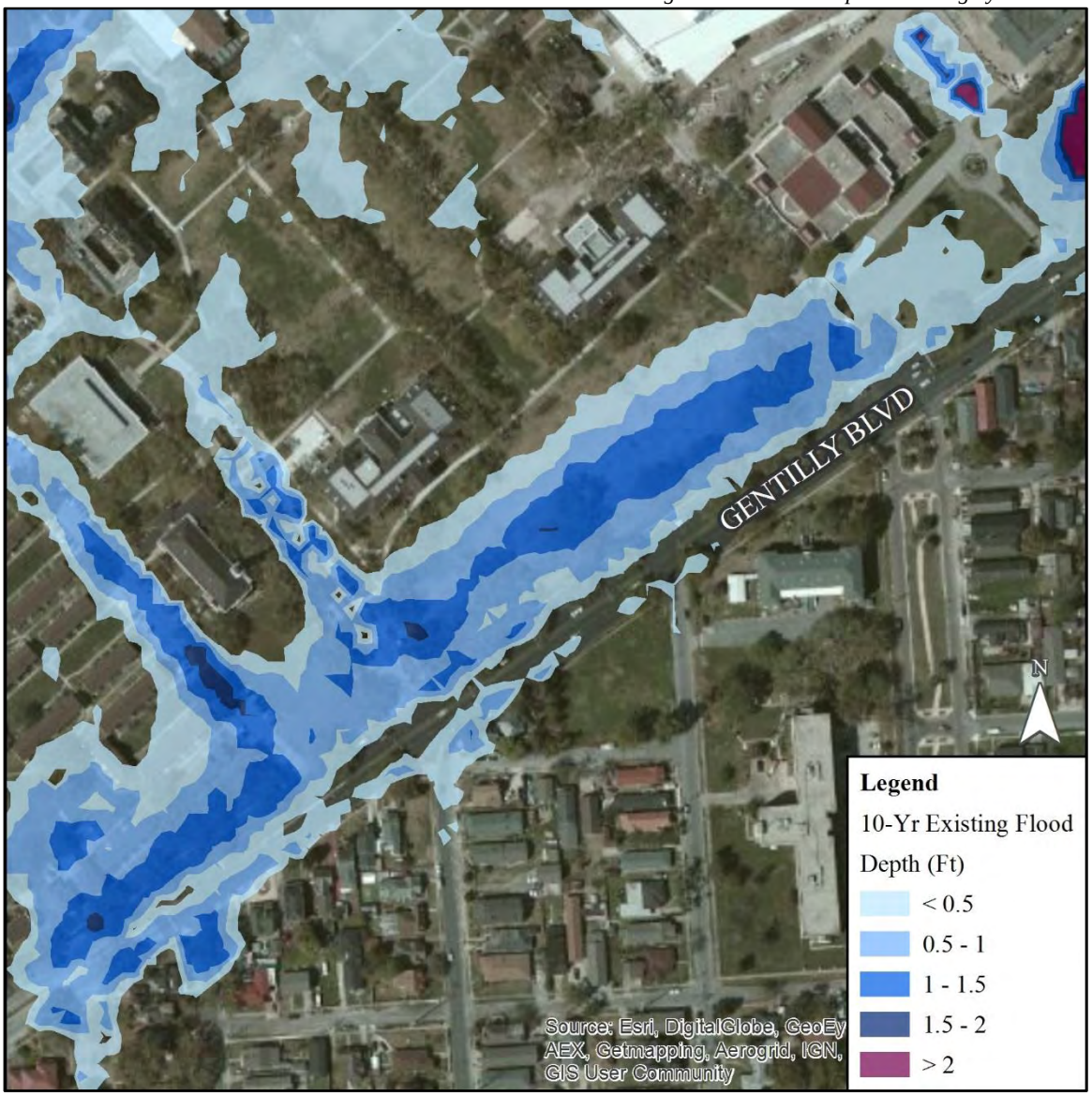
9.0 FRONT CAMPUS EVALUATION AND RECOMMENDATIONS

The front campus consists of that area of the Dillard Campus that is between the Gentilly Ridge and Gentilly Boulevard. The front campus subsurface drainage is designated as ***SD-1*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

9.1 Existing Conditions

The existing model shows significant flooding in the front of the campus as seen in ***Figure 14***, below.

Figure 14: Front Campus - Existing System Model Results

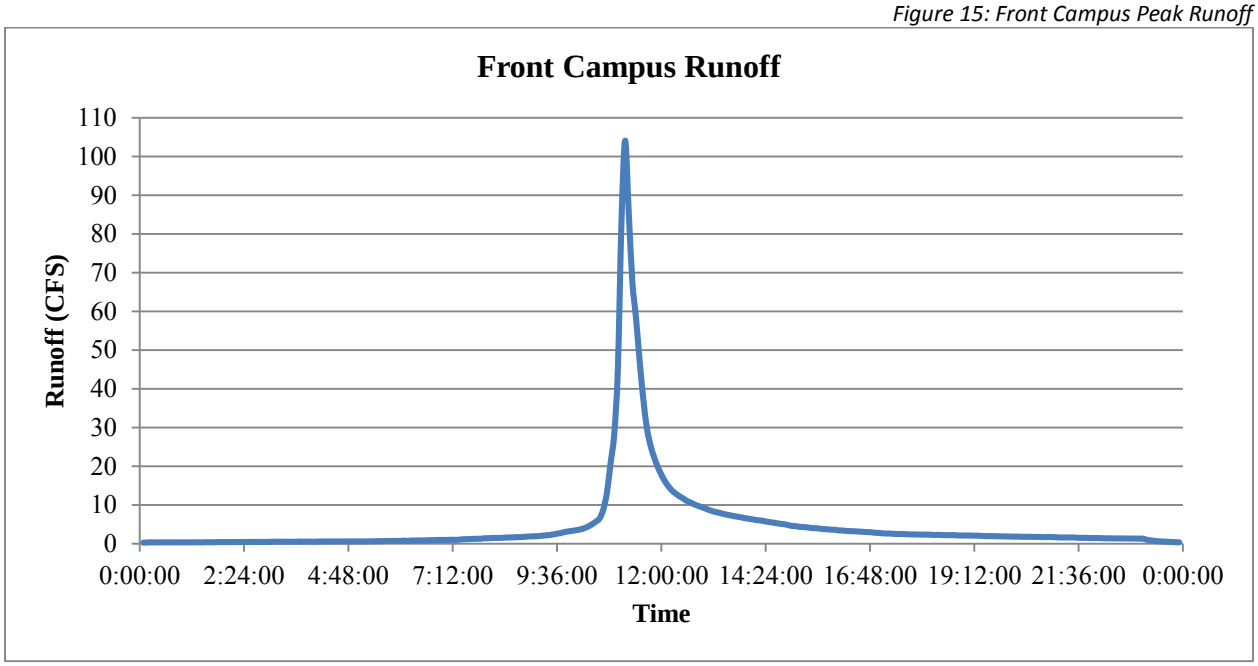


Analysis of the model suggests that the flooding is the result of both campus runoff and the City of New Orleans system water surface boundary condition.

Campus Runoff

The front of the campus, between the East Road and London Avenue Canal, has a total runoff of 421,095 cubic feet with a peak runoff of 104 CFS, during the 10-year design storm. The model calculates an average runoff coefficient of 0.75 given the low permeability and rapid saturation of the soils. The graph of the total runoff from the front of the campus is shown on the graph below.

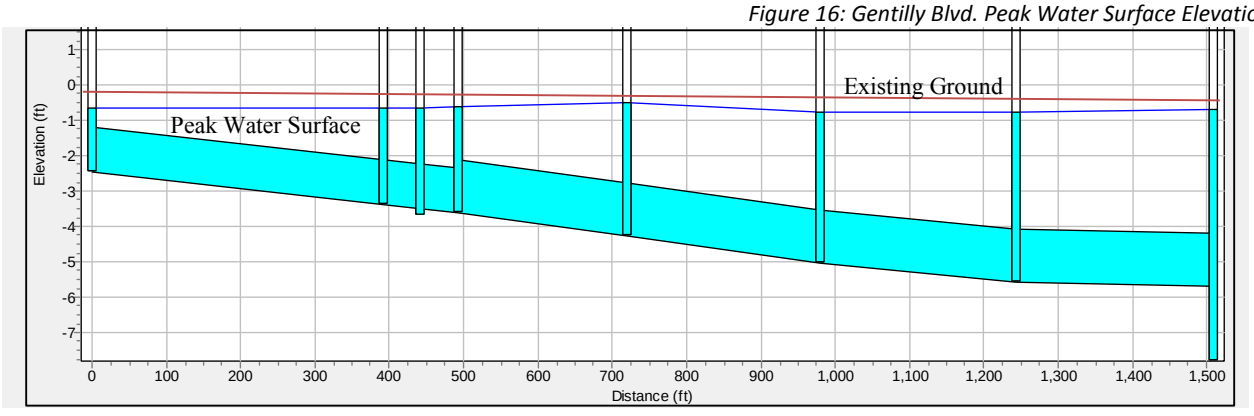
Figure 15: Front Campus Peak Runoff



Water Surface Boundary Condition

The existing 10-year model was modified to remove all runoff from the front campus. The runoff was sent to a dummy outlet node that removed all runoff from the system completely. The runoff from the campus past the East Road, off campus, and downstream created a water surface elevation that is at or just below the existing ground elevation, as shown in ***Figure 16*** below in brown. This hydraulic situation allows for little to no opportunity for Dillard University to mitigate the flooding in front of the campus.

Figure 16: Gentilly Blvd. Peak Water Surface Elevation



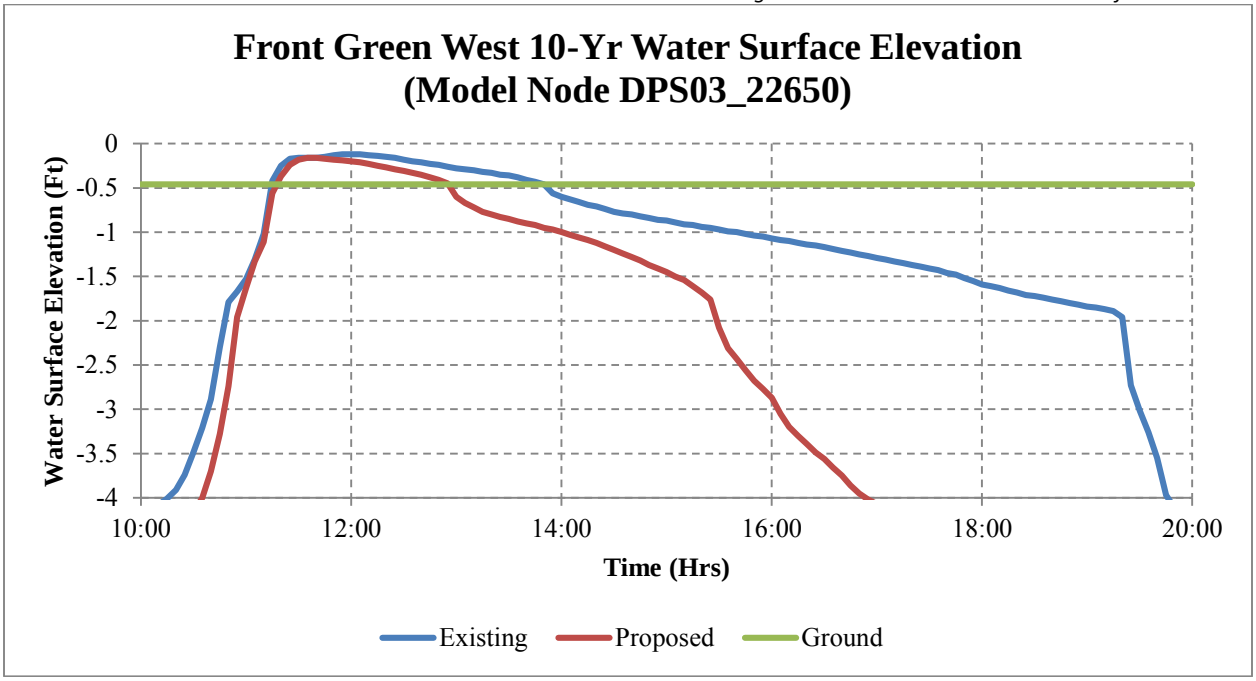
9.2 Proposed Recommendations

The front campus recommendations are limited to pipe upgrades along the front of the campus. The front campus area is already significantly pervious, which does not allow for significant runoff reduction through the addition of pervious cover, nor do the local soils lend themselves to this type of mitigation measure. The addition of a detention area in front of the campus chapel was evaluated and determined to not have substantial benefits.

Front Green Area

The Front Green area subsurface drainage was improved as indicated in alignment ***SD-1*** included in ***Appendix D***. Enhancements include improvements to connectivity and size increases. This recommended improvement reduces the time the West Entrance is flooded by one hour in the 10-year design storm, see ***Figure 17*** below.

Figure 17: Front Green West Water Surface Elevation

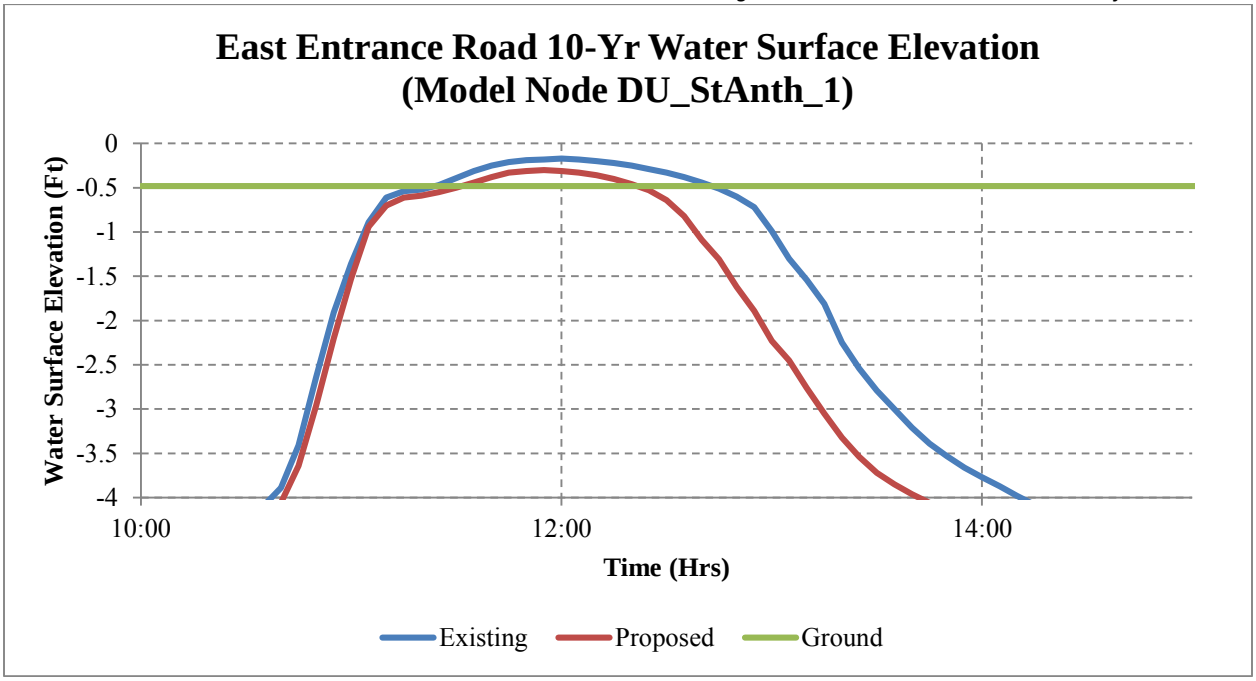


East Entrance Road

The East Entrance Road subsurface drainage is designated as ***SD-6*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

For the East Entrance Road it is recommended that the pipe between DI 25 and MH 2 be removed in order to create a hydraulic break between the front campus flooding and the rear campus. The Gentilly Ridge acts as a topographic barrier. If the pipe is disconnected then the hydraulic connection is removed and the hydraulic grade line breaks at the ridge allowing for a much lower water surface elevation along the east entrance road, see ***Figure 21***.
With the proposed improvements, the front of the campus at the East Entrance Road was minimally improved in both in depth of flooding and time that the area remained flooded. See ***Figure 18*** below.

Figure 18: East Entrance Road Water Surface Elevation

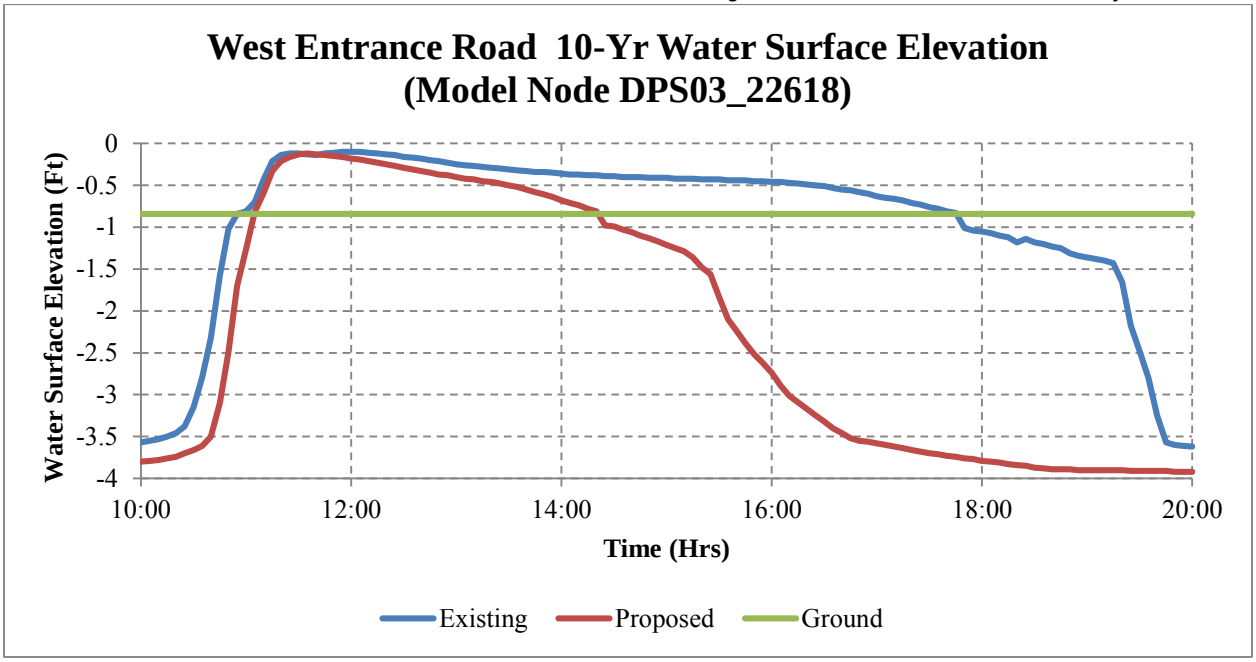


West Entrance Road

The West Entrance Road subsurface drainage is designated as ***SD-9B*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

It is recommended that the West Entrance Road subsurface drainage pipe be increased and the direction of flow change from draining toward Gentilly Blvd. to draining toward the proposed dry detention area, Swale No. 2, on the west side of the Avenue of the Oaks area, described below. With the proposed improvements, the flood depth in front of the campus at the West Entrance Road was not improved, but the length of time that the area remained flooded was decreased from 6.5 hours to 2.5 hours. See ***Figure 19*** below.

Figure 19: West Entrance Road Water Surface Elevation



Ridge Crossing

The Ridge Crossing subsurface drainage is designated as ***SD-2*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

Analysis of the impact of SD-2 was completed. Increasing the size of the Ridge Crossing subsurface drainage pipe and changing the direction of flow from draining toward Gentilly Blvd. to draining toward the proposed dry detention area, Swale No. 2 does not have any significant benefit, as seen in ***Figure 20*** below of the center front green water surface elevation.

Figure 20: Center Front Green Water Surface Elevation

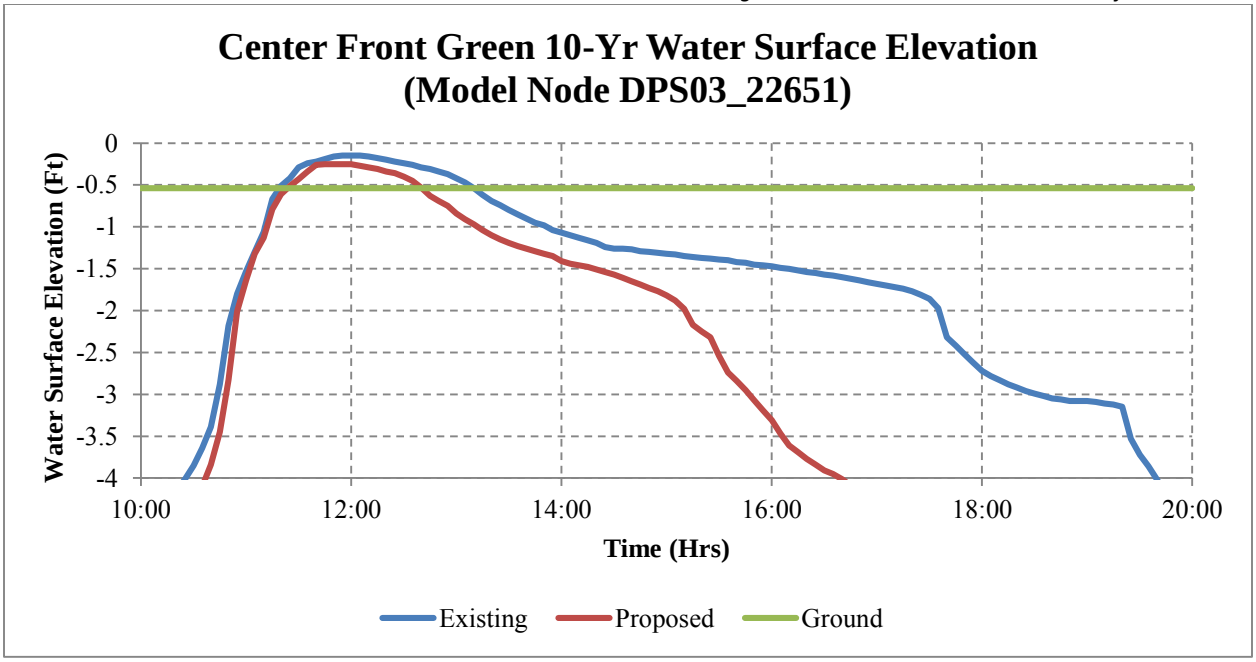
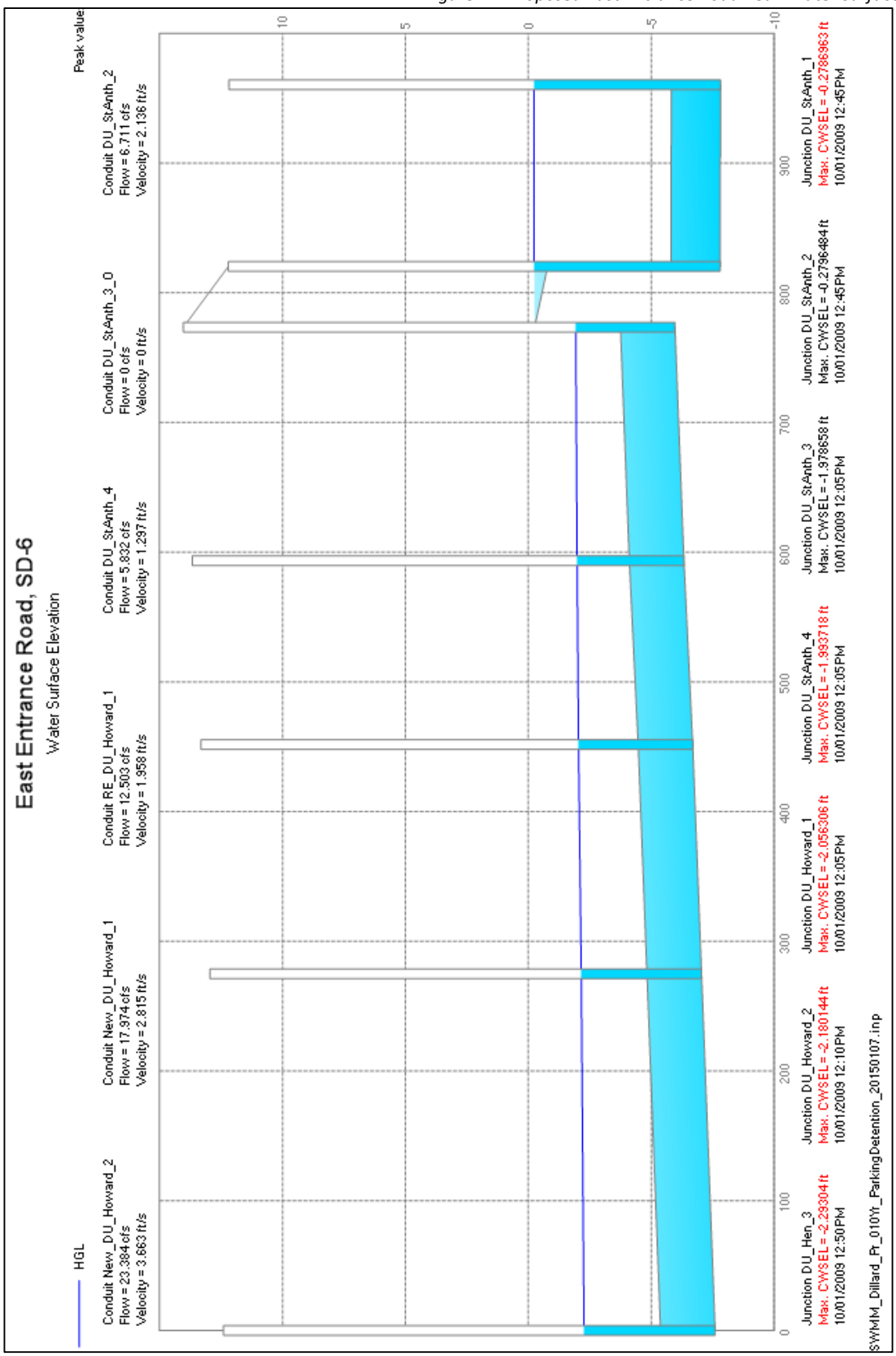


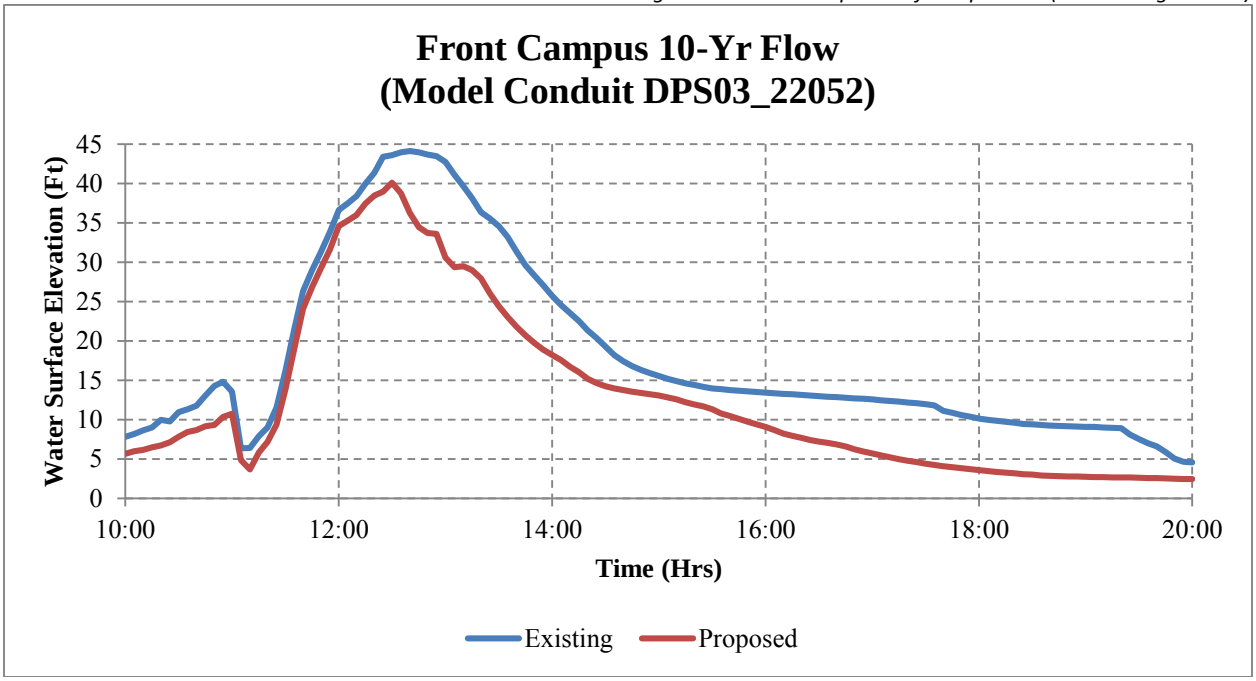
Figure 21: Proposed East Entrance Road Peak Water Surface Profile



Front Campus Outfall Flow Evaluation

The existing and proposed conditions campus outfall pipe flows were evaluated to ensure that flows were not increased. The Front Campus area outfalls to a 36-inch pipe that crosses Gentilly Blvd. to St. Anthony (model link DPS03_22052). The existing and proposed flows for the 10-year design storm are shown in the figure below.

Figure 22: Front Campus Outfall Pipe Flow (10-Yr Design Storm)



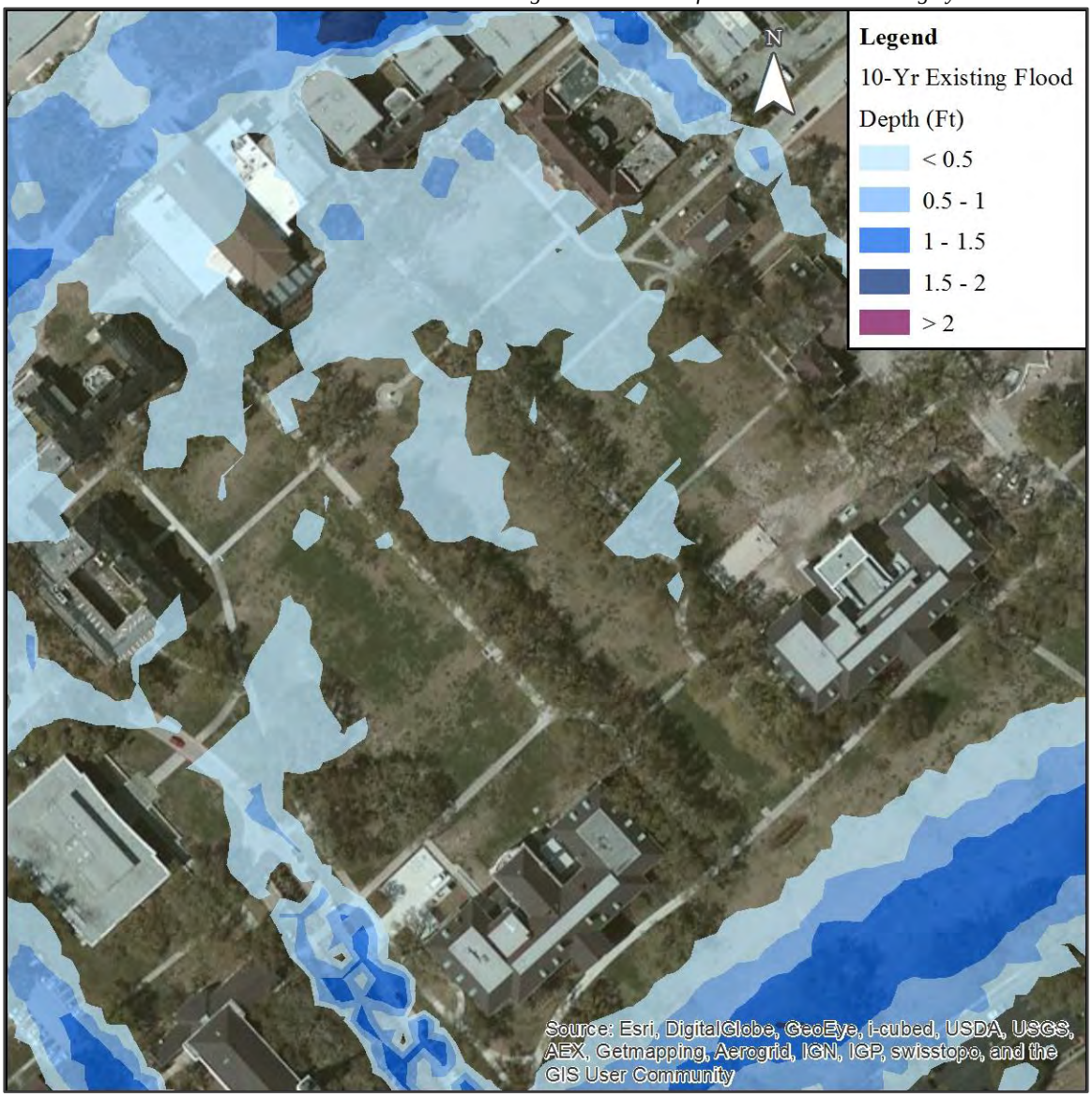
10.0 AVENUE OF THE OAKS AREA STORMWATER MANAGEMENT

The avenue of the oaks subsurface drainage is designated as ***SD-3*** and ***SD-4*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

10.1 Existing Conditions

The stormwater from the existing Avenue of the Oaks drainage area flows, for the most part, overland, downhill from the campus high point between Stern and Rosewald Hall to collect south of Kearny and Williams Halls.

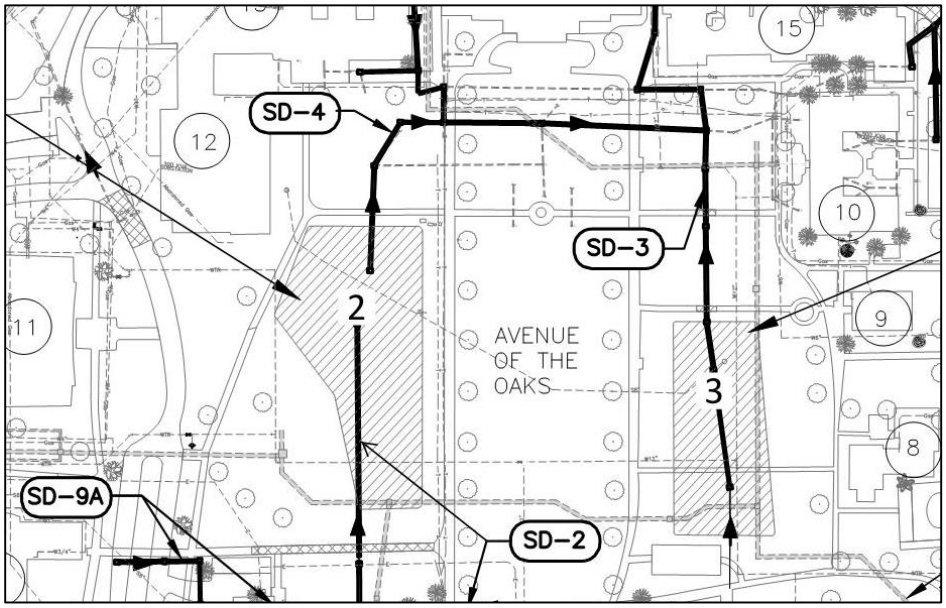
Figure 23: Avenue of the Oaks Area - Existing System Model Results



10.2 Proposed Recommendations

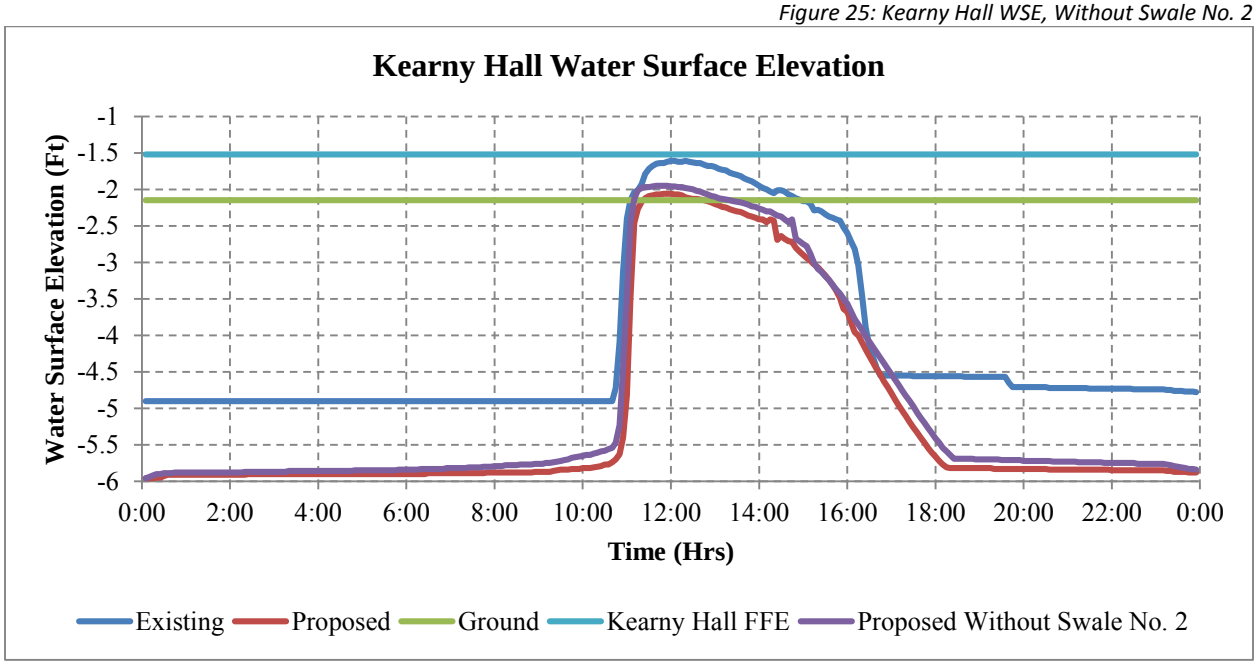
Two detention areas are proposed for the green spaces north of Rosewald and Stern Halls, Swales No. 2 and 3, see ***Figure 24***.

Figure 24: Swale No. 2 and Swale No. 3 Overview Layout



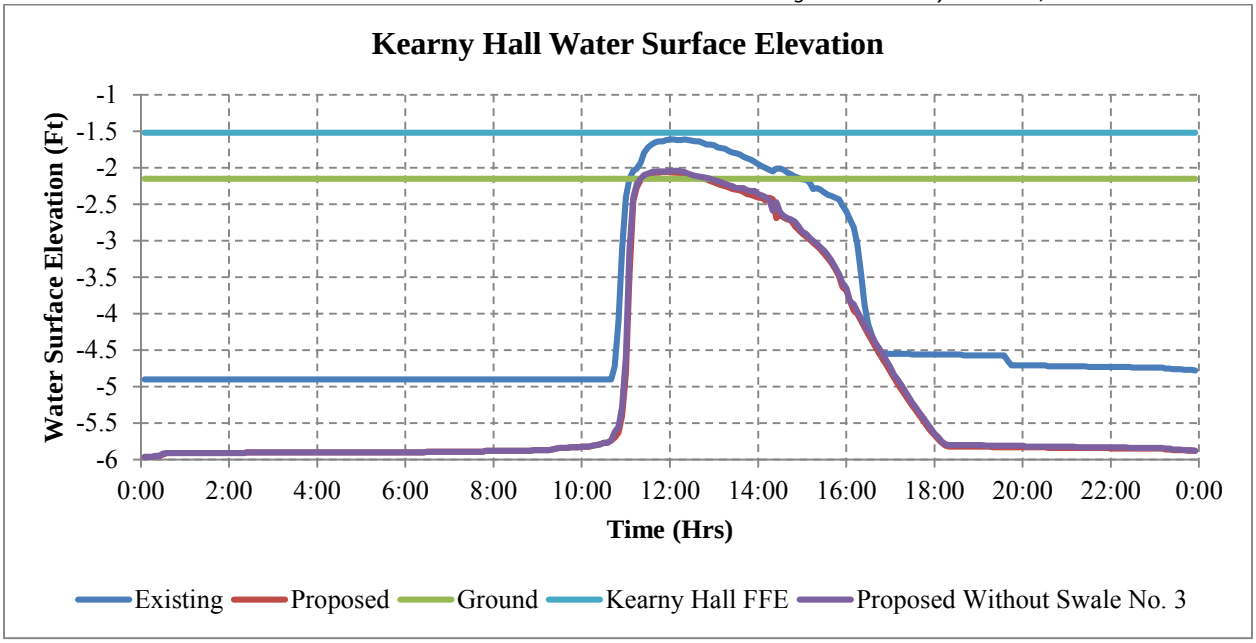
These detention areas are intended to hold the runoff uphill and keep it from collecting as deeply next to Kearny Hall. Analysis of both of the detention ponds effectiveness was completed. Swale No. 2 decreases the water surface elevation at Kearny Hall by 0.2 feet and the length of time that the area remained flooded was decreased by 45 minutes, see ***Figure 25.***

Figure 25: Kearny Hall WSE, Without Swale No. 2



Swale No. 3 has no significant benefits to the water surface elevation at Kearny Hall, see ***Figure 26*** below.

Figure 26: Kearny Hall WSE, Without Swale No. 3



The proposed recommendations reduce the peak water surface elevation south of Kearny Hall from -1.6 to -2.0' during a 10-year design storm.

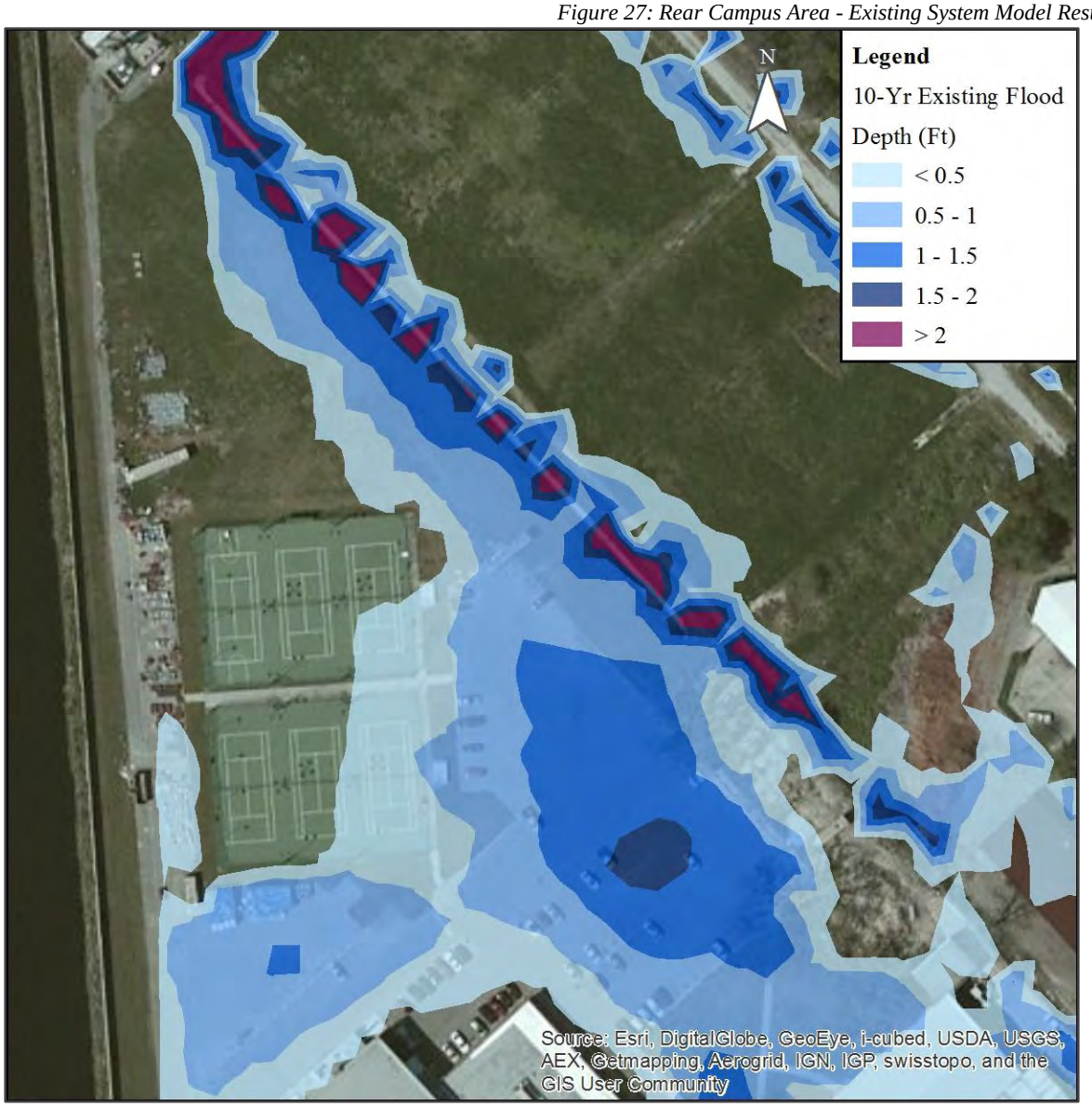
11.0 REAR CAMPUS AREA STORMWATER MANAGEMENT

The rear campus area subsurface drainage is designated as ***SD-5, SD-7, and SD-8*** in the overall map and in preliminary design plan and profile sheets, ***Appendix D***.

11.1 Existing Conditions

The Rear Campus Area sheet flows into the Campus Concrete Ditch moving the water north, then east, and onto the Mandolin Canal. The piped system running parallel to the London Avenue Canal connects to a drainage structure at the bend in the Campus Concrete Ditch and enters the Mandolin canal at that point. The Campus Concrete Ditch conveys the flow from a large portion of the main campus and is therefore a good place to control the flow leaving the campus.

Figure 27: Rear Campus Area - Existing System Model Results



11.2 Proposed Recommendations

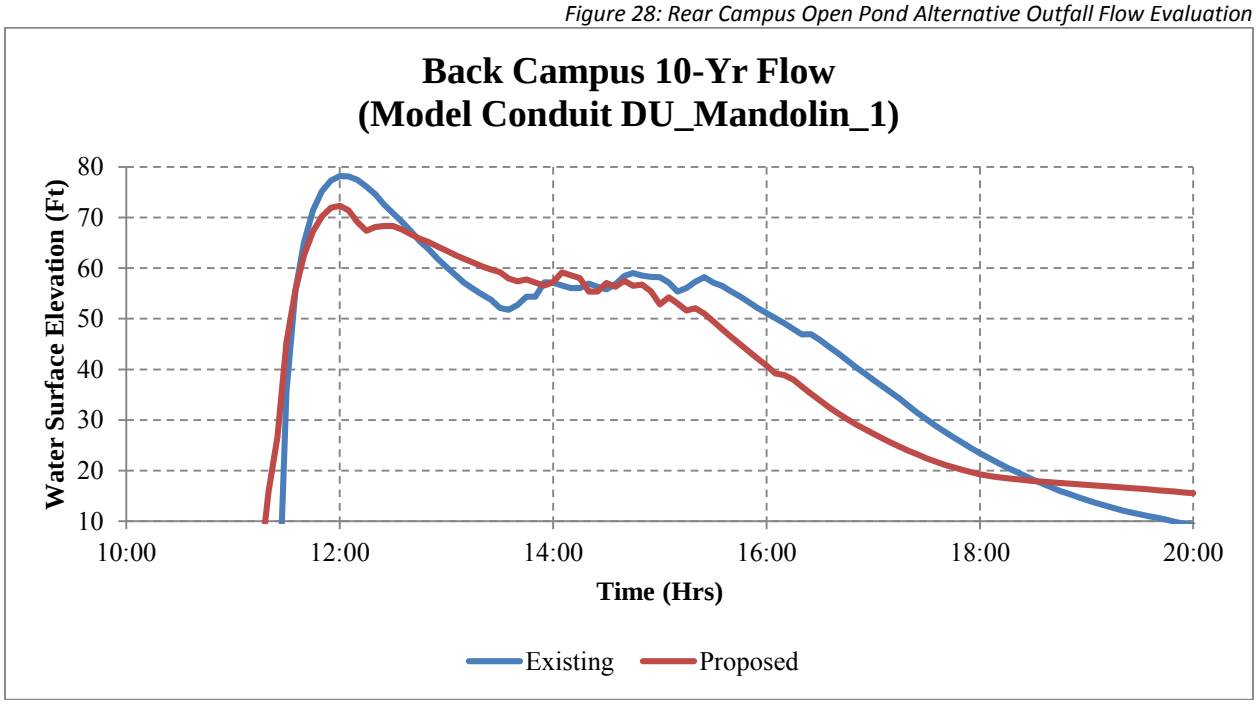
Rear Campus Open Pond Alternative
An approximately 39,000 square foot detention area is proposed to be constructed north of the campus tennis courts. This detention pond will have minimal impact to the reduction of peak flood stage in the rear of the campus, but is required in order to maintain the peak flow leaving the campus so as not to further inundate downstream structures.

This structure will drain as stormwater is pumped out of the city. The City of New Orleans pump stations control the ultimate drainage rate. The Sewerage and Water Board of New Orleans (S&WB) publically states that their pumping capacity is, on average, 0.5-inch per hour. The back of Dillard University is located within Drainage Pump Station (DPS) 04 area, which has a pumping capacity of 3,720 cubic feet per second for 4,410 acres which averages to 0.84-inch per hour, which is greater than the S&WB average. The total depth of rainfall for a 10-year / 24-hour design storm is 8.5 inches, therefore as long as the city collection system can convey at least 0.5-inch per hour, then the detention areas should hold water less than 24 hours.

The campus ditch, in the northeast part of the campus, is also to be modified. It is widened and lined with concrete. The proposed cross-sections of the Campus Ditch can be seen in the preliminary design plans.

Rear Campus Outfall Flow Evaluation, Rear Campus Open Pond
The existing and proposed conditions campus outfall flows were evaluated to ensure that flows were not increased. The Rear Campus area outfalls to an open ditch, the Mandolin Canal (model link DU_Mandolin_1). The existing and proposed flows for the 10-year design storm are shown in the figure below.

Figure 28: Rear Campus Open Pond Alternative Outfall Flow Evaluation



Appendix E

Other Information
(Public Notice, 8-Step, FONSI)

PUBLIC NOTICE
FEMA NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
DRAFT FINDING OF NO SIGNIFICANT IMPACT
HAZARD MITIGATION PROPOSAL FOR
DILLARD UNIVERSITY DRAINAGE PROJECT
NEW ORLEANS, LOUISIANA

Interested parties are hereby notified that the Federal Emergency Management Agency (FEMA) has prepared a draft Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) in compliance with the National Environmental Policy Act (NEPA). The purpose of the EA is to assess the effects on the human and natural environment for hazard mitigation drainage improvements for Dillard University, located in the Gentilly Community of New Orleans, Orleans Parish, LA - a proposed action for which FEMA is considering providing funding assistance.

Dillard University remains at high risk of water inundation from various sources, including flooding, hurricanes, tropical storms, and thunderstorms. As requested by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) and the Dillard University (Applicant), FEMA proposes to fund a hazard mitigation grant project (HMGP) to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Dillard University has undertaken a progressive initiative to address the campus drainage issues. The purpose of this project is to construct low-impact mitigation measures and enhance the campus drainage system's ability to capture, store and convey stormwater runoff during moderate to severe rain events which will aid in protecting existing buildings, infrastructure, property, and daily functions of the university from damages caused by flooding. These FEMA funded mitigation measures would include the increase in length and diameter and realignment of the existing storm drainage pipes into a network of nine (9) subsurface drainage systems. The existing concrete lined ditch would be expanded in length and width to maximize storage capacity and improve conveyance to the Mandolin Canal. This new subsurface system would also connect with three (3) grassed swale storage areas at the center and north end of campus and a triangular shaped detention pond in the northwest corner of campus. A sheet pile wall would be constructed adjacent to the detention pond, parallel to the London Avenue Canal Floodwall. The proposed drainage system improvements would provide more effective capturing, storing, and conveying of rainfall runoff as one overall gravity system.

The purpose of the draft EA is to analyze the potential environmental impacts associated with the preferred action and alternatives. The draft EA evaluates a No Action Alternative; the Preferred Action Alternative, which are the proposed drainage mitigation improvements described above; and an Alternative Action, which is the construction temporary modular floodwall panels and a levee system around the perimeter of the campus as a barrier to high water levels. This floodwall and levee system alternative was dismissed from further consideration due to the high cost that would be incurred by the university to install and remove the floodwall panels prior to and after a storm event, and the potential adverse esthetic, hydrologic, and hydraulic impact on the neighboring community. Impacts to wetlands were also considered in this assessment. The applicant is in the process of securing a permit from the USACE. The applicant is required to comply with all conditions, requirements, and mitigation measures of said permit. The draft EA will not become final until the permit is secured and conditions are incorporated in the EA and FONSI.

The draft FONSI is FEMA's finding that the preferred action will not have a significant effect on the human and natural environment.

The draft EA and draft FONSI are available for review at the Norman Mayer Library at 3001 Gentilly Blvd, New Orleans, LA 70122, Monday - Thursday, 10:00 a.m. – 8:00 p.m.; Friday and Saturday, 10:00 a.m. – 5:00 p.m.; and Sunday 1:00 p.m. – 5:00 p.m. This public notice will run in *The Times Picayune* on Friday, April 15; Sunday, April 17; and Wednesday, April 20, 2016. The notice will also run in *The Advocate-New Orleans* edition Friday, April 15 through Thursday, April 21, 2016. The documents can also be downloaded from FEMA's website at http://www.fema.gov/resource-document-library. There will be a fifteen (15) day comment period, beginning on Friday, April 22 and concluding on Friday May 6, 2016 at 4 p.m. Comments may be mailed to: DEPARTMENT OF HOMELAND SECURITY-FEMA EHP-Dillard University Drainage Mitigation, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802. Comments may be emailed to: FEMA-NOMA@dhs.gov or faxed to 225-346-5848.

Verbal comments will be accepted or recorded at 225-202-5463. If no substantive comments are received, the draft EA and associated FONSI will become final.

8-STEP DECISION MAKING PROCESS (Executive Order 11988)

Dillard University Hazard Mitigation Drainage Improvement Project
Amendment 3, HMGP # 1603-0320 / 1603-071-0036
FEMA Disaster 1603-DR-LA

Executive Order 11988 - FLOODPLAIN MANAGEMENT
Executive Order 11990 - WETLAND PROTECTION

Date: 04/04/2016

Prepared By: Bianca King London, Environmental Protection Specialist

Executive Order (EO) 11988 requires federal agencies "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of the floodplain and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." FEMA's implementing regulations are at 24 CFR Part 9, which includes an eight-step decision making process for compliance with this EO.

While the project appears to be outside the SFHA on the preliminary FIRM (FEMA's best available data), the City of New Orleans has floodplain management requirements that are more restrictive (ABFEs are the locally adopted code). In accordance with EO 11988 (Floodplain Management) and EO 11990 (Wetland Protection), an 8 Step-Process assessment was prepared by FEMA to evaluate the impacts related to the construction of the Proposed Action within the 100-year floodplain (Appendix E). Since the project location is in zone X (shaded), per step 1, this project would have no impact on the 100-year floodplain, so no additional steps need to be assessed. FEMA has determined that no other practicable alternative has been identified that would meet the purpose and need of the project. The proposed action would not either directly or indirectly modify the 100-year floodplain, per preliminary FIRM dated 12/01/2014. The various projects would reduce the duration for above ground surface inundation by storm water, as well as maintain or decrease maximum flood heights during rainfall-runoff events at Dillard University.

The following narrative is applicable to Step 1 in the eight- step process. No further steps are required in this evaluation.

Step 1: **Determine if the proposed action is located in the Base Floodplain.**

Orleans Parish enrolled in the NFIP as of 08/03/1970. Orleans Parish Advisory Base Flood Elevation Maps (ABFEs) were issued June 2006 (FEMA, 2006), and are currently adopted by the Orleans Parish NFIP community for floodplain management purposes. All areas of proposed action and alternatives are outside of the Special Flood Hazard Area, per preliminary Flood Insurance Rate Map, panels 22071C 0114F, 22071C 0227F, and 22071C 0231F, issued 12/01/2014 (Appendix A; no digital data available for effective FIRM dated 1984), which is considered the best available data regarding floodplain inundation at this time. The proposed drainage mitigation sites are located in a shaded zone X with an ABFE 3 ft above the highest adjacent grade (HEAG, with average depths of less than one foot, ground elevation -1.0 ft), base flood elevation undetermined. The London Avenue canal is due west of the proposed mitigation sites.

U.S. Department of Homeland Security
Federal Emergency Management Agency
Region VI - Louisiana Recovery Office
1500 Main Street
Baton Rouge, Louisiana 70802

FINDING OF NO SIGNIFICANT IMPACT
for the
DILLARD UNIVERSITY DRAINAGE IMPROVEMENT PROJECT
NEW ORLEANS, LOUISIANA
HAZARD MITIGATION GRANT PROGRAM
HMGP 1603-0320 / NEMIS 1603-071-0036
FEMA-1603-DR-LA

BACKGROUND

Dillard University is located in Orleans Parish, Louisiana, and is set upon a 55-acre campus filled with live signature oak trees and a mixture of historic buildings and modern facilities. The university is located in the Gentilly community of New Orleans, which is bounded by the London Avenue Canal on the west and Gentilly Boulevard on the south. The topography of the campus is relatively flat with low-lying areas most notably located at the front and rear portions of the campus. The ground surface elevation within the campus ranges from roughly 3 feet above sea level down to 3 feet below sea level in some areas.

As requested by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP, Applicant) and Dillard University (Sub-Applicant), FEMA proposes to fund hazard mitigation drainage improvements on the campus of Dillard University under the Hazard Mitigation Grant Program (HMGP), Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended. The proposed mitigation project would occur in New Orleans, LA on the campus of Dillard University within three corner coordinates (29.999333, -90.068451), (29.992610, -90.068028), and (29.996760, -90.062039).

In accordance with 44 CFR Part 10, FEMA regulations to implement the National Environmental Policy Act (NEPA), a draft Environmental Assessment (EA) was prepared. The purpose of the draft EA was to analyze the potential environmental impacts associated with the drainage improvements and to determine whether to prepare an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI). The need for the proposed action is to protect the people and property within the Dillard University community and improve the existing drainage system - thereby reducing the risk of future damage from flooding. If left unprotected, future storm events have the potential to repeatedly damage structural elements and property on the campus. The alternatives considered include 1) No Action; 2) Overall Drainage System Improvements, Construction of grassed swales, Expansion of Concrete-lined ditch, and Construction of dry detention pond with an Adjacent Sheet Pile Wall (Proposed Action), and 3) Construction of a

Temporary Flood Wall and Levee System (Dismissed Action). Alternative 3 was eliminated from further consideration by university leaders and engineers since it would not solve the repetitive flooding identified on the north and south areas of the campus. Alternative 2 was chosen. This alternative includes the expansion of nine (9) storm drainage lines into an integrated system, the expansion and concrete lining of an existing earthen and concrete lined ditch, the construction of three (3) depressed grassed swale storage areas, and a newly constructed sheet pile wall adjacent to a newly constructed dry detention pond on the north side of campus.

FINDINGS

FEMA has evaluated the proposed project for significant adverse impacts to geology and soils, water resources (surface water, groundwater, and wetlands), floodplains, coastal resources, air quality, biological resources (vegetation, fish and wildlife, Federally-listed threatened or endangered species and critical habitats), cultural resources, environmental justice and socioeconomics (including minority and low income populations), climate change, traffic and transportation, safety, noise, hazardous materials and cumulative impacts. The results of these evaluations as well as consultations and input from other federal and state agencies are presented in the EA.

CONDITIONS

The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds:

- Louisiana Unmarked Human Burial Sites Preservation Act: If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The Applicant shall notify the law enforcement agency of the jurisdiction where the remains are located within twenty-four (24) hours of the discovery. The Applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within seventy-two (72) hours of the discovery.

- Inadvertent Discovery Clause: If during the course of work, archaeological artifacts (prehistoric or historic) are discovered, the Applicant shall stop work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the finds. The Applicant shall inform its, GOSHEP State Applicant Liaison and Hazard Mitigation Assistance contacts at FEMA, who will in turn contact FEMA Historic Preservation (HP) staff. The Applicant will not proceed with work until FEMA HP completes consultation with the SHPO, and others as appropriate.

- Implement construction Best Management Practices (BMPs); install silt fences/straw bales to reduce downslope sedimentation. Area soils must be covered and/or wetted during construction.

- Prior to construction, and in accordance with Stipulation X of the LA HMGP PA, Standard Treatment Measure, X.E.1, Digital Photography (Standard Mitigation Measure) will be implemented according to the terms of the Standard Mitigation Measures Agreement (SMMA), dated January 21, 2016, in order to resolve adverse effects of this undertaking for compliance with Section 106 of the NHPA.

- If fill is stored on site as part of unit installation or removal, the contractor is required to appropriately cover it.

- Applicant is required to coordinate with the local floodplain administrator regarding building permits, clearances, drainage studies, etc. Documentation of all coordination activities with the local floodplain administrator pertaining to this project shall be submitted to the LA GOHSEP and FEMA for inclusion in the permanent project files.

- As per 44 CFR 9.11 (d), mitigation or minimization standards must be applied, where possible.

- Per 44 CFR 9.11(d)(4), until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point within the community. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

- Per 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program.

- New construction must be compliant with current codes and standards. All coordination pertaining to these activities and Applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

- The Applicant is required to obtain and comply with all local, state and federal permits, approvals and requirements prior to initiating work on this project. All coordination pertaining to these activities and Applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

- Care must be taken during the construction process through the appropriate use and maintenance of Best Management Practices (BMPs). Applicant must adhere to all

conditions outlined in Clean Water Act Section 401/404 permits associated with the project.

- In order to minimize impacts to waters of the U.S., the contractor is required to implement BMPs that meet the LDEQ permitting specifications for storm water discharge regulated under Section 402 of the CWA. This includes designing the site with specific construction measures to reduce or eliminate run-off impacts.

- The contractor will be responsible for keeping all excavated areas periodically sprayed with water, all equipment maintained in good working order, and all construction vehicles would be limited to 15 mph to minimize pollution/fugitive dust. In addition, during the storm drain line culvert removal and installation process, the contractor will be responsible for keeping the culvert and drainage system areas covered during non-work hours to prevent water and air erosion during rain events or high winds.

- If the project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.

- LDEQ has storm-water general permits for construction areas equal to or greater than one acre. It is recommended that the LDEQ Water Permit Division be contacted at (225) 219-3181 to determine whether the proposed improvements require one of these permits.

- All precautions must be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one (1) acre. The applicant must contact the LDEQ Water Permits Division at 225-219-9371 to determine if the proposed project requires a permit. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx.

- Any changes or modifications to the proposed project would require a revised determination. Off-site locations of activities such as borrow, disposals, haul-and detour-roads and work mobilization site developments may be subject to the Department of the Army regulatory requirements and may have an impact to a Department of Army project.

- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the United States Army Corps of Engineers (USACE), USACE should be contacted directly to inquire about the possible necessity for permits. If a USACE permit is required, part of the application process may involve a water quality certification from LDEQ.

- All precautions should be observed to protect the groundwater of the region.

- Please be advised that water softeners generate wastewaters that may require special limitations, depending on local water quality considerations. Therefore, if water system improvements include water softeners, the Applicant is advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

- Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies. Applicant is responsible for acquiring LDEQ permits for the temporary debris staging and reduction sites (TDSRS) associated with this project prior to project closeout. Failure to provide FEMA with LDEQ approval may jeopardize project funding eligibility.

- Mitigation and abatement measures would be required to reduce the noise levels to a range that would be considered acceptable. The applicant must comply with the local ordinance.

- The work shall be accomplished in accordance with vicinity maps and drawings provided to the USACE.

- The sheet-pile wall should be installed prior to the excavation of the retention pond to avert any complications from seepage concerns. The applicant must have a mandatory order of work in which the installation of the sheet-pile should precede any work on the excavation of the detention pond.

- Any damage to the floodwall and/or levee right-of-way resulting from the applicant's activities shall be repaired at the applicant's expense.

- If changes in the location or section of the existing floodwall, or in the generally prevailing conditions in the vicinity, be required in the future in the public interest, the applicant shall make changes in the project concerned, or in the arrangement thereof, as may be necessary to satisfactorily meet the situation and shall bear the cost thereof.

- The applicant must provide written notification to the USACE of the construction timeline to include the start and end dates. Additionally, the applicant must notify USACE prior to the commencement and prior to the completion of the approved scope of work.

CONCLUSIONS

Based upon the incorporated EA, and in accordance with Presidential Executive Orders 12898 (Environmental Justice), 11988 (Floodplain Management), and 11990 (Wetland Protection), FEMA has determined that the proposed action implemented with the conditions and mitigation measures outlined above and in the EA will not have any significant adverse effects on the quality of the natural and human environment. As a result of this FONSI, an Environmental Impact Statement will not be prepared (44 CFR §10.8) and the proposed action alternative as described in the EA may proceed.

APPROVALS

JERAME J CRAMER

Digitally signed by JERAME J CRAMER
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05/31/2016

Jerame J. Cramer — Date
Environmental Liaison Officer,
Louisiana Recovery Office, Region VI
FEMA 1603-1607-DR-LA

Digitally signed by THOMAS M WOMACK
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Thomas M. (Mike) Womack — Date
Director of the Louisiana Recovery Office
FEMA 1603-1607-DR-LA