Draft Environmental Assessment

Eastwood Storm Line Drainage Improvements Slidell, LA

St. Tammany Parish, Louisiana
HMGP 1603-0321

FEMA-1603-DR-LA

May 2015

FEMA

U.S. Department of Homeland Security
Louisiana Transitional Recovery Office
Baton Rouge, Louisiana 70802

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LIST OF ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BMP	Best Management Practices
CAA	Clean Air Act
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resources System
CUP	Coastal Use Permit
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DEA	Draft Environmental Assessment
DFIRM	Digital Flood Insurance Rate Map
EDP	Eastwood Drainage Project
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness
HMGP	Hazard Grant Mitigation Program
HH	Hydrologic and Hydraulic
LKS	Lakewood Subdivision
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LSB	Louisiana State Brownfield
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Services
OPA	Otherwise Protected Area
RCBC	Reinforced Concrete Box Culvert
RCRA	Resource Conservation and Recovery Act
RCP	Reinforced concrete pipe
RHA	Rivers and Harbors Act
SHPO	State Historic Preservation Office/Officer
SOW	Scope of Work
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
WSRA	Wild and Scenic Rivers Act

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1.0 INTRODUCTION

1.1 Project Authority

Hurricane Katrina, a Category 4 hurricane with a storm surge above normal high tide levels, moved across the Louisiana, Mississippi and Alabama Gulf Coasts on August 29, 2005. 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) on August 29, 2005, 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. Section 404 and Section 406 of the Stafford Act authorizes FEMA's Hazard Mitigation Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration.

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA); the President's Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508); and FEMA's regulations implementing NEPA (44 CFR 10.9). The purpose of this EA is to analyze potential environmental impacts associated with drainage improvements for the Eastwood area/ Lakewood Subdivision of St. Tammany Parish, Louisiana. FEMA will 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 Project Location

St. Tammany Parish is located in the Northshore area of Southeast Louisiana. It is approximately 854 square miles, bordered to the east by Pearl River, to the south by Lake Pontchartrain, and to the west by the Tchefuncte River. The City of Slidell is located in the southeastern tip of St. Tammany Parish, and is the parish's largest municipality with approximately 27,068 people according to 2010 Census figures. It is approximately three miles from the north shore of Lake Pontchartrain (Figures 1 and 2). Three major highways, I-10, I-12, and I-59, form a "cross roads" in the city. Slidell is approximately 30 miles from New Orleans, Louisiana and 82 miles from Baton Rouge, Louisiana. The project is located in the southeastern portion of St. Tammany Parish, northeast of Slidell. The specific site for the proposed drainage improvements for the Lakewood Subdivision and surrounding residences is along the 1500 block of Fremaux Avenue in Slidell, LA (Figure 3). The proposed drainage improvements would start at the 1500 block of Fremaux Avenue near Beth Drive (30.277555, -89.762260) and end past Fremaux Avenue, a short distance southeast of Marsha Drive. The proposed drainage improvements in this residential area would end on the east side of Fremaux Avenue, east of Marsha Avenue, with outfall at an unnamed stream (Figure 4). The GPS coordinates for the proposed work are (30.277555, -89.762260) start, and (30.277626, -89.758622) end.

Figure 1: Location of Slidell, St. Tammany Parish, LA
(FEMA, May 2015)

Aerial View – Eastwood Project Area
Lakewood Subdivision
St. Tammany Parish - Slidell, LA

Latitude 30.277555, Longitude -89.762260

Figure 2: Aerial View of Project Area, St. Tammany Parish, LA
(FEMA, May 2015)

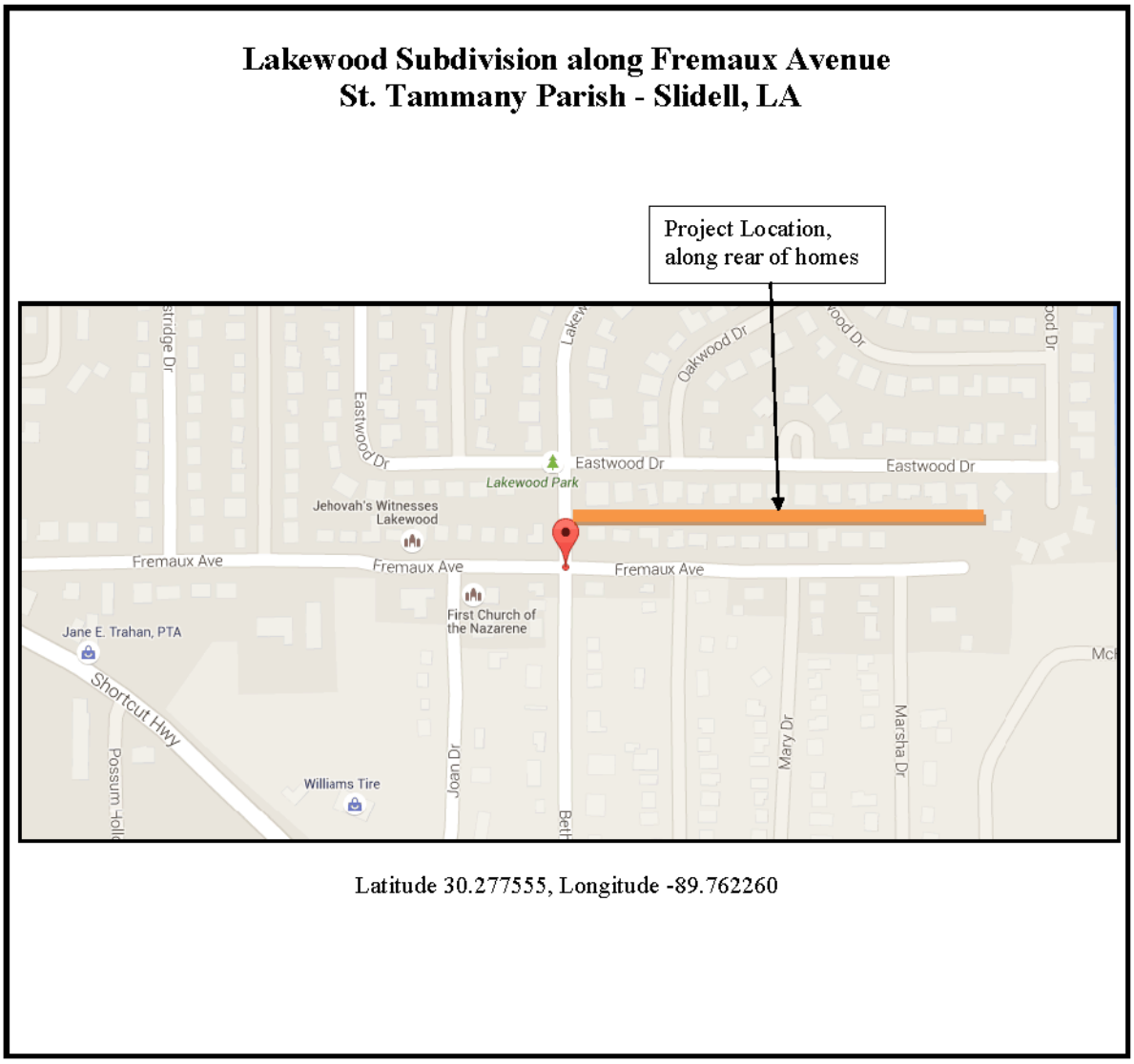

Figure 3: Street Map View of Proposed Project Location, St. Tammany Parish, LA (FEMA, May 2015)

Drainage Improvements, Connection to Outfall

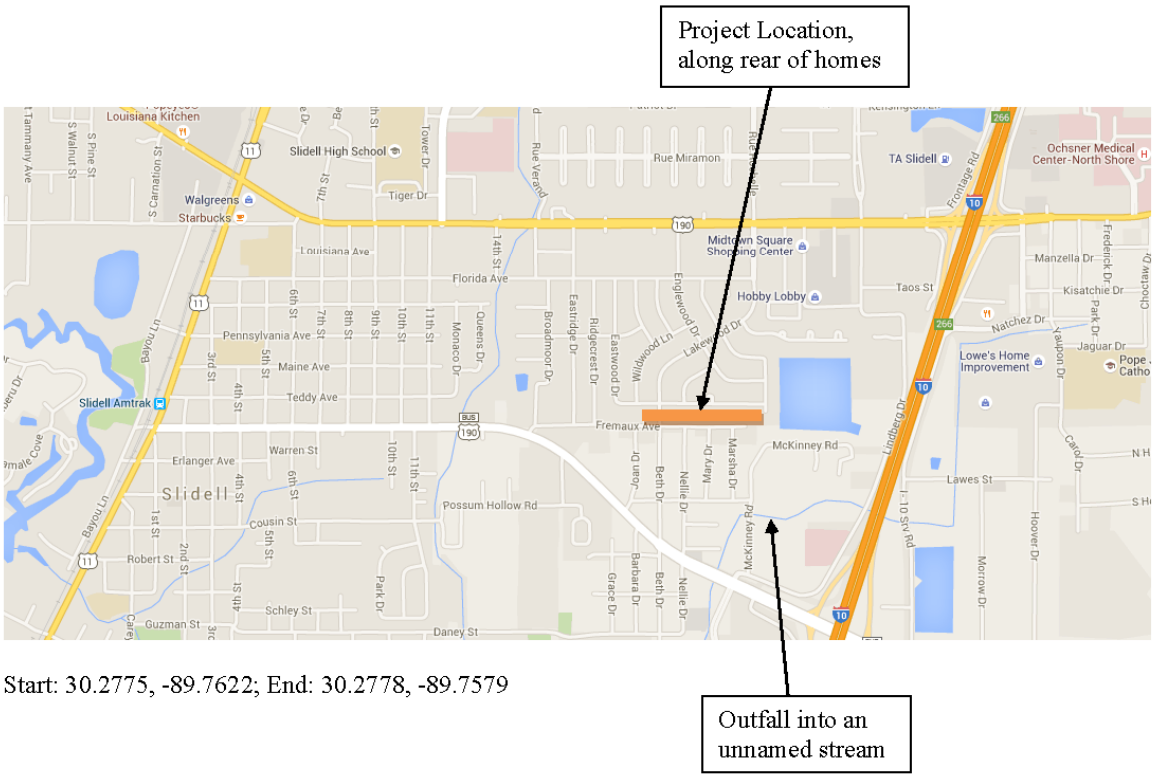

Figure 4: Drainage Improvements, Connection to Outfall, St. Tammany Parish, LA (FEMA, May 2015)

1.3 Site Description

Lakewood and the surrounding subdivisions are densely populated residential areas located in the southeastern portion of St. Tammany Parish, Louisiana. (See Appendix A for site photos). The culverts are located at Eastwood Drive in Slidell, St. Tammany, Louisiana. This culvert is approximately 1600 feet in length and was constructed in the 1970s. Failure of this culvert would cause blockage of the Eastwood storm drain lines, which are located in a dense residential area. Structures that would be affected by flooding include 340 residences. During rainfall events, the surface streets experience significant flooding, a major safety hazard. Detailed maps of the area, as well as a map depicting its location within the subdivision are found in Figures 1 – 5.

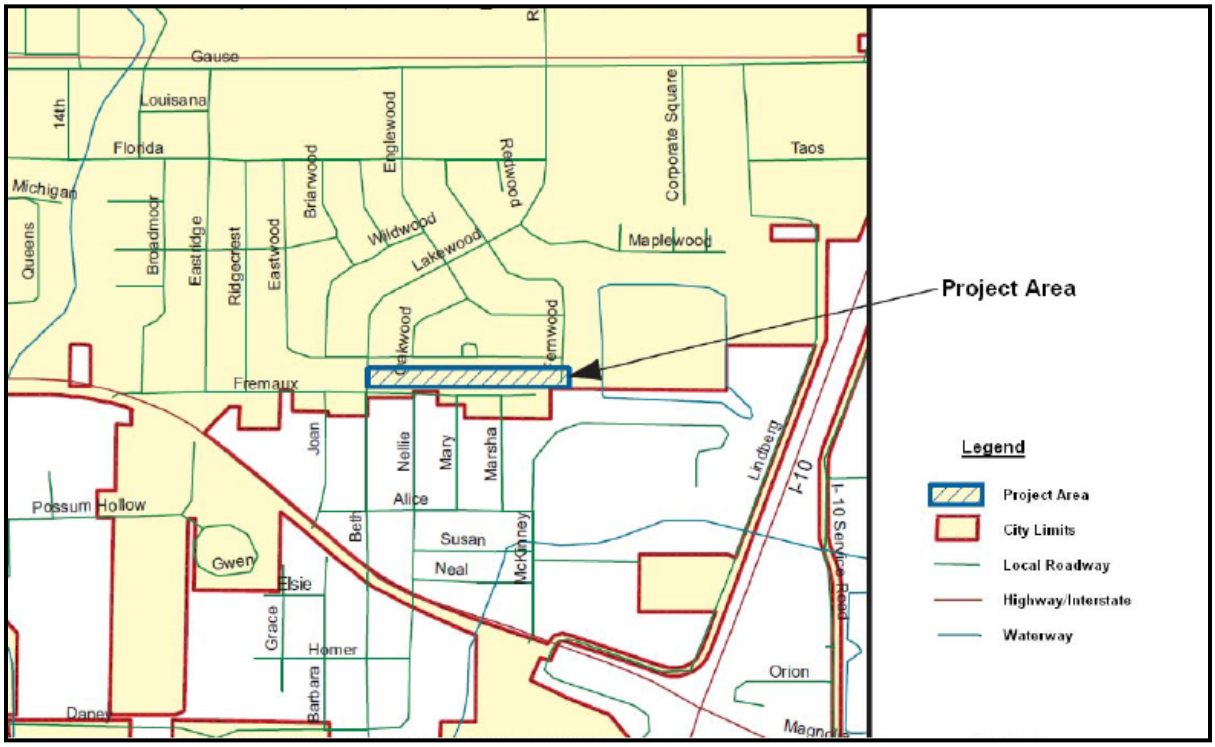

Figure 5: Map of Project Area Within Slidell City Limits
(Richard C. Lambert Consultants L.L.C., February 2015)

2.0 PURPOSE AND NEED

The proposed Eastwood Drainage Improvement project site has experienced major flooding during storm events in 2005 ($9,925,327), 2001 ($4,207,791), and 1995 ($3,174,530). The combined amount of reported damages for those three storms totaled $17,382,321. Additionally, the cost of repair or rebuilding in the City of Slidell area increased progressively from one storm year event to the next. According to the City of Slidell's HMGP Application, the proposed drainage improvement mitigation project is for protection of the people and property within the project watershed area. If left unprotected, future storm events have the potential to repeatedly damage homes and property in this area. To mitigate

this residential area from future floods, FEMA is proposing to participate in funding St. Tammany Parish's application to improve storm drainage line in this heavily populated residential area. The drainage systems and pump stations currently support storm water drainage for the residents of the surrounding subdivisions and businesses of the area. The culverts and pump stations are maintained by the City of Slidell Public Works Department. Reports from city representative assert that the current box culverts, constructed in the 1970s, have reached the end of its useful life. The reports also describe the culverts as having substandard construction, undersized, in poor condition and in need of replacement with higher quality materials. Failure of the Eastwood culvert would cause road collapse and blockage of the Eastwood Storm Drain, which is located in the dense residential and high traffic area. Structures that would be affected by future flooding include 340 residences in the immediate area and 1,220 residences in the surrounding area. During rainfall events, the streets flood, causing a major safety hazards and road closures. Currently, the area roads may be closed during periods of heavy rainfall. City Officials believe that a larger sized box culvert, a 5' x 8' for example, would be needed and would decrease the flooding that occurs in the immediate and surrounding watershed area. The proposed project is expected to provide flood protection from the 100-year event. All culvert elevations would be determined in the final design. Successful implementation of the proposed drainage improvement project would ensure that new culverts are designed to handle the peak flow event and prevent potential residential flooding during intense rainfall events.

3.0 ALTERNATIVES CONSIDERED

3.1 Alternative 1: No Action

Implementation of the No Action Alternative would entail no hazard mitigation measures for the Lakewood Subdivision and surrounding residential areas. Consequently, this alternative would not provide any type of protection to residents of the area during peak flow events or other emergency situations. Under this alternative, water damage would likely continue to occur and both insured and uninsured losses would be experienced. This alternative would perpetuate the "damage-repair-damage" cycle thus requiring additional funding to be drawn from the National Flood Insurance Program (NFIP) as well as depleting local and National disaster funds.

3.2 Alternative 2: Eliminated from Further Consideration

Storm Line Drainage Improvements along Eastwood. Alternative 2 includes the filling and plugging of the existing 36' RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete culvert along Eastwood Drive. The existing 3' x 8' box culvert would be removed and replaced with dual 5' x 8' reinforced concrete box culverts. This Alternative would require the removal and replacement of half the roadway and all conflicting sidewalks and driveways along Eastwood Drive. This item would require the removal and replacement of water and sewer service lines along the roadway. If this alternative were chosen, increased cost would be incurred because of the large amount of concrete roadways, sidewalks, and driveways required for removal and replacement. Therefore, this alternative was not considered cost effective and will not be carried forward.

3.3 Alternative 3: Proposed Action

Storm Line Drainage Improvements along Fremaux. The preferred alternative is the filling and plugging of the existing 36" RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. The 36" RCP and 32" x 36" box culvert drain lines would be abandoned in place, plugged at the ends of the lines, and filled with excavatable flow-able fill. The drainline would be replaced with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. In addition, 146 linear feet of 42" RCP would be installed and connected to the existing drainage along Lakewood Drive to the new Fremaux drainage. An extension of the existing box culvert with dual 5' x 8' reinforced concrete box culverts would not be required. During design, it was determined that the 5' x 8' RCBC was not necessary; only the headwall at the outfall of the existing 2' x 9' box culvert would be required. This alternative would require the removal and replacement of the southern half of the asphalt street with mill and asphalt overlay on the remaining portion of the street; and the removal and replacement of portions of the sidewalks and driveways along Fremaux Avenue. Servitudes have been obtained in order to connect a section of the existing drainage system from Eastwood Drive into the new drain line along Fremaux Avenue. The approximate GPS coordinates along the rear of homes on Fremaux Avenue at the beginning of the project are (30.277957, -89.762255) and (30.277817, -89.757901) at the end of the project. The project replaces existing drainage that currently runs along the rear of lots from Fremaux Avenue with drainage that will be installed within the ROW of Fremaux Avenue.

The scope of work for this alternative also required the acquisition of four (4) five (5) foot wide drainage servitudes. The applicant has already acquired the servitudes and no additional acquisition of servitudes or right-of-ways are anticipated. This alternative does not require temporary access roads to be constructed. Furthermore, the applicant does not anticipate the demolition of residential or commercial structures. The applicant's preferred alternative, appears to be the most economical because the majority of the drain line will be placed in an existing drainage ditch which limits the amount of asphalt roadway to be removed and replaced. Such improvements to the outdated and substandard drainage systems, will not adversely affect the environment or historic resources due to proposed safety measures and BMPs to be taken to minimize and mitigate any potential and/or minor impacts.

New drain lines and box culverts will be installed by excavation of existing ground, installing new drainage and backfilling with granular material. New ground disturbance will be approximately 0.302 acres at an average cut depth of 8 feet. The pre-existing system would be before any drainage was ever installed and thus nonexistent other than natural drainage channels. The existing system capacity is inadequate. The proposed drainage plan was designed to reduce surface street flooding for the 10, 25, 50, and 100 year storms. The proposed 4' x 6' RCBC will discharge into the Lakewood Canal which flows to the W-14 Canal. Design plans, maps, and site photos included as attachments illustrate the work to be completed. The scope of work will not require the applicant to acquire structures for demolition, or right-of-ways. Servitudes have already been acquired. No additional right-of ways or residential or commercial structure demolition are anticipated. Additionally, the project does not require temporary access roads to be constructed.

For the proposed action, the downstream impacts of the H&H Drainage Report states that due to an existing drainage structure at Shortcut Highway, the impacts downstream of the improvements will have negligible surface water increases. The study model estimates that water surface profile elevations for the 100 year storm could rise from elevation 10.1 for the existing condition to 10.2 for the improved conditions. The water surface profile for the 25 year storm is estimated to rise from elevation 9.8 to 10.0. The variation of the inundation area within the developed areas appears to be minimal (See Appendix D).

4.0 AFFECTED ENVIRONMENT AND IMPACTS

4.1 Impact Summary

The following matrix summarizes the results of the environmental review process (Table 1). Potential environmental impacts that were found to be negligible are not evaluated further. Resource areas that have the potential for impacts of minor, moderate, or major intensity are further developed in the following sections. Definitions of the impact intensity are described below:

Negligible: The resource area (e.g., geology) would not be affected, or changes would be either non-detectable or if detected, would have effects that would be slight and local. Impacts would be well below regulatory standards, as applicable.

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.

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 are being altered on a short-term basis. Mitigation measures would be necessary and the measures would reduce any potential adverse effects.

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, though long-term changes to the resource would be expected.

Table 1: Affected Environment and Environmental Consequences Matrix

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Geology and Soils	Yes	No	No	No	Potential for short-term localized increase in soil erosion during construction. NRCS policy clarifies several activities that are not subject to the rules and regulations of the Farmland Protection Policy Act (FPPA)- Subtitle I of Title XV, Section 1539-1549 of Public Law 97-98, which was published in the Federal Register on June 17, 1994. The third exception item is "Projects on land already in urban development or used for water storage."	Construction contractor would be required to obtain applicable LPDES permit, and implement storm water pollution prevention plan.	Implement construction Best Management Practices (BMPs); install silt fences/straw bales to reduce sedimentation. Area soils would be covered and/or wetted during construction. If fill is stored on site as part of unit installation or removal, the contractor would be required to appropriately cover it. Construction contractor would be required to obtain a Louisiana Pollutant Discharge Elimination System (LPDES) permit, if applicable, and implement stormwater pollution prevention plan. The LDEQ has stormwater general permits for construction areas equal to or greater than one (1) 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 precaution should be observed to control nonpoint source pollution from construction activities.
Hydrology and Floodplains (Executive Order 11988)	Yes	No	No	No	Preliminary Flood Insurance Rate Maps were reviewed on FEMA's web site. The project site is located within Shaded Zone X, outside zones AE (EL11, 12, 13, 14) and unshaded X. Phase II of the project, once completed, would provide long-term protection against the 10, 25, 50, & 100-year flood for the project area without significantly increasing flooding in areas upstream or downstream of the project area.	8 Step completed and attached.	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.

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Wetlands (Executive Order 11990)	Yes	No	No	No	No USFWS-mapped wetlands are present in the proposed project area. No apparent wetlands were observed during the FEMA site visit to the proposed project site.	SOV sent to USACE, 05/05/15. Awaiting response. Consultation Period ends 06/05/15 (See Appendix E)	Any changes or modifications to the proposed project will 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.
Surface Water and Water Quality	No	Yes	No	No	Potential for short-term localized increase in sedimentation during construction.	SOV sent to LDEQ on 05/05/15. Awaiting response. Consultation Period ends 06/05/15. LDEQ be consulted regarding the need for a LPDES permit to be obtained by construction contractor. (See Appendix E)	Contractor is responsible for contacting the LDEQ to determine if a LPDES permit is required. If required, the contractor must follow all requirements of the LPDES permit. Implement construction BMPs, install silt fences/straw bales to reduce sedimentation.
Groundwater	No	Yes	No	No	According to NEPAssist (EPA internet resource), the St. Tammany Parish project area overlies a Sole Source Aquifer.	SOV sent to the EPA-Region 6 on 05/05/15. Awaiting response. (See Appendix E)	The contractor should observe all precautions to protect the groundwater of the region.
Coastal Resources	No	Yes	No	No	St. Tammany Parish lies entirely within the Louisiana Coastal Zone and the proposed project may be subject to the rules and regulations of the CZMA. The project is not located within the CBRS.	SOV sent to LDNR, CZMP on 05/05/15. Consultation period ends 06/05/15. (See Appendix E)	The applicant is responsible for coordinating with and obtaining any required permit(s) from the Louisiana Department of Natural Resources' (LDNR) Coastal Management Division (CMD) prior to initiating work. The applicant shall comply with all conditions of the required permit. 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 file.
Threatened and Endangered Species (Endangered Species Act Section 7)	Yes	No	No	No	No impact to federally listed threatened or endangered species is anticipated. No impacts to critical habitats are anticipated.	SOV sent to USFWS on 05/05/15. Awaiting response. Consultation period ends 06/05/15. (See Appendix E)	There will be no impacts to any listed threatened/endangered species.

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Cultural Resources (National Historic Preservation Act Section 106)	Yes	No	No	No	The Scope of Work (SOW) for the proposed Eastwood Drainage Improvements Project APE meets allowances defined in the Louisiana State-Specific Programmatic Agreement Regarding FEMA's Hazard Mitigation Grant Program dated January 31, 2011 (2011 LA HMGP PA), Appendix C: Programmatic Allowances, Items I.A., II.B.1, V.D., and V.G. In accordance with Stipulation VI.A of the 2011 LA HMGP PA, FEMA may document this determination in the project file and authorize funding for the undertaking without further Section 106 review. The applicant must comply with the Louisiana Unmarked Human Burial Sites Preservation Act.	Referenced in SHPO/Tribal Consultation dated 5/15/2015.	If archaeological artifacts or features (prehistoric or historic) or human remains are discovered during the course of FEMA funded work at the project site, the Applicant must ensure that their Contractor stops work in the vicinity of the discovery and takes all reasonable measures to avoid and minimize harm to the discovery. The Applicant shall inform the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) and FEMA of the discovery, and FEMA would deploy an archaeologist to the location to conduct a site condition assessment. The Applicant would not proceed with work until FEMA has completed consultation with the SHPO on the treatment of the discovery. The local Coroner's Office would assess the nature and age of the human skeletal remains. If the Coroner's Office determines that the human skeletal remains are older than 50 years of age, the Louisiana Division of Archaeology would take jurisdiction over the remains. Within twenty-four (24) hours, FEMA would notify the Louisiana Division of Archaeology (225-342-8170) of the finding. Within seventy-two (72) hours, FEMA would take the lead in working with the Louisiana Division of Archaeology and other interested parties, as necessary, to ensure compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 *et seq.*) and other applicable laws. In addition, the Applicant must afford FEMA the opportunity to comply with the "Human Remains Policy" set forth by the ACHP.

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Environmental Justice (Executive Order 12898)/Socioeconomics	Yes	No	No	No	According to the U.S. Census Bureau, Estimated Data for 2013, the City of Slidell is comprised up of 79.8% White, 17.6% Black or African American, and 7.5% Hispanic or Latino. The median family income in 2013 was $48,122, and 16.3% of families earn incomes below the poverty level.	See References	The mitigation improvements will benefit all communities and would not adversely impact any populations.

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Resource Recovery and Conservation Act (RCRA)	Yes	No	No	No	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 metal and concrete piping and wingwall. All debris would be disposed of at a permitted landfill.	SOV sent to LDEQ on 05/05/15. Awaiting response. Consultation Period ends 06/05/15.	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 at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents. Regardless of the asbestos content, the applicant is responsible for ensuring that renovation or demolition activities are coordinated with the LDEQ. Demolition activities related to possible Asbestos-Containing Materials (PACM) must be inspected for ACM/PACM where it is safe to do so. Should Asbestos Containing Materials (ACM) be present at the project site, the applicant is also responsible for ensuring proper disposal in accordance with the previously referenced administrative orders. ACM/PACM must be handled in accordance with local, state and federal regulations and disposed of at approved facilities that accept ACM. Demolition activity notification must be sent to the LDEQ before work begins. The applicant is responsible for complying with the Toxic Substances Control Act (TSCA) Section 402(c)(3) requirements as well as to the satisfaction of the governing local, state, and federal agencies to ensure that project activities are managed, administered, and/or handled by certified/accredited technicians, contractors, and providers. The applicant is responsible complying with all local, state, and federal laws and ensuring that project activities are coordinated with the LDEQ for abatement activities

Resource Area	Negligible Impact Intensity	Minor Impact Intensity	Moderate Impact Intensity	Major Impact Intensity	Impact Summary	Agency Coordination / Permits	Mitigation
Noise	No	Yes	No	No	During the construction period there will be a short-term increase in noise levels.		The applicant is required to comply with the noise ordinance for St. Tammany Parish.
Traffic and Transportation	No	Yes	No	No	Traffic volumes along the respective work areas would increase temporarily during work activities. Railroad traffic will be impacted during work in the active railroad area.		Contractor would coordinate with the owner of the railroad to minimize disruption to rail traffic. 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 would implement traffic control measures, as necessary.
Hazardous Materials and Toxic Wastes	Yes	No	No	No	EPA and Louisiana LDEQ hazardous materials database searches queried. No sites of concern were identified by the database search. No environmental conditions of concern observed during field reconnaissance. No impacts related to hazardous materials and wastes are anticipated. No oil, gas, or registered active wells are located within the project area.	SOV sent to EPA and LDEQ on 05/05/15. Awaiting response. Consultation period ends 06/05/15. (See Appendix E)	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.

4.2 Geology and Soils

The Farmland Protection Policy Act (FPPA: P.L. 97-98, Sections 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. To implement the FPPA, federal agencies are required to develop and review their policies and procedures every two (2) years. The FPPA does not authorize the federal government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.

The Natural Resources Conservation Service (NRCS) is responsible for protecting significant agricultural lands from irreversible conversions that result in the loss of essential food or environment sources. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Prime farmland is characterized as land with the best physical and chemical characteristics for production of food, feed, forage, fiber and oilseed crops (United States Department of Agriculture, USDA 2013). Farmland subject to FPPA requirements does not have to be currently used for cropland; it can be forest land, pastureland, cropland, or other land, but not water or built-up land.

According to the *Soil Survey of St. Tammany Parish, Louisiana*, the Parish consists of four (4) physiographic areas: the forested terrace uplands, the broad terraces (Gulf Coast Flatwoods), the narrow floodplains of major streams, and the marshes and swamps. Elevation in the Parish ranges from approximately 200 feet above sea level on the terrace uplands to approximately 5 feet below sea level in the former marshes and swamps. The soil type found at the Lakewood Subdivision site is Prentiss fine sandy loam, 0 -1% slopes (Pr).

Prentiss fine sandy loam is a level, moderately well drained soil that contains fragipan. The slope is zero to one percent and has low fertility and high levels of exchangeable aluminum which is potentially toxic to most crops. This soil is considered to have a medium rate for runoff, with a seasonal high water table that is perched above the fragipan at a depth of 2 to 2.5 feet from January to March. The soil is mainly used as woodland and well suited to pasture, but only moderately suited for crops and urban uses.

Alternative 1- No Action: The No Action alternative would not affect any Prime and Unique Farmland

Alternative 2- (Proposed Action): The Proposed Action Alternative would temporarily impact soils. The soil would be exposed during grading, foundation work and installation of drain lines and culverts. Additionally, the project would result in the compaction of the underlying soil. The soil around the construction site could be more susceptible to erosion if adequate drainage and vegetation is not used.

After consultation and consideration of potential impacts to soil and geology, it was determined that implementation of the proposed project would result in no impacts. Soil erosion during construction would be minimized by the implementation of Best Management Practices (BMPs), such as using silt fencing, covering stockpiled soils, mulching cleared areas, and regenerating with native species. The applicant is expected to use BMPs to minimize impacts to soil.

4.3 Water Resources

4.3.1 Surface Water

Drainage for storm water runoff is provided by a few ponds that are located on and around the property along with Bayou Liberty. From here the water runs to Lake Pontchartrain (Figure 3).

Alternative 1- No Action: The No Action alternative would not change site drainage or have an effect on the surface water quality of the area.

Alternative 2- Proposed Action: During construction there is the potential to impact surface waters through minor erosion and runoff. Storm water runoff could carry sediment offsite into the receiving wetlands, bayous and lakes. In order to minimize impacts to waters of the U.S., the contractor is required to implement Best Management Practices (BMPs) that meet the Louisiana Department of Environmental Quality's (LDEQ) permitting specifications for storm water discharge regulated under Section 402 of the Clean Water Act (CWA). This includes designing the site with specific construction measures to reduce or eliminate run-off impacts. Any adverse effects to water quality associated with the construction of the projects would be short term and minimized by the measures described above. There would be no long-term effects to water quality because once structures are in place, natural vegetation will reemerge.

4.3.2 Waters of the U. S., including Wetlands

The United States Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to Section 404 of the CWA. USACE also regulates the building of any structures in waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act (RHA). Bayou Liberty borders the property to the north, east, and south. There are no wild and scenic rivers, as designated under the Wild and Scenic Rivers Act (WSRA), in or near the property.

Jurisdictional wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The property contains Freshwater Emergent wetlands to the south and east of the property. Jurisdictional wetland determinations are regulated by the

USACE pursuant to the CWA. In addition, Executive Order 11990, Protection of Wetlands, directs federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands.

Alternative 1- No Action: The No Action alternative would have no effect on wetlands or other waters of the U.S. and would not require permits regulated under Sections 401 or 404 of the CWA, or Section 10 regulated under the RHA.

Alternative 2- Proposed Action- The proposed action would not destroy or modify wetlands, have an adverse effect on the natural values of wetlands, or directly or indirectly support new development in wetlands.

4.3.3 Floodplains

Executive Order (E.O.) 11988 (Floodplain Management) requires federal agencies to avoid or minimize development in the floodplain except when there are no practicable alternatives. St. Tammany Parish enrolled in the National Flood Insurance Program (NFIP) on April 23, 1971. According to Preliminary Digital Flood Insurance Rate Map (DFIRM) 22103C0495F, dated 4/30/2008, the site is located in shaded zone X.

Alternative 1- No Action: The No Action alternative would have no effect on floodplains.

Alternative 2- Proposed Action: With this alternative, the Eastwood storm drain lines would be improved. To comply with Executive Order 11988, Floodplain Management, FEMA is required to follow the procedure outlined in 44 CFR Part 9 to assure that alternatives to the proposed action have been considered. This process, also known as the "Eight Step Planning Process," has been applied to this mitigation project and is described in Appendix C. This action must be coordinated with the local floodplain manager as well as comply with local floodplain ordinances. For the purposes of this study, there are no practical alternatives to the proposed action. Local ordinance calls for a no net fill in St. Tammany Parish. Per this ordinance “net fill” is defined “as the placement of any fill material that results in any increase in the surface elevation of property from its natural or pre-development state.”

4.4 Coastal Resources

Louisiana Department of Natural Resources (LDNR) regulates development in the designated coastal zone under the Coastal Zone Management Act (CZMA) of 1972. A central requirement of the CZMA is that each state develops a management program for its coastal zone. In an attempt to meet this requirement, several bills were introduced to the Louisiana Legislature, as a result the state and local Coastal Resources Management Act of 1978 was passed. This act established a coastal zone boundary and a system of Coastal Use Permits (CUPs) to regulate uses and activities in the coastal zone. These permits are required for those projects which have a direct impact on coastal waters.

The U. S. Fish and Wildlife Service (USFWS) regulates federal funding in Coastal Barrier Resource System (CBRS) Units under the Coastal Barriers Resources Act (CBRA). The Act protects undeveloped coastal barriers and related areas (Otherwise Protected Areas [OPA]) by prohibiting direct or indirect federal funding of projects in these areas that might support development. Its purpose is to promote more appropriate use and conservation of coastal barriers along the Gulf of Mexico.

4.5 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 provides for the protection of all listed threatened and endangered species. It is unlawful "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect ..." any protected species. “Harm” is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.

The U.S. Fish and Wildlife Service (USFWS) list seven species in St. Tammany Parish as being threatened or endangered. Listed species for St. Tammany Parish include: West Indian Manatee, Brown Pelican, Louisiana Quillwort, Gulf Sturgeon, Gopher Tortoise, Ringed Map Turtle, and the Red-Cockaded Woodpecker.

4.6 Air Quality

The Clean Air Act (CAA) of 1963, as amended, provides for federal protection of air quality by regulating air pollutant sources and setting emissions standards for certain air pollutants. Under CAA, states adopt ambient air quality standards in order to protect the public from potentially harmful amounts of pollutants. The United States Environmental Protection Agency (USEPA) establishes primary and secondary air quality standards. Primary air quality standards protect the public health, including the health of “sensitive populations, such as people with asthma, children, and older adults.” Secondary air quality standards protect the public welfare by promoting ecosystems health, and preventing decreased visibility and damage to crops and buildings. The USEPA has set National Ambient Air Quality Standards (NAAQS) for the following six criteria pollutants: ozone (O3), particulate matter (PM2.5, PM10), nitrogen dioxide (NO2), carbon monoxide (CO), sulfur dioxide (SO2), and lead (Pb).

The USEPA has designated specific areas as NAAQS attainment or non-attainment areas. Non-attainment areas are any areas that do not meet the quality standard for a pollutant, while attainment areas do meet ambient air quality standards. The General Conformity Rule (GCR) currently applies to all Federal actions that are taken in designated non-attainment or maintenance areas, with the following exceptions: (1) actions covered by the transportation conformity rule; (2) actions with associated emissions clearly at or below specified *de minimis* levels; (3) actions listed as exempt in the rule; or, (4) actions

covered by a Presumed-to-Conform approved list (40 CFR § 93.153(c). When the total direct and indirect emissions from the project or action are clearly below the *de minimis* levels, the project or action would not be subject to a conformity determination, and may proceed [40 CFR §93.153(b) and (c)]. If, on the other hand, emissions are equal to or exceed 40 CFR. §93.153 or Louisiana Administrative Code (LAC) 33:III.1405.B *de minimis* levels, a general conformity determination must be made by the Federal agency involved. LDEQ requests a "general conformity applicability determination" in order to demonstrate that a formal general conformity determination is not required. Project-associated emissions are quantified using (1) direct emissions, and (2) indirect emissions within the scope of the Federal agency's authority. *See* 40 CFR § 93.158(a).

According to the USEPA, St. Tammany Parish is currently an attainment area (EPA, 2015).

Alternative 1- No Action: The No Action alternative would have no effect on air quality.

Alternative 2- Proposed Action: Pollutant emissions from construction equipment may result in minor, temporary effects to air quality in the area immediately surrounding the construction activity. Fugitive dust would escape into the atmosphere during these activities. However, the effects would be localized and of short duration and would not jeopardize the attainment status of St. Tammany Parish. The contractor would be required to keep all equipment in good working order to minimize fugitive dust and diesel emissions.

To reduce potential short-term effects to air quality from construction-related activities, the contractor will be responsible for keeping all excavated areas and the newly constructed berm 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 construction of the earthen berm, the contractor will be responsible for keeping the berm covered during non-work hours to prevent water and air erosion of the berm during rain events or high winds.

4.7 Noise

Noise is generally described as unwanted sound. Neither St. Tammany Parish nor the City of Slidell has a noise ordinance pertaining to construction. Existing ambient noise levels in the area are consistent with residential traffic along Fremaux Avenue and residential landscaping equipment. There is also intermittent noise from boats that use Bayou Liberty for transportation and recreation. There are no noise sensitive receptors (i.e. hospitals, schools, churches) in or adjacent to the project area. The closest noise receptors to the project site are greater than 400 feet from the proposed project location, which are residential properties to the north and south. Noise levels within and adjacent to the project area would increase during the proposed construction activities as a result

of construction equipment and vehicular activity. The noise levels generated would be limited to workday daylight hours for the duration of the project.

Alternative 1- No Action: The No Action alternative would have no effect on noise in the project area.

Alternative 2- Proposed Action: Construction of the new earthen berm and elevation of the FCH would result in a slight increase in noise during the construction activities. This increase in noise may be perceived by residential property owners that are located within 250 yards of the construction area. The increase is expected to be minor and would not affect any sensitive receptors; however, no change to the long term noise levels that existed prior to the proposed action would be anticipated.

4.8 Hazardous Materials

Hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), are "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed." The management of hazardous materials is regulated under various federal and state environmental and transportation laws and regulations. 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 that have already been contaminated by releases of hazardous materials, wastes, or substances.

A review of regulatory environmental databases was conducted via the Internet. A database search revealed that no Louisiana Voluntary Remediation Program (VRP) or Environmental Protection Agency (EPA) or Louisiana State Brownfield (LSB) sites are located within 1.0 mile of the drainage improvements project area. Searches of the EPA National Priorities List (NPL), EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List, EPA hazardous waste sites, EPA toxic release sites, EPA waste water discharge sites, EPA air emission sites, and EPA multi-activity sites revealed no sites within 1.0 mile of the property. A NEPAssist Report conducted on 05/06/2015 reports that the drainage improvements project area is located within 0.5 miles of a hazardous waste RCRA facility. The same report indicated that the project area is also located within 0.5 miles of a Toxic Release Inventory (TRI) site, a water discharger (NPDES), and air emission facility. A search of the LDEQ Leaking Underground Storage Tank (LUST) List revealed no known sites within 1.0 mile of the property. There are no debris sites or oil and gas wells within 1.0 mile of the property.

Alternative 1- No Action: The No Action alternative would not disturb any hazardous materials or create any potential hazard to human health.

Alternative 2- Proposed Action: Eastwood storm drain line improvements would not disturb any hazardous materials or create any potential hazard to human health. If suspect hazardous materials or debris 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.

4.9 Environmental Justice

Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority and low-income populations. According to the U.S. Census Bureau, 2009-2013 5-Year American Community Survey, the City of Slidell is comprised up of 79.8% White, 17.6% Black/African American, and 7.5% Hispanic/Latino. The median family income in 2013 was $48,122, and 16.3% of families earn incomes below the poverty level.

Alternative 1 - No Action: The No Action alternative would not adversely affect minority or low-income populations in the subdivision due to repetitive flooding in Lakewood subdivision and surrounding areas.

Alternative 2 Proposed Action: The proposed improvements to storm line drainage would not adversely affect any low-income or minority population. The mitigation improvements will benefit all populations.

5.0 CUMULATIVE IMPACTS

Cumulative impacts are those effects on the environment that result from the incremental effect of the action when added to past, present and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The City Barn and Markham Peachtree projects, when added to the proposed action at Eastwood, would not have a significant cumulative impact on the human environment.

6.0 CONDITIONS AND MITIGATION MEASURES

Based upon the studies and consultations undertaken in this Environmental Assessment (EA), several conditions and mitigation measures must be taken by the applicant prior to and during project implementation.

Environmental

- 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.

- The applicant is responsible for coordinating with and obtaining any required permit(s) from the Louisiana Department of Natural Resources' (LDNR) Coastal Management Division (CMD) prior to initiating work. The applicant shall comply with all conditions of the required permit. 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 stormwater 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 should be observed to control nonpoint source pollution from construction activities.

- Any changes or modifications to the proposed project will 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 U.S. Army Corps of Engineers, USACE should be contacted directly to inquire about the possible necessity for permits. 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 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.

- 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.

- 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.

Cultural Resources

To remain in compliance with Section 106 of the National Historic Preservation Act, the Applicant (St. Tammany Parish) must adhere to conditions outlined below and in the documented responses from SHPO, National Park Service, and the Alabama-Coushatta Tribe of Texas (documents attached).

Archaeology/Ground Disturbing Activities

- Due to the loose structure and sandy nature of the soil in the APE, fill for the drainage system should be stored in the staging area, which will be restricted to the circular gravel drive. Heavy vehicles such as loaded dump trucks should be restricted to the gravel drive, and soil can then be transported into the APE with lighter equipment.

- Fill or borrow material must come from off site and must be sourced from areas that do not contain any buried cultural materials (e.g. brick foundations, prehistoric Indian artifacts, human burials, and the like).

- Existing utility trenches will be used to the greatest extent possible.

- Tree removal should be by "cut flush and remove" practices only. If stump removal is necessary, the stumps should be ground out in place to a depth not to exceed 12" below surface.

- *Unexpected Discovery and Stop Work:* If archaeological artifacts or features (prehistoric or historic) are discovered during the course of FEMA funded work, the Applicant must ensure that their Contractor stops work in the vicinity of the discovery and takes all reasonable measures to avoid and minimize harm to the discovery. The Applicant shall inform GOHSEP and FEMA of the discovery and FEMA will deploy an archaeologist to the location to conduct a site condition assessment. The Applicant will not proceed with work until FEMA has completed consultation with the SHPO on the treatment of the discovery.

- *Unmarked Human Burials Discovery*: If human remains are discovered during the course of FEMA funded work, the Applicant and the Applicant's Contractor are responsible for immediately halting work within the vicinity of the human remains finding. The Applicant will immediately notify GOHSEP, FEMA, the local Police Department, and the local Coroner's Office of the discovery. The local Coroner's Office will assess the nature and age of the human skeletal remains. If the Coroner's Office determines that the human skeletal remains are older than 50 years of age, the Louisiana Division of Archaeology will take jurisdiction over the remains. Within twenty-four (24) hours, FEMA will notify the Louisiana Division of Archaeology (225-342-8170) of the finding. Within seventy-two (72) hours, FEMA will take the lead in working with the Louisiana

Division of Archaeology and other interested parties, as necessary, to ensure compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 *et seq.*) and other applicable laws. In addition, the Applicant must afford FEMA the opportunity to comply with the "Human Remains Policy" set forth by the Advisory Council on Historic Preservation (ACHP).

- No known impacts to religious, cultural, or historical assets of the Alabama-Coushatta Tribe of Texas are anticipated in conjunction with the proposal. However, in the event of inadvertent discovery of human remains and/or archaeological artifacts during construction, activity in proximity to the location must cease and appropriate authorities, including the Historic Preservation Officer of the Alabama-Coushatta Tribe of Texas, should be notified without delay.

- Failure to comply with stop work stipulations associated with archaeological findings or human remains discoveries would jeopardize the Applicant's receipt of FEMA funding.

Failure to comply with these conditions may make part or all of these projects ineligible for FEMA funding.

7.0 PUBLIC INVOLVEMENT

The public will be invited to comment on the proposed action. A legal notice was published in the following newspapers: St. Tammany Farmer on Thursday May 14, and Thursday May 21, 2015, and in the Times Picayune on Wednesday, May 13, Friday, May 15, and Sunday May 17, 2015. Additionally the Environmental Assessment was made available at the St. Tammany Parish Library - Slidell Branch. The Environmental Assessment was published on FEMA's and the Parish's official websites. A copy of the Public Notice is attached in Appendix F.

8.0 AGENCY COORDINATION

U.S. Army Corps of Engineers (USACE)
Louisiana Department of Environmental Quality (LDEQ)
Louisiana Department of Natural Resources (LDNR), CZMP
Louisiana Department of Wildlife and Fisheries (LDWF)
Environmental Protection Agency (EPA)
U.S. Department of Agriculture - Natural Resources Conservation Service
Louisiana State Historic Preservation Officer (SHPO)
U.S. Fish and Wildlife Service (USFWS)

9.0 CONCLUSION

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 improvements to the Eastwood storm drainage system. Therefore, the proposed action meets the requirements of a Finding of No Significant Impact (FONSI) under NEPA and the preparation of an Environmental Impact Statement (EIS) will not be required.

10.0 LIST OF PREPARERS

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Federal Emergency Management Agency, Louisiana Recovery Office

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Federal Emergency Management Agency, Louisiana Recovery Office

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Federal Emergency Management Agency, Louisiana Recovery Office

Maria M. Tavaszi, M.A., R.P.A. - Archaeologist/Historic Preservation Specialist
Federal Emergency Management Agency Louisiana Recovery Office

11.0 REFERENCES

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Eastwood Drainage Improvements, 100% Final Plans. Richard C. Lambert Consultants, L.L.C. March 12, 2015, Franz. J. Zemmer, P.E.

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Appendix A

Site Photographs and Maps

Photo 1: Looking northwest at a previously proposed route for flow conveyance through private property

Photo 2: Looking east: Note the concrete outfall that drains into the unnamed stream at the end of Fremaux Avenue. This stream drains south to the eastern branch of the W-14 Canal, also known as the Lakewood Drainage Canal, then to the W-14 Main Diversion Canal toward the Fritchie Marsh and ultimately into Lake Ponchartrain.

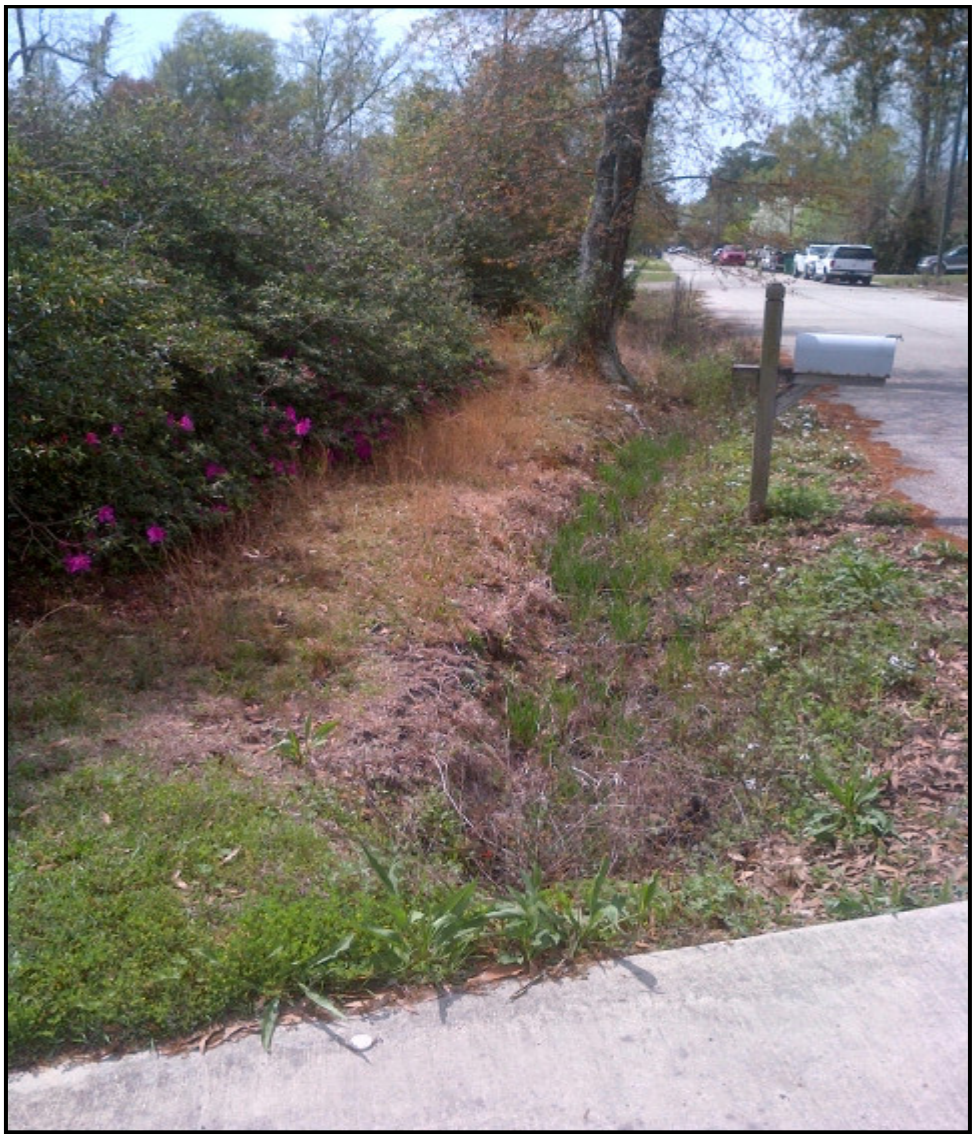


Photo 3: Looking west along the ditch on Fremaux Avenue. The ditch would be widened from Beth Drive to flow into the unnmaed stream alongside a box culvert installed in the street.

Photo 4: Looking east along the ditch on Fremaux Avenue, to be widened from Beth Drive that flows into the unnamed stream.

Photo 5: Looking northeast at the concrete box culvert that would be filled, plugged, and capped.

Photo 6: Looking south at the unnamed stream where trees would be removed and riprap would be placed over geotextile fabric for approximately 50 linear feet of streambank.

U.S. Fish and Wildlife Service

National Wetlands Inventory

Eastwood Drainage

May 6, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

User Remarks:

Aerial of Eastwood

Appendix B

Site Plans for Proposed Drainage Improvements

CITY OF SLIDELL
CITY OF SLIDELL PROJECT NO. 100-116
GOHSEP NO. 1603n-103-0043

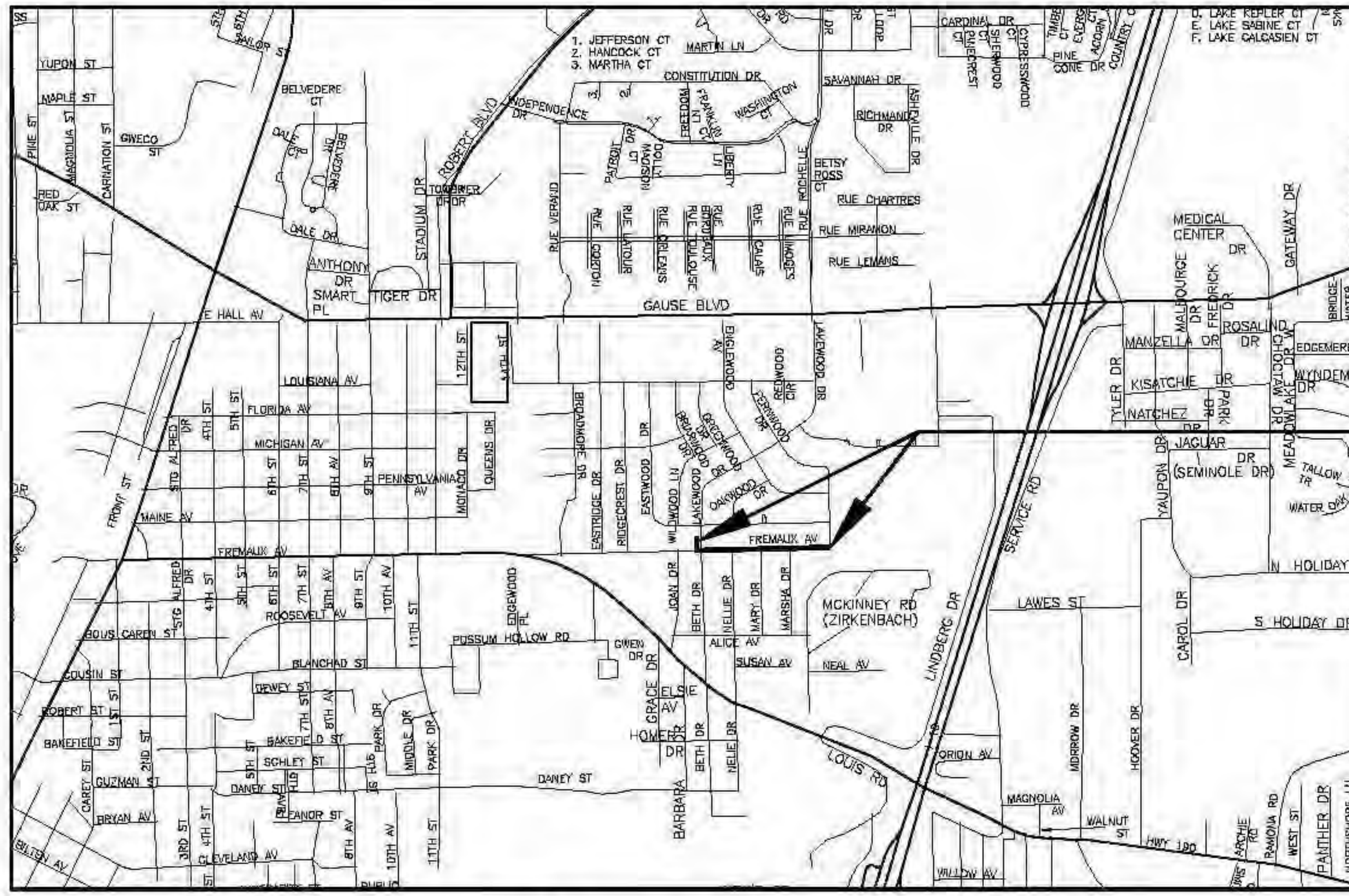
EASTWOOD DRAINAGE IMPROVEMENTS

ST. TAMMANY PARISH

INDEX TO SHEETS

STANDARD PLANS

SHEET NO.	DESCRIPTION	REVISION DATE
306, 307	EC-01 (1, 2 OF 2)	10-1-08
308	FN-01	11-3-11
309	R-CB-11 MOD	3-1-11
310	R-CB-32	5-3-76



PROJECT LOCATION

LOCATION MAP

APPROX. SCALE: 1"=1000'

SITE LOCATION

VICINITY MAP

RECOMMENDED FOR APPROVAL

FRANZ J. ZEMMER, P.E.
RICHARD C. LAMBERT CONSULTANTS, LLC

APPROVED

DONNA O'DELL P.E.
CITY ENGINEER
CITY OF SLIDELL

TYPE OF CONSTRUCTION :

NEW DRAINAGE WITH REMOVAL AND REPLACEMENT OF EXISTING PAVEMENT, SIDEWALKS AND DRAINAGE AS REQUIRED, MILL AND OVERLAY.

NOTE:
THE 2006 EDITION OF THE LOUISIANA DOTD STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, AS AMENDED BY THE PROJECT SPECIFICATIONS, SHALL GOVERN ON THIS PROJECT

100% FINAL PLANS
NOT FOR CONSTRUCTION
03/12/15
FRANZ J. ZEMMER, P.E.
La. License No. 28232

THIS DOCUMENT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT

RCL CONSULTANTS, L.L.C.
Planning • Architecture • Engineering • Construction Management

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900 W. Causeway Approach
Mandeville, LA 70471
985-727-4440
Fax: 985-727-4447

DESIGNED	FJZ
CHECKED	RCL
DETAILED	JAC
CHECKED	RCL
DATE	03/12/15
SHEET	1

NO.	DATE	REVISION DESCRIPTION	BY

TITLE SHEET

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
1

GENERAL NOTES

THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HEREON HAVE BEEN DETERMINED FROM DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR EXTRACTED FROM RECORDS MADE AVAILABLE TO US BY THE AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF LOCATIONS 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 INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN HEREON, INCLUDING PRIOR TO EXCAVATION AND DIGGING.

BASIS OF ELEVATION

ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) UTILIZING GEOID (09). THEY ARE DERIVED FROM GPS OBSERVATIONS REFERENCED TO THE LOUISIANA STATE UNIVERSITY CONTINUOUSLY OPERATING REFERENCE STATIONS NETWORK IN ACCORDANCE WITH LOUISIANA R.S. 50:173.1 COVERING VERTICAL CONTROL STANDARDS.

SERVITUDES

THE SERVITUDES AND RESTRICTIONS SHOWN ON THIS SURVEY ARE LIMITED TO THOSE SET FORTH IN THE DESCRIPTION FURNISHED US AND THERE IS NO REPRESENTATION THAT ALL APPLICABLE SERVITUDES AND RESTRICTIONS ARE SHOWN HEREON. THE SURVEYOR HAS MADE NO TITLE SEARCH OR PUBLIC RECORD SEARCH IN COMPILING THE DATA FOR THIS SURVEY.

SPECIAL FLOOD HAZARD AREA

WE HAVE CONSULTED THE FEDERAL INSURANCE ADMINISTRATION FLOOD HAZARD BOUNDARY MAPS AND FOUND THIS PROPERTY IS NOT IN A SPECIAL FLOOD HAZARD AREA.

FIRM ZONE: X
BASE FLOOD ELEVATION: N/A

COMMUNITY PANEL NO. 2202040010C
MAP DATED/REVISED: 4/21/1999

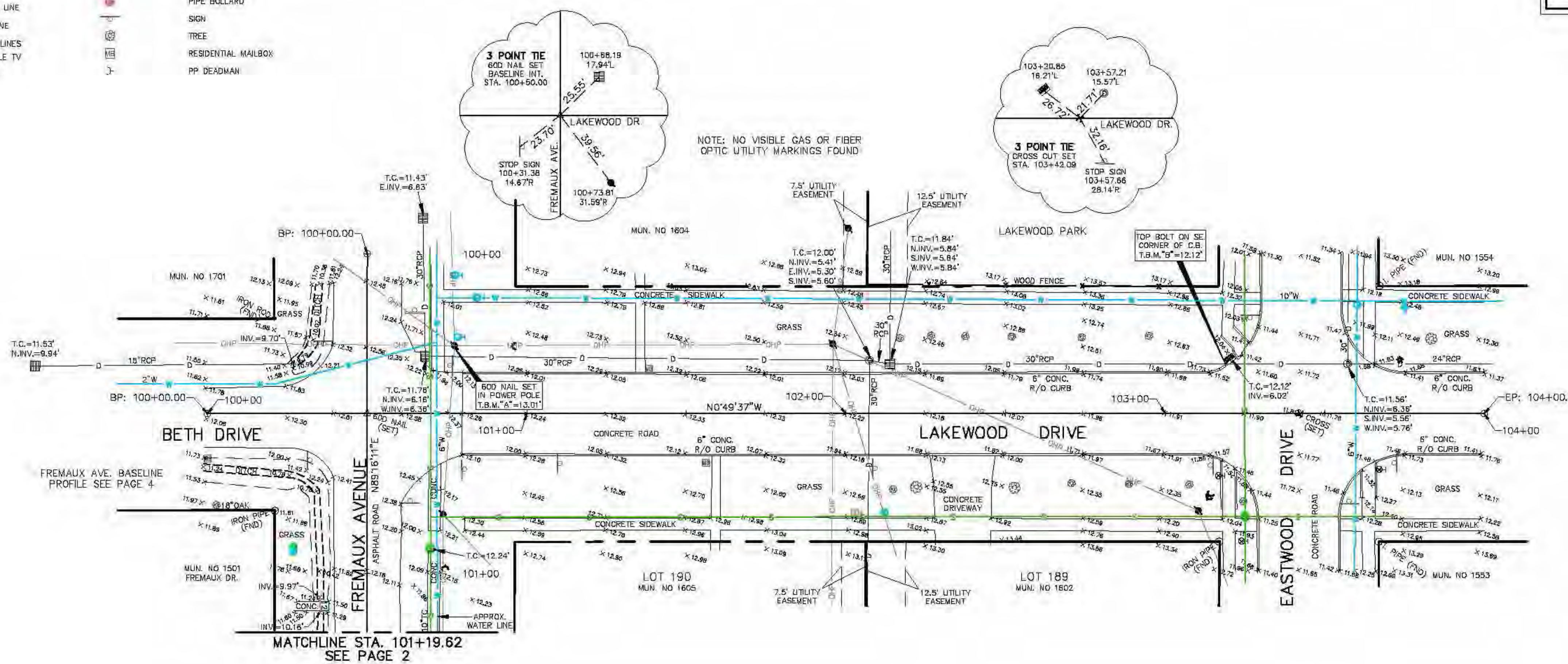
TEMPORARY BENCHMARKS (TBM)

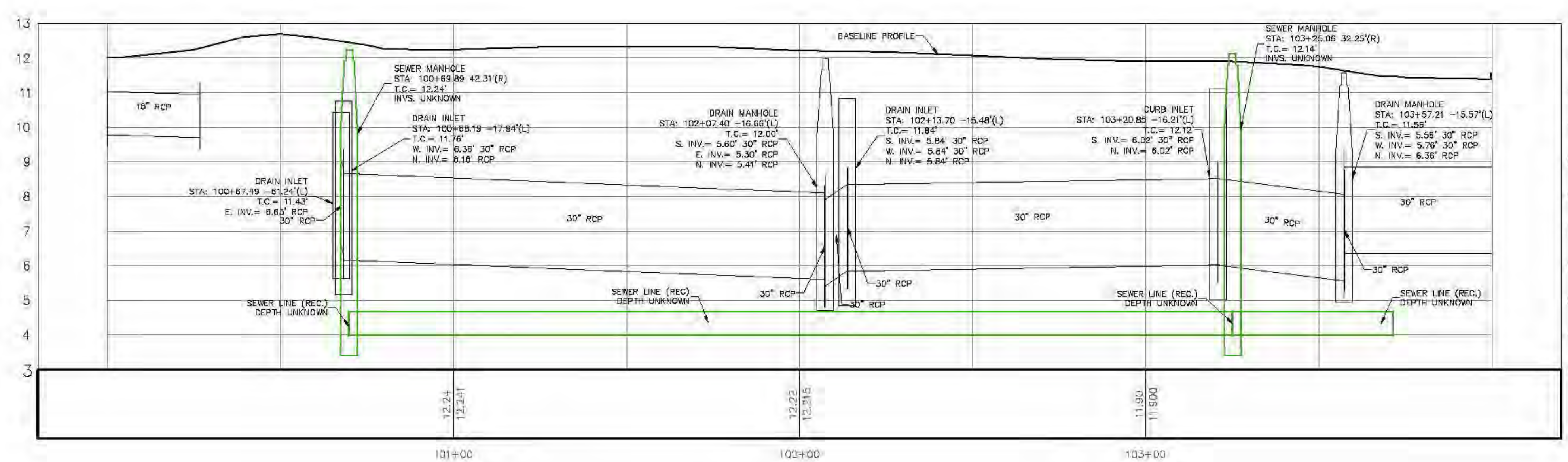
TBM "A" IS A 60D NAIL SET 1' ABOVE GROUND LEVEL IN A POWER POLE LOCATED AT THE NORTHWEST SIDE OF THE INTERSECTION OF FREMAUX AVENUE AND LAKEWOOD DRIVE, APPROXIMATELY 21' WEST OF THE ℄ OF LAKEWOOD DRIVE AND 27' NORTH OF THE ℄ OF FREMAUX AVENUE.
ELEVATION: 13.01' N.A.V.D. 88 (2006.81) GEOID 09

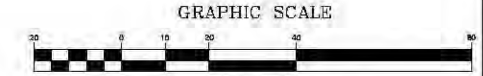
TBM "B" IS A TOP OF BOLT IN THE SOUTHEAST CORNER OF A CURB INLET LOCATED AT THE SOUTHWEST SIDE OF THE INTERSECTION OF EASTWOOD AND LAKEWOOD DRIVE, APPROXIMATELY 15' WEST OF THE ℄ OF LAKEWOOD DRIVE AND 23.5' SOUTH OF THE ℄ OF EASTWOOD DRIVE.
ELEVATION: 12.12' N.A.V.D. 88 (2006.81) GEOID 09

VICINITY MAP
NOT TO SCALE

GRID NORTH
NORTH REFERENCED TO LOUISIANA STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83.







TOPOGRAPHIC SURVEY
FREMAUX AVENUE & LAKEWOOD DRIVE
CITY OF SLIDELL
ST. TAMMANY PARISH, LOUISIANA

I certify that this plat represents an actual ground survey made by me or under my direction, and it does not conform to the requirements for the Minimum Standards for Property Boundary Surveys as found in Louisiana Administrative Code TITLE 46: LXI, Chapter 29 for a Class C survey.

RICHARD C. LAMBERT CONSULTANTS, LLC

BFM Professional Land Surveyors
534 WILLIAMS BOULEVARD
E-mail: bfmcorp@bfmcorporation.com
(504) 468-6800
Fax No. (504) 467-0065
CITY OF KENNER
JEFFERSON PARISH, LOUISIANA, 70062

REGISTERED PROFESSIONAL LAND SURVEYOR
JOHN S. TEEGARDEN
REGISTRATION NO. 4635

MARK	DESCRIPTION	DATE	BY	CHK'D

REVISION RECORD

SCALE: 1" = 20' VERTICAL: 1" = 2'	
DATE: 8/04/2014	
DRAWN BY: W.R.C.	
CHECKED BY: K.A.B.	
FILE NO. 8746	PROJECT NO. 8746
SHEET S1	OF S4

LEGEND

BUILDING	FENCE
EXISTING RIGHT OF WAY	TELCO RISER / PEDESTAL
SERVITUDE	UTILITY CLEANOUT
CATCH BASIN	UTILITY METER
CULVERT	UTILITY PEDESTAL
DROP INLET, DRAIN LINE	UTILITY VALVE
COMMUNICATIONS MANHOLE, LINE	UTILITY VALVE VAULT
DRAIN MANHOLE, DRAIN LINE	FIRE HYDRANT
ELECTRICAL MANHOLE, ELEC. LINE	LIGHT STANDARD
GAS MANHOLE, GAS LINE	TRAFFIC SIGNAL POLE
SEWER MANHOLE, SEWER LINE	TRAFFIC LIGHT POWER VAULT
TELEPHONE MANHOLE, TELE LINE	CANOPY SUPPORT
TRAFFIC MANHOLE, TRAFFIC LINE	PIPE BOLLARD
WATER MANHOLE, WATER LINE	SIGN
UTILITY POLE / OVERHEAD LINES ELECTRIC, TELEPHONE, CABLE TV	TREE
FIBER OPTIC RISER / LINE	RESIDENTIAL MAILBOX
	PP DEADMAN

GENERAL NOTES

THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HEREON HAVE BEEN DETERMINED FROM DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR EXTRACTED FROM RECORDS MADE AVAILABLE TO US BY THE AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF LOCATIONS 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 INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN HEREON, INCLUDING PRIOR TO EXCAVATION AND DIGGING.

BASIS OF ELEVATION

ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) UTILIZING GEOID (09). THEY ARE DERIVED FROM GPS OBSERVATIONS REFERENCED TO THE LOUISIANA STATE UNIVERSITY CONTINUOUSLY OPERATING REFERENCE STATIONS NETWORK IN ACCORDANCE WITH LOUISIANA R.S. 50:173.1 COVERING VERTICAL CONTROL STANDARDS.

SERVITUDES

THE SERVITUDES AND RESTRICTIONS SHOWN ON THIS SURVEY ARE LIMITED TO THOSE SET FORTH IN THE DESCRIPTION FURNISHED US AND THERE IS NO REPRESENTATION THAT ALL APPLICABLE SERVITUDES AND RESTRICTIONS ARE SHOWN HEREON. THE SURVEYOR HAS MADE NO TITLE SEARCH OR PUBLIC RECORD SEARCH IN COMPILING THE DATA FOR THIS SURVEY.

SPECIAL FLOOD HAZARD AREA

WE HAVE CONSULTED THE FEDERAL INSURANCE ADMINISTRATION FLOOD HAZARD BOUNDARY MAPS AND FOUND THIS PROPERTY IS NOT IN A SPECIAL FLOOD HAZARD AREA.

FIRM ZONE: X
BASE FLOOD ELEVATION: N/A

COMMUNITY PANEL NO. 2202040010C
MAP DATED/REVISED: 4/21/1999

GRAPHIC SCALE

20 0 10 20 40 80

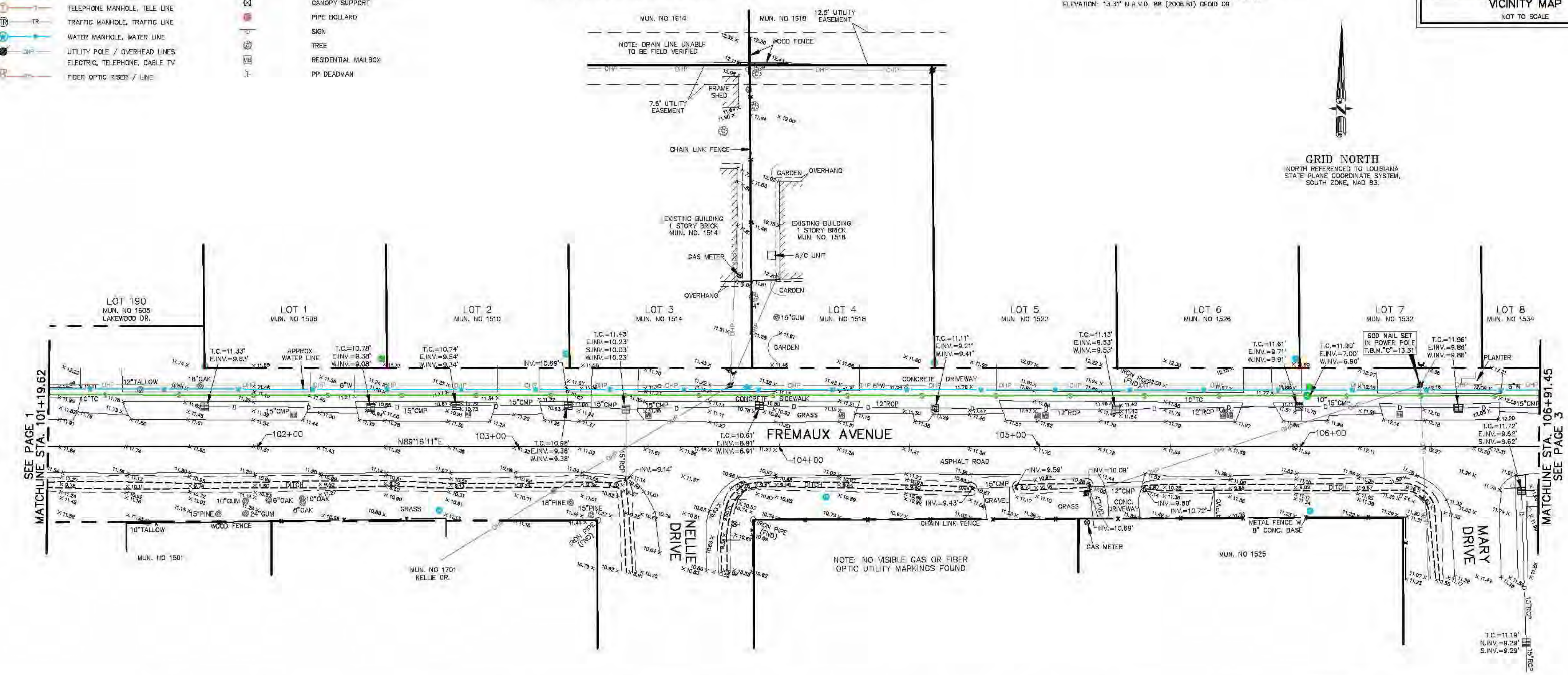
(IN FEET)
1 inch = 20 ft.

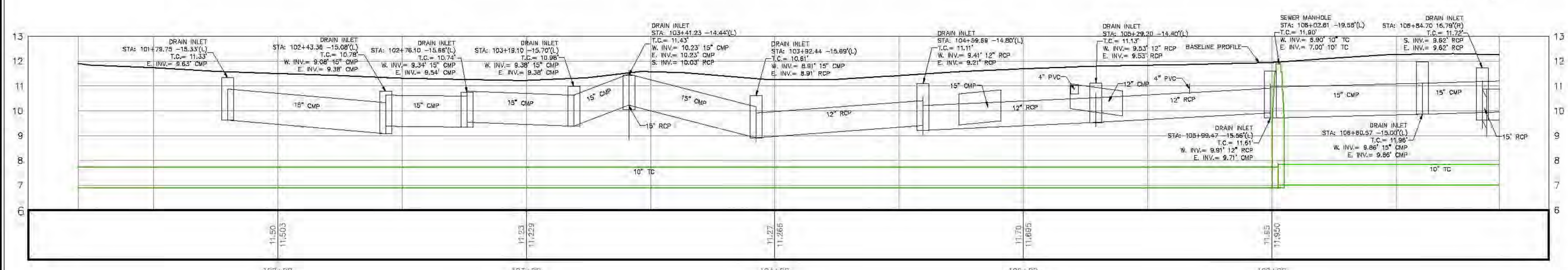
TEMPORARY BENCHMARK (TBM)

TBM "C" IS A 60D NAIL SET 1' ABOVE GROUND LEVEL IN A POWER POLE LOCATED APPROXIMATELY 24' NORTH OF THE ℄ OF FREMAUX AVENUE AND 19' WEST OF THE PROJECTION OF MARY DRIVE.
ELEVATION: 13.31' N.A.V.D. 88 (2006.81) GEOID 09

VICINITY MAP
NOT TO SCALE

GRID NORTH
NORTH REFERENCED TO LOUISIANA STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83.





TOPOGRAPHIC SURVEY
FREMAUX AVENUE &
LAKEWOOD DRIVE
CITY OF SLIDELL
ST. TAMMANY PARISH, LOUISIANA

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Fax No. (504) 467-0065
CITY OF KENNER
JEFFERSON PARISH, LOUISIANA, 70062

REGISTERED PROFESSIONAL LAND SURVEYOR
JOHN S. TEEGARDEN
REGISTRATION NO. 4635

MARK	DESCRIPTION	DATE	BY	CHK'D
	REVISION RECORD			

SCALE: 1" = 20'
VERTICAL: 1" = 2'
DATE: 8/04/2014
DRAWN BY: W.R.C.
CHECKED BY: K.A.B.
FILE NO. 8746
PROJECT NO. 8746
SHEET S2 OF S4

LEGEND

- BUILDING
- EXISTING RIGHT OF WAY
- SERVITUDE
- CATCH BASIN
- CULVERT
- DROP INLET, DRAIN LINE
- COMMUNICATIONS MANHOLE, LINE
- DRAIN MANHOLE, DRAIN LINE
- ELECTRICAL MANHOLE, ELEC. LINE
- GAS MANHOLE, GAS LINE
- SEWER MANHOLE, SEWER LINE
- TELEPHONE MANHOLE, TELE LINE
- TRAFFIC MANHOLE, TRAFFIC LINE
- WATER MANHOLE, WATER LINE
- UTILITY POLE / OVERHEAD LINES ELECTRIC, TELEPHONE, CABLE TV
- FIBER OPTIC RISER / LINE
- FENCE
- TELCO RISER / PEDISTAL
- UTILITY CLEANOUT
- UTILITY METER
- UTILITY PEDESTAL
- UTILITY VALVE
- UTILITY VALVE VAULT
- FIRE HYDRANT
- LIGHT STANDARD
- TRAFFIC SIGNAL POLE
- TRAFFIC LIGHT POWER VAULT
- CANOPY SUPPORT
- PIPE BOLLARD
- SIGN
- TREE
- RESIDENTIAL MAILBOX
- PP DEADMAN

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

GENERAL NOTES

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TEMPORARY BENCHMARK (TBM)

TBM "D" IS A 60D NAIL SET 1' ABOVE GROUND LEVEL IN A POWER POLE LOCATED APPROXIMATELY 17' NORTH OF THE ℄ OF FREMAUX AVENUE AND 24' EAST OF THE PROJECTION OF MARSHA DRIVE. ELEVATION: 12.54' N.A.V.D. 88 (2006.81) GEOID 09

SERVITUDES

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SPECIAL FLOOD HAZARD AREA

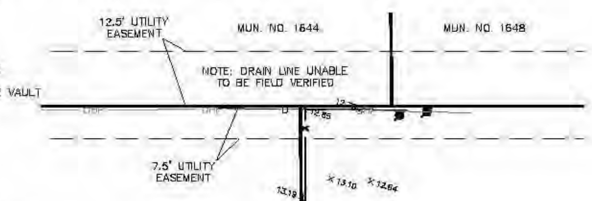
WE HAVE CONSULTED THE FEDERAL INSURANCE ADMINISTRATION FLOOD HAZARD BOUNDARY MAPS AND FOUND THIS PROPERTY IS NOT IN A SPECIAL FLOOD HAZARD AREA.

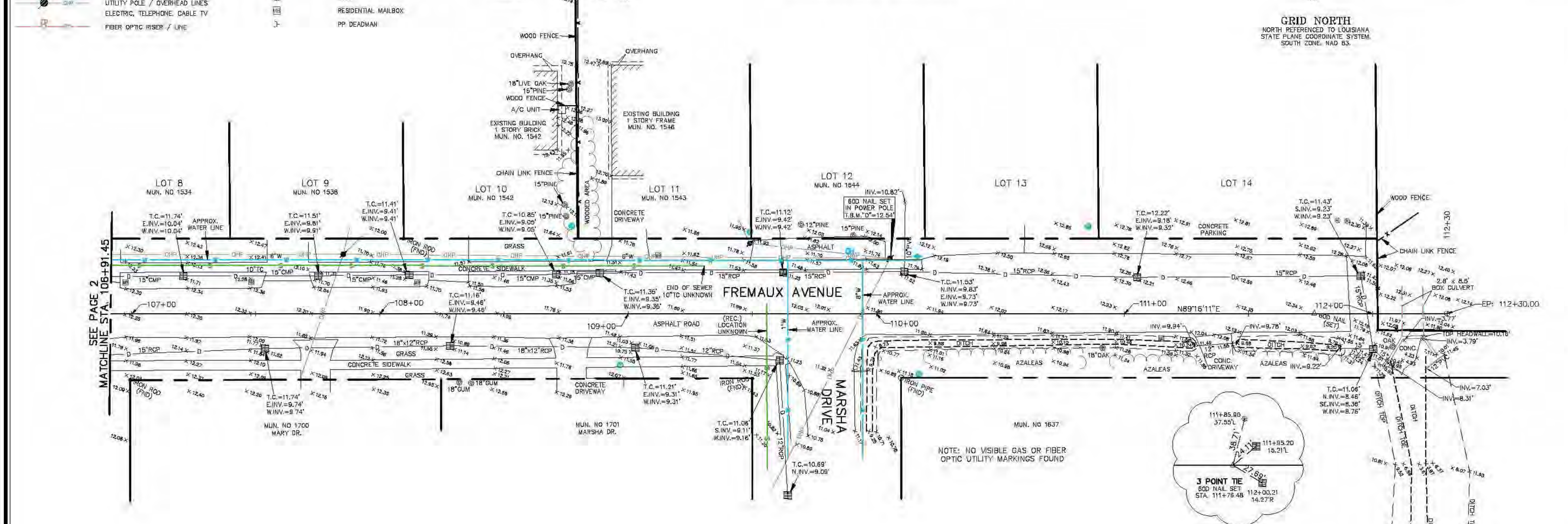
FIRM ZONE: X
BASE FLOOD ELEVATION: N/A

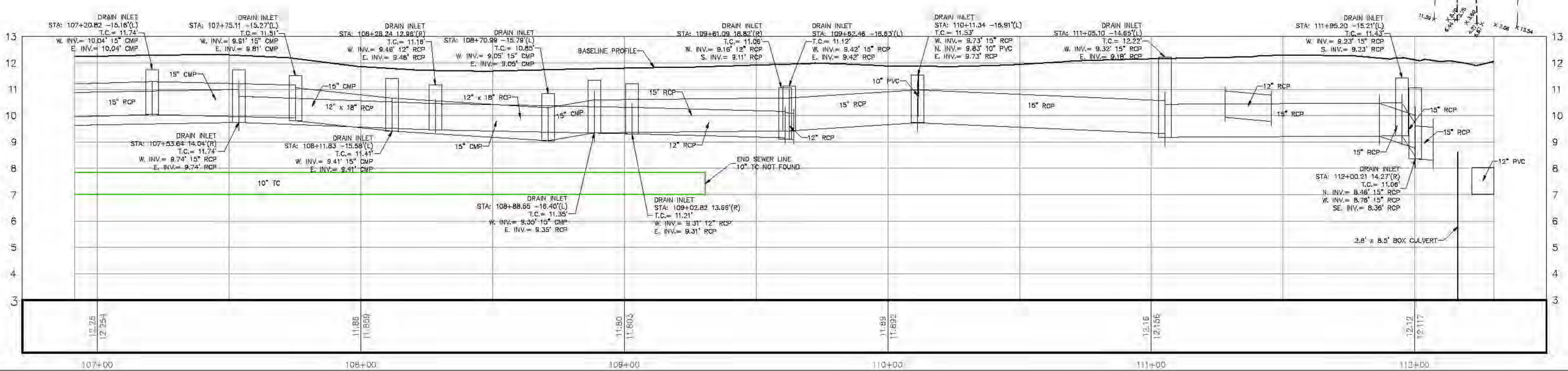
COMMUNITY PANEL NO. 2202040010C
MAP DATED/REVISED: 4/21/1999

VICINITY MAP
NOT TO SCALE

GRID NORTH
NORTH REFERENCED TO LOUISIANA STATE PLANE COORDINATE SYSTEM, SOUTH ZONE, NAD 83.







TOPOGRAPHIC SURVEY
FREMAUX AVENUE &
LAKEWOOD DRIVE
CITY OF SLIDELL
ST. TAMMANY PARISH, LOUISIANA

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CITY OF KENNER
JEFFERSON PARISH, LOUISIANA, 70062

REGISTERED PROFESSIONAL LAND SURVEYOR
JOHN S. TEEGARDEN
REGISTRATION NO. 4635

MARK	DESCRIPTION	DATE	BY	CHK'D

REVISION RECORD

SCALE: 1" = 20'
VERTICAL: 1" = 2'

DATE: 8/04/2014

DRAWN BY: W.R.C.

CHECKED BY: K.A.B.

FILE NO. 8746 | PROJECT NO. 8746

SHEET S3 OF S4

GENERAL NOTES

THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HEREON HAVE BEEN DETERMINED FROM DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR EXTRACTED FROM RECORDS MADE AVAILABLE TO US BY THE AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF LOCATIONS 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 INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN HEREON, INCLUDING PRIOR TO EXCAVATION AND DIGGING.

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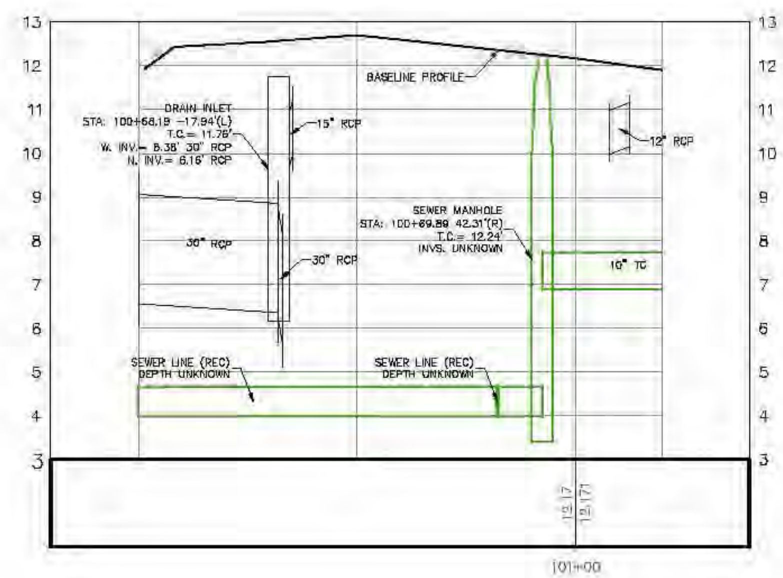
FIRM ZONE: X
BASE FLOOD ELEVATION: N/A

COMMUNITY PANEL NO. 2202040010C
MAP DATED/REVISED: 4/21/1999

VICINITY MAP
NOT TO SCALE



BASELINE PROFILE
FREMAUX AVENUE
SEE PAGE 1

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

REGISTERED PROFESSIONAL LAND SURVEYOR
JOHN S. TEEGARDEN
REGISTRATION NO. 4835

BFM Professional Land Surveyors
634 WILLIAMS BOULEVARD
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TOPOGRAPHIC SURVEY
FREMAUX AVENUE &
LAKEWOOD DRIVE
CITY OF SLIDELL
ST. TAMMANY PARISH, LOUISIANA

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RICHARD C. LAMBERT CONSULTANTS, LLC

MARK	DESCRIPTION	DATE	BY	CHK'D
	REVISION RECORD			

SCALE: 1" = 20'
VERTICAL: 1" = 2'

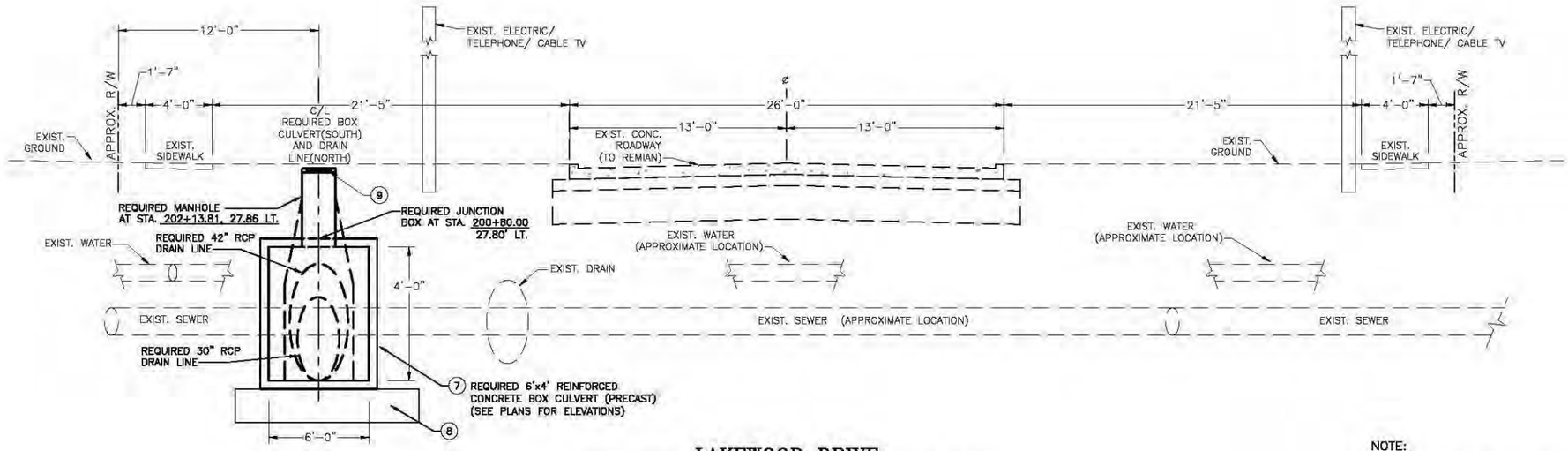
DATE: 8/04/2014

DRAWN BY: W.R.C.

CHECKED BY: K.A.B.

FILE NO. 8746
PROJECT NO. 8746

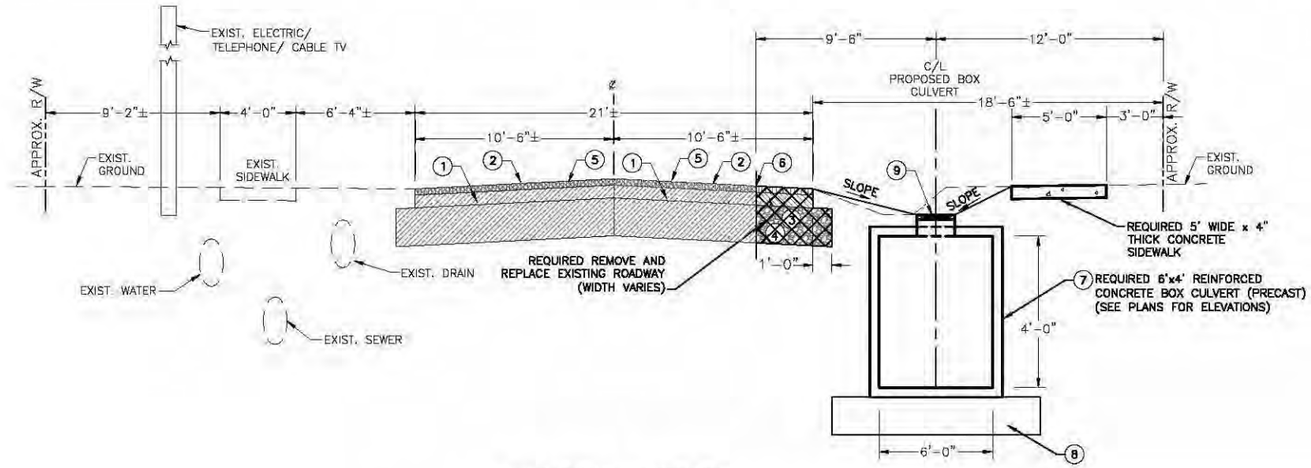
SHEET S4 OF S4



LAKEWOOD DRIVE

TYPICAL EXISTING ROADWAY SECTION FROM FREMAUX AVE. TO EASTWOOD DR.

HALF SCALE	(LOOKING NORTH)	FULL SCALE
HOR.: 1" = 8'		HOR.: 1" = 4'
VER.: 1" = 4'		VER.: 1" = 2'



FREMAUX AVENUE

TYPICAL EXISTING ROADWAY SECTION FROM LAKEWOOD DR. TO MARY DR.

HALF SCALE	(LOOKING EAST)	FULL SCALE
HOR.: 1" = 8'		HOR.: 1" = 4'
VER.: 1" = 4'		VER.: 1" = 2'

NOTE:

1. CLASS II BASE COURSE SHALL BE SET ON GEOTEXTILE PAVING FABRIC IN ACCORDANCE WITH LADOTD SPECIFICATIONS. ALL COSTS OF GEOTEXTILE FABIC TO BE INCLUDED IN SQUARE YARD COSTS OF CLASS II BASE COURSE.

NOTE

THE CONTRACTOR'S ATTENTION IS CALLED TO THE PRESENCE OF OVERHEAD AND UNDERGROUND POWER LINES, UNDERGROUND GAS, AND COMMUNICATION LINES THROUGHOUT THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY AND COORDINATING HIS OPERATIONS WITH ALL UTILITY COMPANIES.

THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.

100% FINAL PLANS
NOT FOR CONSTRUCTION
03/12/15
FRANZ J. ZEMMER, P.E.
La. License No. 28232

THIS DOCUMENT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALES OR AS THE BASIS FOR THE ISSUANCE OF A PERMIT

LEGEND

1. EXISTING ASPHALT PAVEMENT TO REMAIN
2. REQUIRED ASPHALTIC CONCRETE WEARING COURSE (TYPE 3)(AC-30)(2" THICK)
3. REQUIRED ASPHALTIC CONCRETE BINDER COURSE (TYPE 3)(AC-30)(4" THICK)
4. REQUIRED CLASS II BASE COURSE (CRUSHED STONE OR RECYCLED PCC)(12" THICK)
5. REQUIRED COLD PLANING ASPHALTIC PAVEMENT (2" DEPTH)
6. REQUIRED FULL DEPTH SAW CUT
7. REQUIRED 6'x4' REINFORCED CONCRETE BOX CULVERT (PRECAST)
8. REQUIRED BEDDING MATERIAL (TO BE INCLUDED IN LINER FOOT OF PRECAST REINFORCED CONCRETE BOX CULVERT)
9. REQUIRED 24" x 24" TEE INLET

RCL CONSULTANTS, L.L.C.
Planning
Architecture
Engineering
Construction Management

RICHARD C. LAMBERT CONSULTANTS, L.L.C.
900 W. Causeway Approach
Mandeville, LA 70471
985-727-4440
Fax: 985-727-4447

DESIGNED	FJZ	DATE	03/12/15
CHECKED	RCL	SHEET	2
DETAILED	JAC		
CHECKED	RCL		

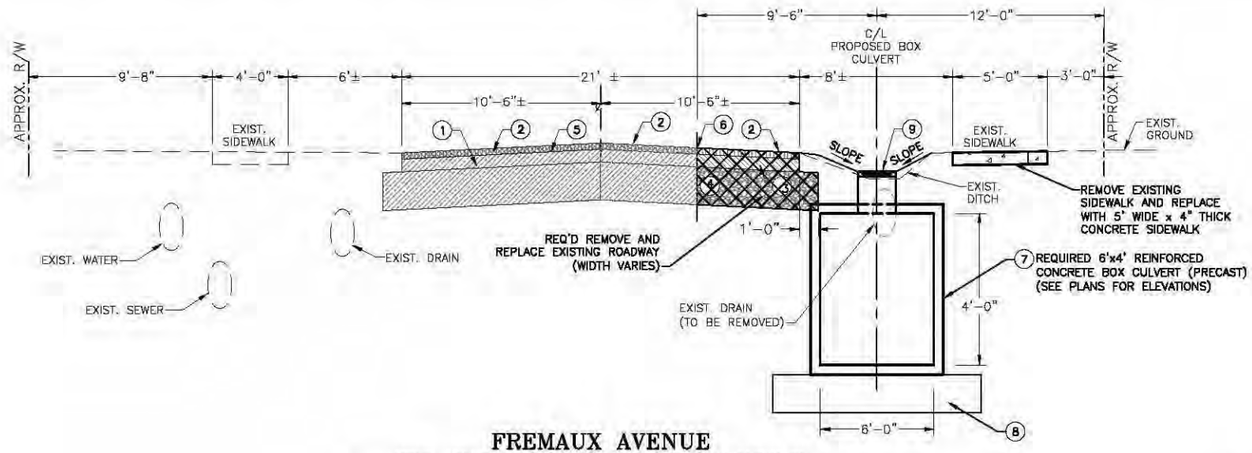
NO.	DATE	REVISION DESCRIPTION	BY

TYPICAL SECTIONS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
2



FREMAUX AVENUE

TYPICAL EXISTING ROADWAY SECTION FROM MARY DR. TO MARSHA DR.

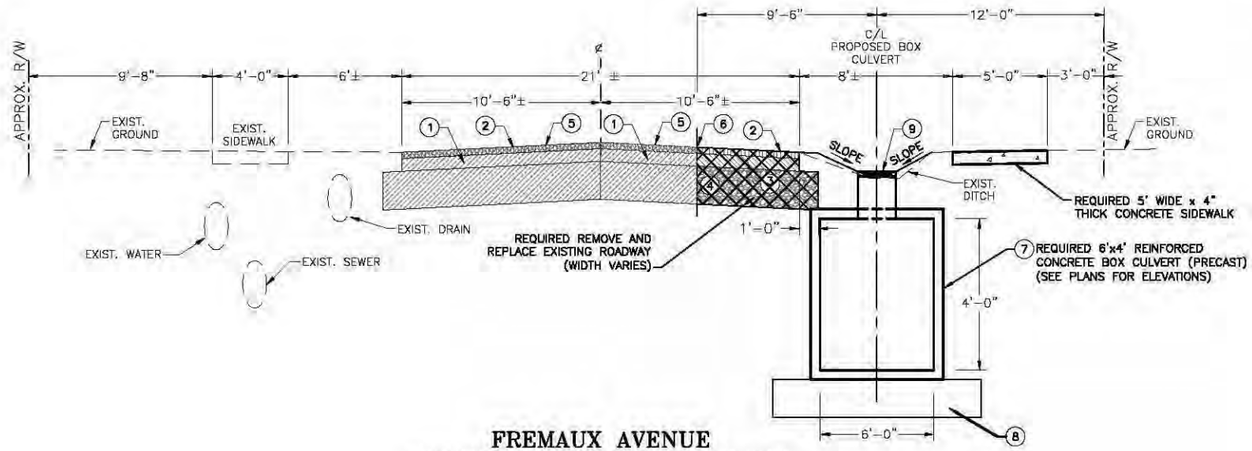
HALF SCALE (LOOKING EAST) FULL SCALE

HOR.: 1" = 8' VER.: 1" = 4'

HOR.: 1" = 4' VER.: 1" = 2'

NOTE:

1. CLASS II BASE COURSE SHALL BE SET ON GEOTEXTILE PAVING FABRIC IN ACCORDANCE WITH LADOTD SPECIFICATIONS. ALL COSTS OF GEOTEXTILE FABIC TO BE INCLUDED IN SQUARE YARD COSTS OF CLASS II BASE COURSE.



FREMAUX AVENUE

TYPICAL EXISTING ROADWAY SECTION FROM MARSHA DR. TO END

HALF SCALE (LOOKING EAST) FULL SCALE

HOR.: 1" = 8' VER.: 1" = 4'

HOR.: 1" = 4' VER.: 1" = 2'

LEGEND

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2. REQUIRED ASPHALTIC CONCRETE WEARING COURSE (TYPE 3)(AC-30)(2" THICK)
3. REQUIRED ASPHALTIC CONCRETE BINDER COURSE (TYPE 3)(AC-30)(4" THICK)
4. REQUIRED CLASS II BASE COURSE (CRUSHED STONE OR RECYCLED PCC)(12" THICK)
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6. REQUIRED FULL DEPTH SAW CUT
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9. REQUIRED 24" x 24" TEE INLET

NOTE

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Mandeville, LA 70471
985-727-4440
Fax 985-727-4447

DESIGNED	FJZ	DETAILED	JMC
CHECKED	RCL	CHECKED	RCL
DATE	03/12/15		
SHEET	3		

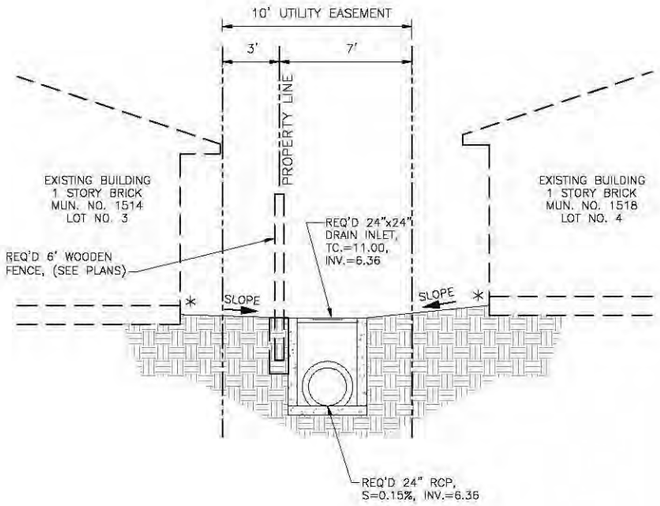
NO.	DATE	REVISION DESCRIPTION	BY

TYPICAL SECTIONS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No.: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

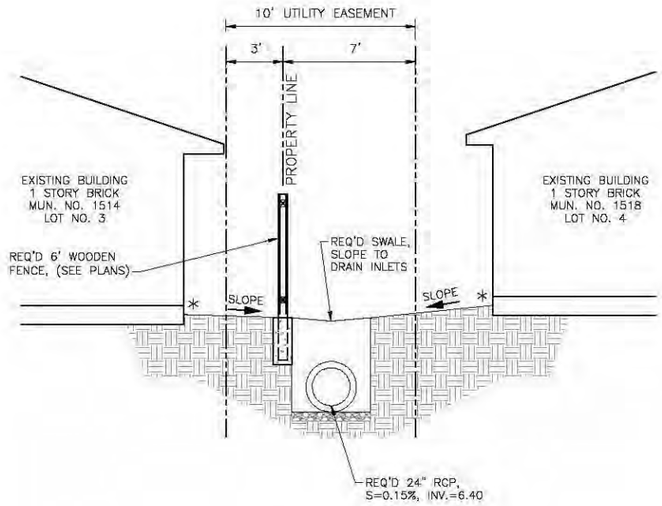
Sheet Number:
2a



FREMAUX AVENUE

STA. 103+92 TYPICAL DRAINAGE SECTION AT FRONT OF EXISTING HOUSES (SECTION A1–A1)

(LOOKING NORTH) SCALE: 1" = 4'



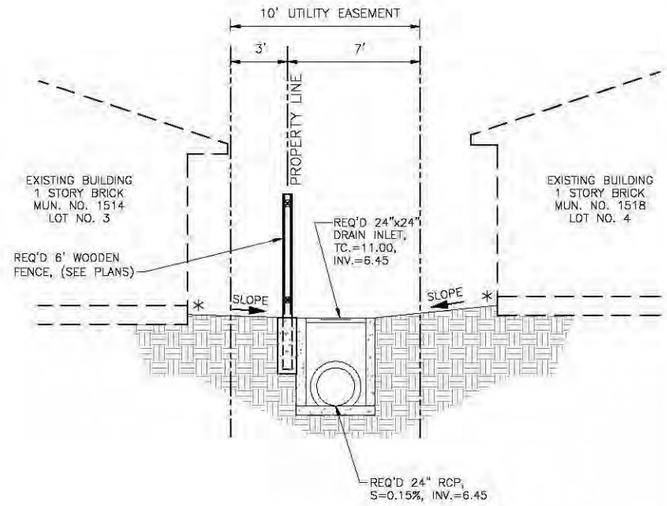
FREMAUX AVENUE

STA. 103+92 TYPICAL DRAINAGE SECTION BETWEEN EXISTING HOUSES (SECTION A2–A2)

(LOOKING NORTH) SCALE: 1" = 4'

* FINISHED GRADE AT RESIDENTIAL STRUCTURE SHALL BE A MINIMUM OF 6" BELOW TOP OF SLAB AND HAVE A FILL THICKNESS NOT EXCEEDING 6" SLOPING AWAY FROM STRUCTURE TOWARD PROPERTY LINE.

** EXISTING A/C UNIT TO REMAIN AT EXISTING GRADE AND LOCATION. GRADE ADJACENT AREA TO MATCH REQUIRED CONDITION.

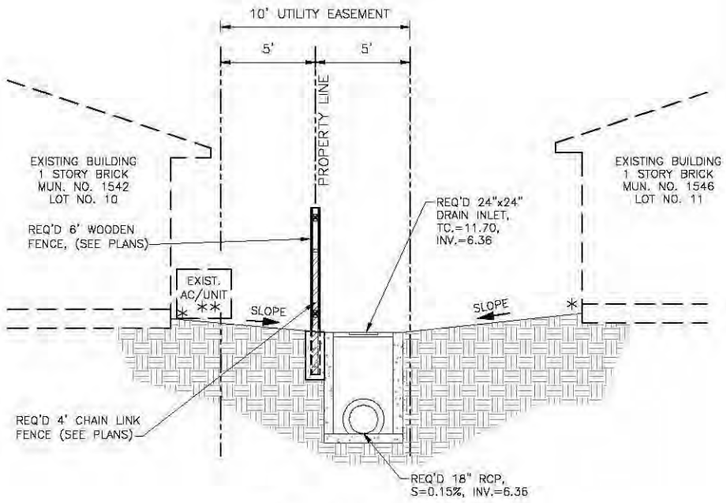


FREMAUX AVENUE

STA. 103+92 TYPICAL DRAINAGE SECTION AT REAR OF EXISTING HOUSES (SECTION A3–A3)

(LOOKING NORTH) SCALE: 1" = 4'

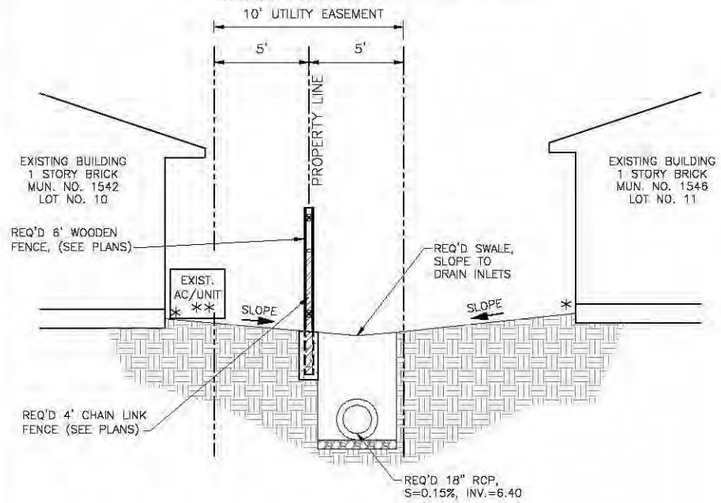
SECTIONS A–A TAKEN FROM SHEET 12



FREMAUX AVENUE

STA. 108+83 TYPICAL DRAINAGE SECTION AT FRONT OF EXISTING HOUSES (SECTION B1–B1)

(LOOKING NORTH) SCALE: 1" = 4'



FREMAUX AVENUE

STA. 108+83 TYPICAL DRAINAGE SECTION BETWEEN EXISTING HOUSES (SECTION B2–B2)

(LOOKING NORTH) SCALE: 1" = 4'

NOTE

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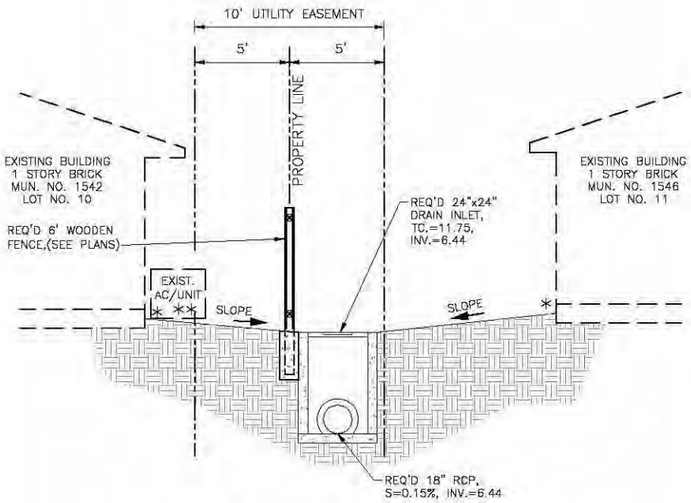

FREMAUX AVENUE

STA. 108+83 TYPICAL DRAINAGE SECTION AT REAR OF EXISTING HOUSES (SECTION B3–B3)

(LOOKING NORTH) SCALE: 1" = 4'

SECTIONS B–B TAKEN FROM SHEET 12

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CHECKED	RCL	CHECKED	RCL	SHEET	2b

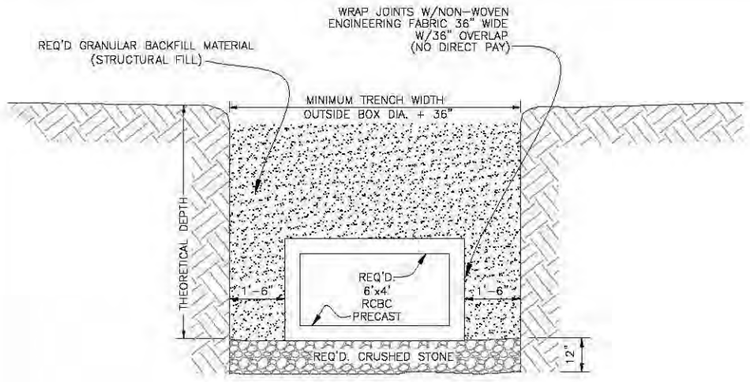
NO.	DATE	REVISION DESCRIPTION	BY

TYPICAL SECTIONS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

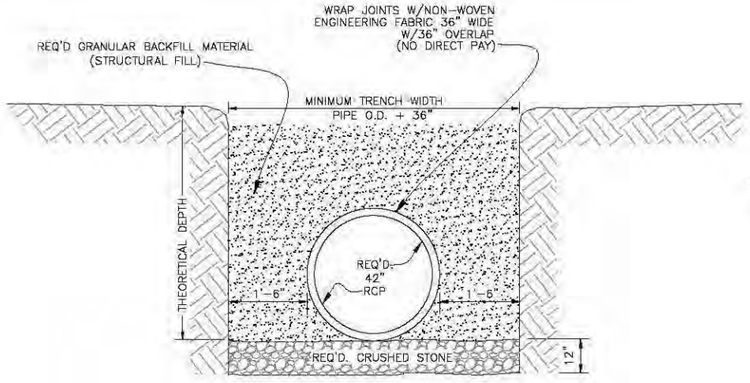
Sheet Number:
2b



6'x4' RCBC BEDDING & BACKFILL DETAIL OF OPEN DITCH

N.T.S.

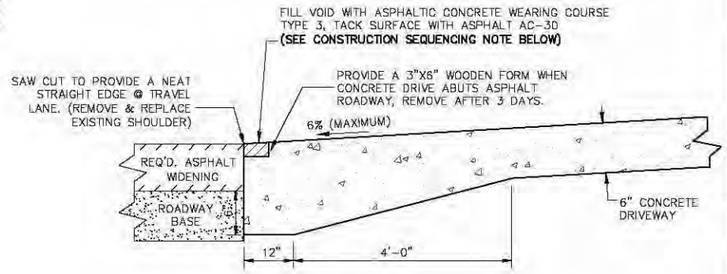
1. BACKFILL AND BEDDING SHALL BE INCLUDED IN LINEAR FOOT OF REQUIRED 6'x4' REINFORCED CONCRETE BOX CULVERT.



42" RCP BEDDING & BACKFILL DETAIL OF OPEN DITCH

N.T.S.

1. BACKFILL AND BEDDING SHALL BE INCLUDED IN LINEAR FOOT OF 42" RCP.



BUTT JOINT CONNECTION TO EXISTING ASPHALT ROADWAY FOR 6" CONCRETE DRIVEWAY

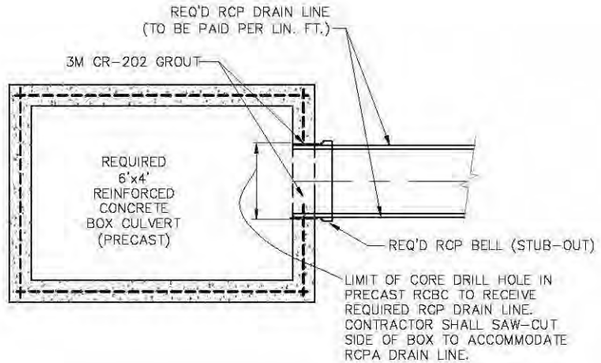
N.T.S.

CONSTRUCTION SEQUENCING:

IF CONCRETE DRIVEWAY IS CONSTRUCTED PRIOR TO ASPHALT PAVING, TEMPORARY 3"X 6" WOODEN FORM WEDGE WILL NOT BE REQUIRED.

TRAFFIC CONTROL NOTE:

ANY WORK IN THE ROADWAY OR ADJACENT TO THE ROADWAY CAUSING AN INTERFERENCE TO VEHICULAR TRAFFIC REQUIRES PRIOR NOTIFICATION TO THE CITY ENGINEER. CONTACT DONNA O'DELL AT 985-624-4270. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE UNIFORM MANUAL ON TRAFFIC CONTROL DEVICES OF THE STATE OF LOUISIANA. THE CONTRACTOR MUST FURNISH ALL NECESSARY TRAFFIC SIGNS AND/OR BARRICADES, AND MAINTAIN THEM DURING CONSTRUCTION ACTIVITY.

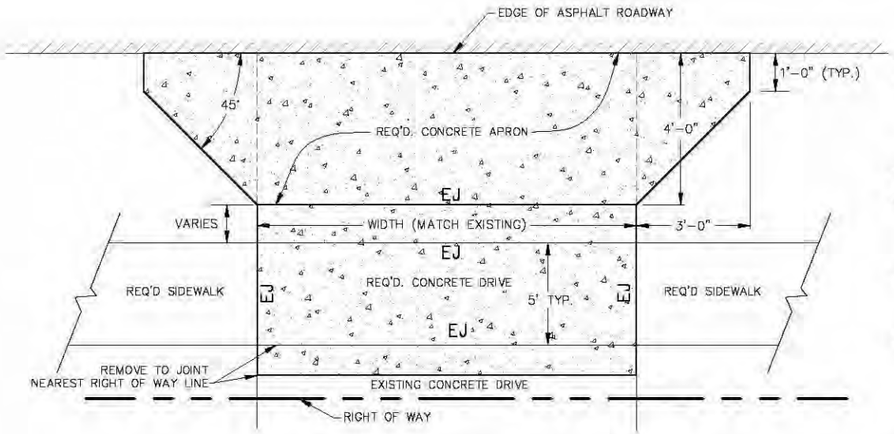


RCP DRAIN LINE STUB-OUT DETAIL

N.T.S.

NOTES:

1. NO DRAIN PIPE SHALL BE INSTALLED AT JOINTS OF THE RCBC. THE DRAIN PIPE SHALL BE ADJUSTED TO MEET THE NEAREST DOWNFLOW SECTION OF RCBC PIPE AT NO DIRECT PAY.
2. CONTRACTOR MAY SUPPLY LADOTD APPROVED PRECAST DRAINAGE STRUCTURES IN LIEU OF CAST IN PLACE DRAIN MANHOLE TYPE SHOWN. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR ADJUSTMENTS IF TOPS OF CASTINGS ARE RAISED OR LOWERED.
3. ALL COSTS ASSOCIATED WITH DRAIN LINE, BELL CONNECTION, CORE DRILL AT SAW-CUTTING HOLE, GROUTING RCP TO REINFORCED CONCRETE BOX CULVERT, EXCAVATION AND BACKFILL AND OTHER MISCELLANEOUS MATERIAL, LABOR AND EQUIPMENT NECESSARY TO CONSTRUCT THIS ITEM SHALL BE INCLUDED IN THE DRAIN LINE RCB STUB-OUT TIE-IN ITEM.



CONCRETE DRIVES

N.T.S.

GENERAL NOTES:

1. 9" MINIMUM COVER IS REQUIRED OVER DRAINAGE STRUCTURES, DRAIN LINES AND OTHER UTILITIES WHERE POSSIBLE. IN AREAS WHERE 9" CANNOT BE ACHIEVED, THE CONTRACTOR IS REMINDED TO TAKE CARE NOT TO DAMAGE PIPES DURING SUB-BASE CONSTRUCTION AND/OR PAVING OPERATIONS. ANY DAMAGE TO PIPES SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE CITY OF SLIDELL.
2. ALL EXISTING DRAINAGE TO REMAIN UNLESS OTHERWISE NOTED.
3. STRUCTURAL FILL AND BACKFILL SHALL BE CLAYEY-SAND WITH A MAXIMUM LIQUID LIMIT OF 40 AND A PLASTICITY INDEX OF LESS THAN 20%, OR GRANULAR FILL CONSISTING OF SAND WITH LESS THAN 10% PASSING THE NO. 200 SEIVE. MATERIAL SHALL BE COMPACTED TO 95% PER ASTM D698 AND GRANULAR MMATERIAL USED UNDER ROADWAY BASE COURSE SHALL BE ENCAPSULATED IN GEOTEXTILE FABRIC.
4. COST TO REMOVE SHRUBS, GRASS, ROOTS, TREES WITH A DBH OF 6" OR LESS, AND VEGETATION IN CONFLICT WITH REQUIRED WORK SHALL BE INCLUDED UNDER ITEM NUMBER 201-01-00100, "CLEARING AND GRUBBING". CONTRACTOR SHALL VERIFY WITH ENGINEER FOR ANY TREES TO BE REMOVED PRIOR TO ANY TREE REMOVAL.
5. UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE PER INFORMATION PROVIDED. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES FOR EXACT LOCATION AND DEPTH BEFORE CONSTRUCTION.

ASPHALT PAVING REPAIR NOTES

1. PRIOR TO INSTALLATION OF AC-30, TYPE3 ASPHALT PAVEMENT THE CONTRACTOR SHALL SUBMIT AN ASPHALT MIX PREPARED BY A REPUTABLE TESTING LABORATORY TO THE ENGINEER FOR APPROVAL. JOB MIX FORMULA FOR ASPHALT PAVEMENT PER LA. D.O.T.D. STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, 2000 EDITION.
2. ASPHALTIC CONC. WEARING COURSE: 2" THICKNESS, TYPE 3 MIX (AC-30).
   ASPHALTIC CONC. BINDER COURSE: 4" THICKNESS, TYPE 3 MIX (AC-30).
   CLASS II BASE COURSE: 12" THICKNESS (CRUSHED STONE OR RECYCLED P.C. CONCRETE)
3. ASPHALTIC CONCRETE PAVEMENT SHALL BE UNDERLAIN BY A CLASS II BASE COURSE COMPACTED TO 95% DENSITY AT OPTIMUM MOISTURE CONTENT PER ASTM D698. CLASS II BASE COURSE SHALL BE CRUSHED STONE OR RECYCLED PORTLAND CEMENT CONCRETE.
4. ASPHALT WEARING AND BINDER COURSES SHALL BE IN ACCORDANCE WITH THE 2000 EDITION OF THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES.

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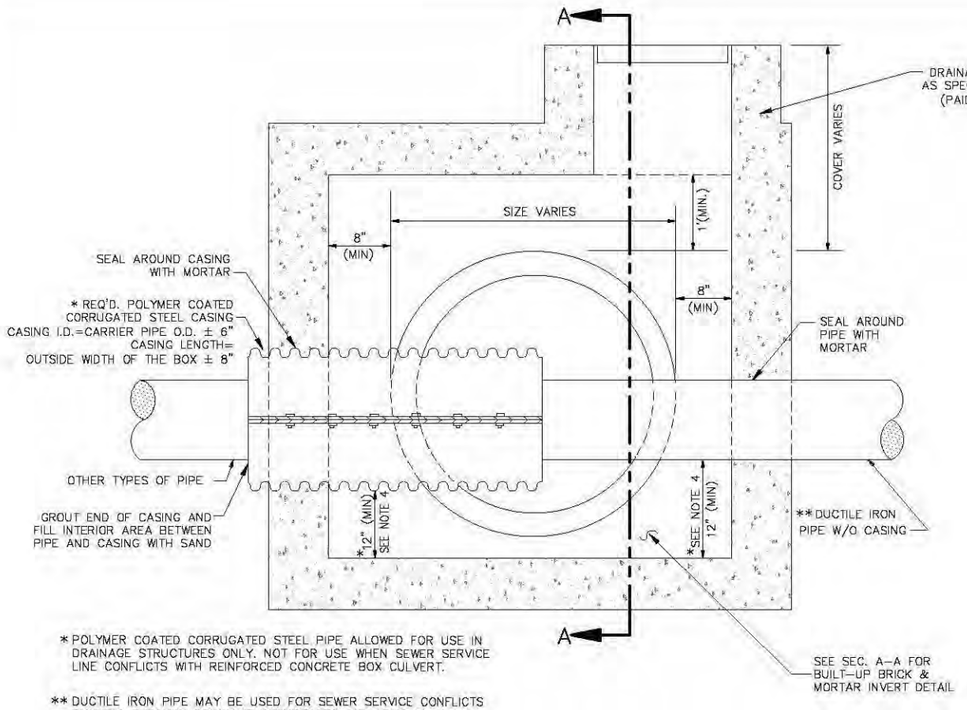
DATE	03/12/15			
SHEET	2c			
		BY	DATE	REVISION DESCRIPTION
		NO.		

DRIVEWAY & DRAINAGE DETAILS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
2c

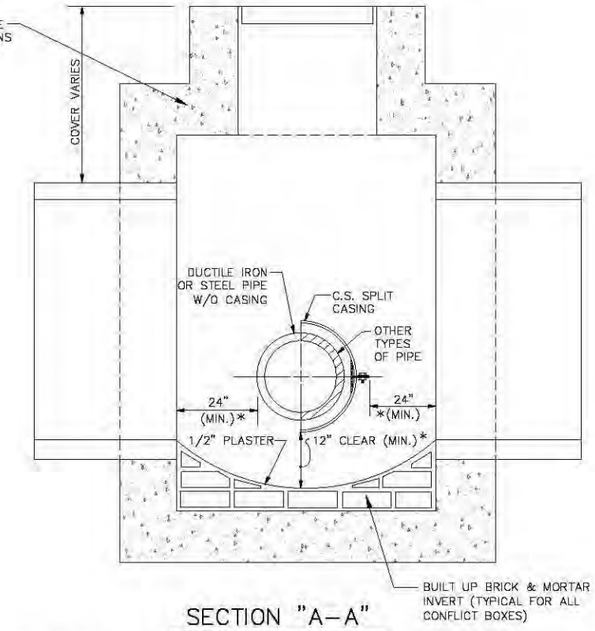


* POLYMER COATED CORRUGATED STEEL PIPE ALLOWED FOR USE IN DRAINAGE STRUCTURES ONLY. NOT FOR USE WHEN SEWER SERVICE LINE CONFLICTS WITH REINFORCED CONCRETE BOX CULVERT.

** DUCTILE IRON PIPE MAY BE USED FOR SEWER SERVICE CONFLICTS RUNNING THROUGH DRAINAGE STRUCTURES AND MUST BE USED FOR REINFORCED CONCRETE BOX CULVERT CONFLICTS.

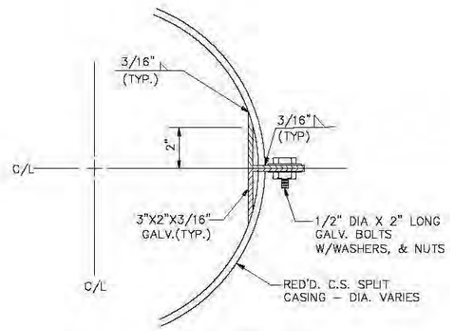
UTILITY LINE PROTECTION FOR DRAIN LINE CONFLICTS

SCALE: N.T.S.



SECTION "A-A"

N.T.S.

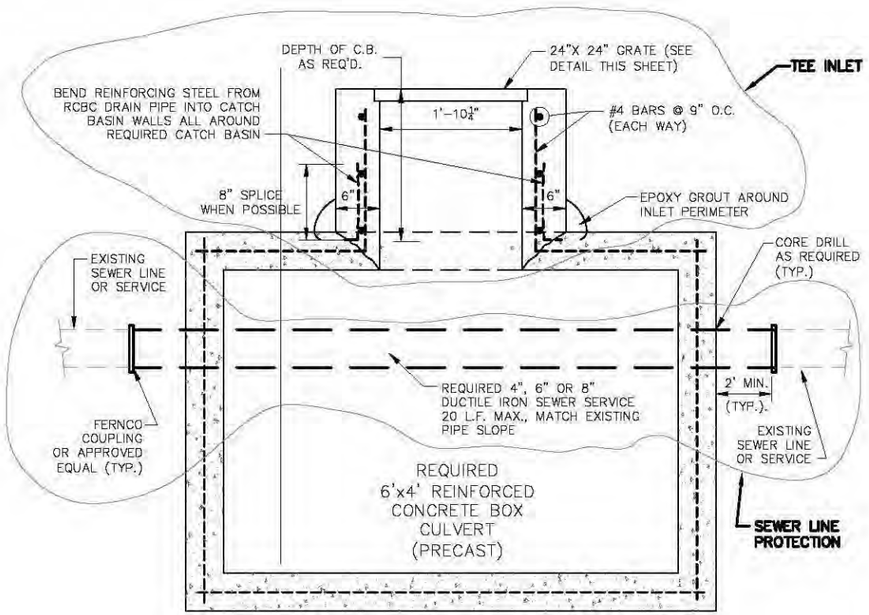


SPLIT CASING DETAIL

N.T.S.

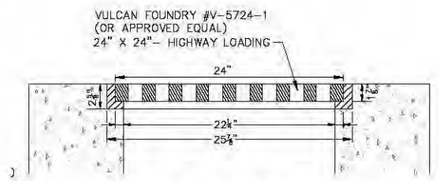
CONFLICT NOTES:

1. SPLIT CASING SHALL BE POLYMER COATED (10MIL./10MIL.) IN ACCORDANCE WITH AASHTO DESIGNATIONS M-218, M-245 AND M-246: 16 GAGE.
2. IF BOTTOM ELEVATION OF THE CONFLICT IS ABOVE THE UPPER 3RD. OF THE INSIDE DIAMETER OF THE DRAIN LINE THE INVERT OF THE CONFLICT BOX COULD BE THE SAME AS THE INVERT OF THE DRAIN LINE SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER.
3. ALL WATER LINES IN CONFLICT BOX SHALL BE DUCTILE IRON PIPE. OTHER PIPE MATERIAL SHALL BE INSTALLED IN SPLIT CASING.
4. CLEARANCES SHOWN ARE NOT FOR HYDRAULIC DESIGN PURPOSES, BUT ARE MINIMUM CLEARANCES REQUIRED FOR PROPER INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM. THE 12" AND 24" MIN. CLEARANCES SHOWN WILL EXTEND FROM INNER WALL SURFACES OR THE INVERT OF THE CONFLICT BOX TO THE OUTSIDE OF THE CASING OR THE OUTER EDGE OF THE CASING FLANGE, WHICHEVER IS APPLICABLE. MODIFIED CONFLICT BOXES SHALL BE DESIGNED AND CONSTRUCTED, IF NECESSARY, TO PROVIDE FOR SMOOTH AND ADEQUATE FLOW OF THE DESIGN RUNOFF. ALL CLEARANCES AND OPENINGS OF MODIFIED CONFLICT BOXES SHALL BE COMPATIBLE WITH AND SIZED FOR THE DRAIN LINES IN CONFLICT.
5. THE PREFERRED METHOD OF INSTALLING SPLIT CASINGS IS TO HAVE THE FLANGES IN 3 O'CLOCK/9 O'CLOCK POSITIONS AS SHOWN IN SEC. A-A.



TEE INLET & SEWER LINE PROTECTION DETAILS

N.T.S.



24" X 24" TEE INLET FRAME & GRATE DETAIL

N.T.S.

TEE INLET NOTES:

1. TEE INLETS SHALL BE CONSTRUCTED ON R.C. BOX CULVERT DIRECTLY ABOVE ALL SEWER LINES AND SERVICES THAT RUN THROUGH REINFORCED CONCRETE BOX CULVERT.
2. THIS FRAME AND GRATE SHALL ALSO BE USED FOR PRECAST 24"x24" DRAIN INLETS. PRECAST INLETS SHALL BE ON THE LADOTD QUALIFIED PRODUCTS LISTS.

NOTE

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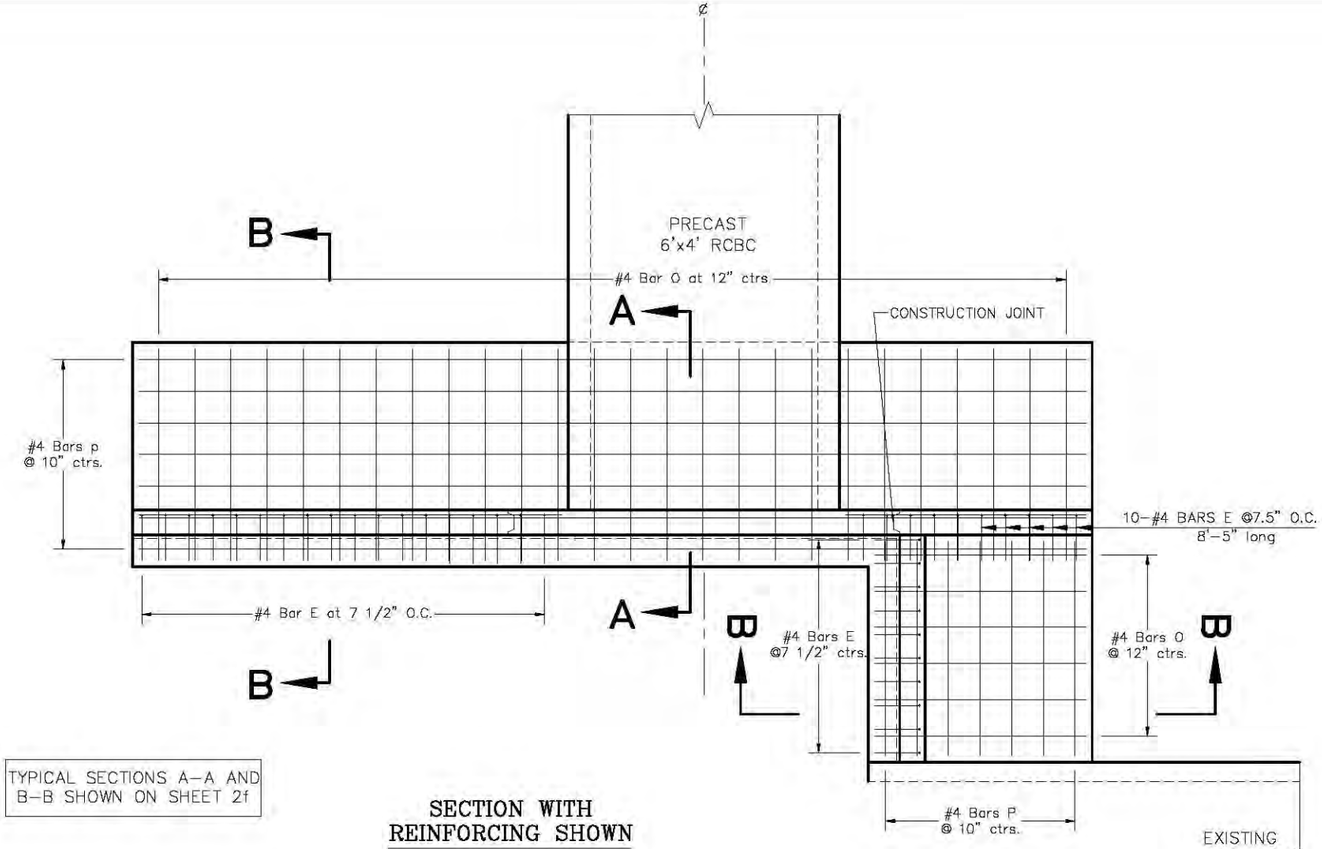
TEE INLET AND CONFLICT DETAILS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCL No: 713-20

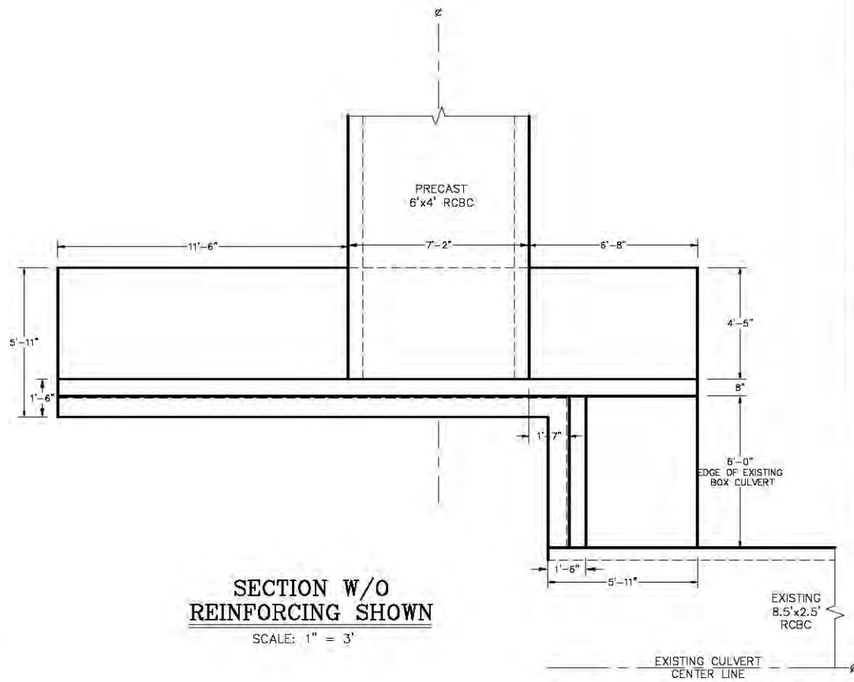
Sheet Number:
2d



TYPICAL SECTIONS A–A AND B–B SHOWN ON SHEET 2f

SECTION WITH REINFORCING SHOWN

SCALE: 1" = 2'



SECTION W/O REINFORCING SHOWN

SCALE: 1" = 3'

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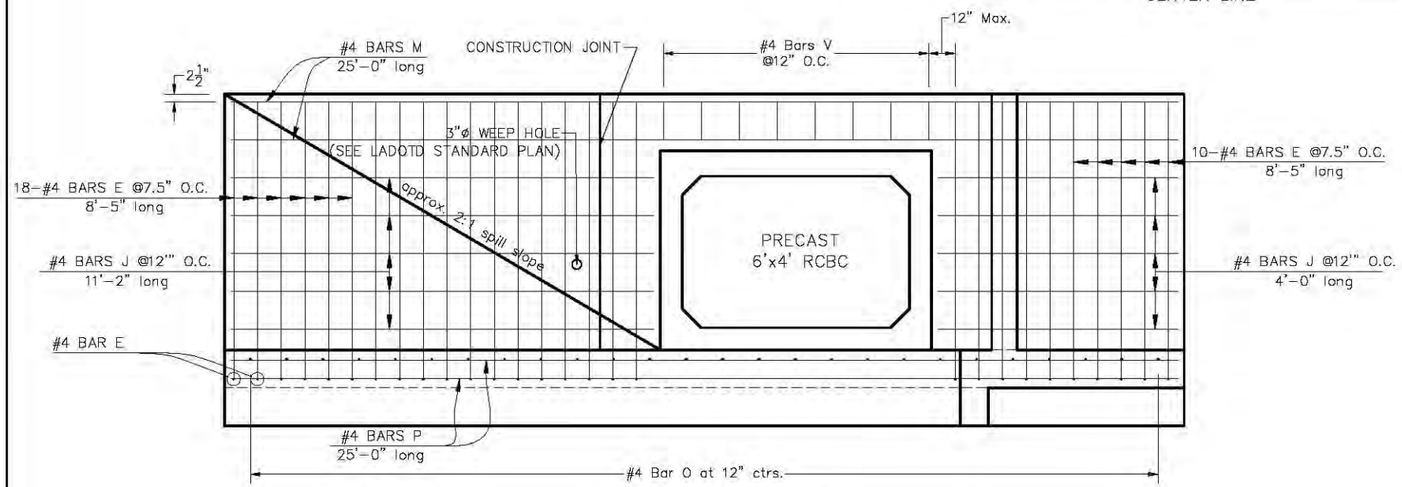
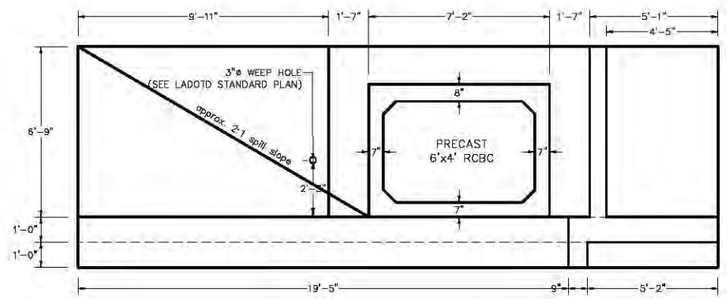


END ELEVATION WITH REINFORCING SHOWN

SCALE: 1" = 2'

LOOKING WEST



END ELEVATION W/O REINFORCING SHOWN

SCALE: 1" = 3'

LOOKING WEST

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TYPICAL SECTION REINFORCED CONCRETE BOX CULVERT

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
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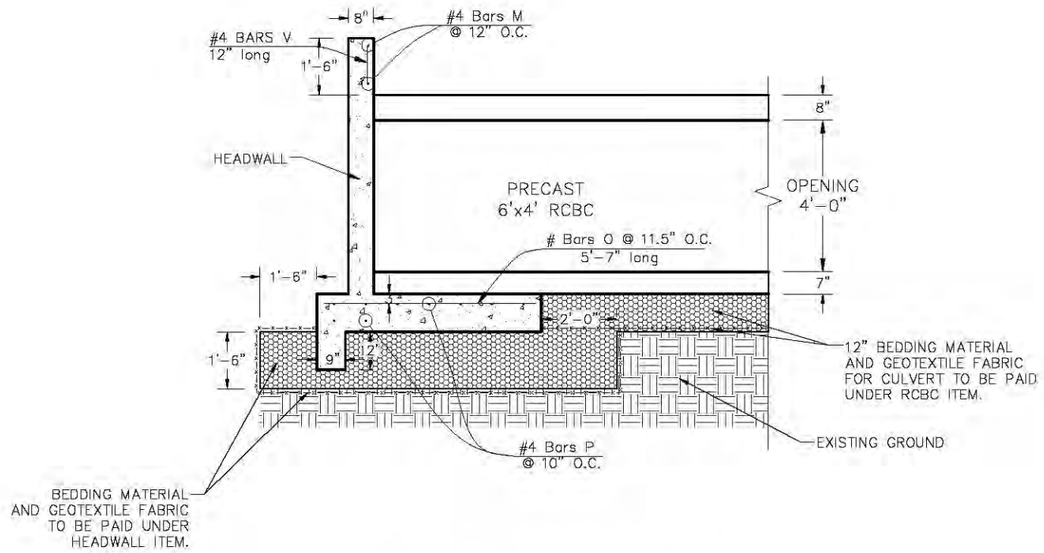
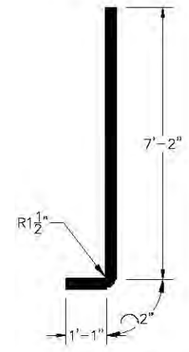
Sheet Number:
2e



TYPICAL SECTION "A–A"
6'x4' REINFORCED CONCRETE BOX CULVERT

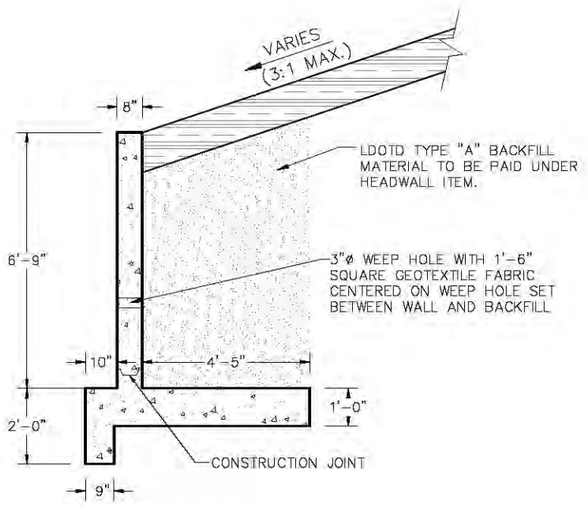
SCALE : 1" = 2'



BAR E
NTS

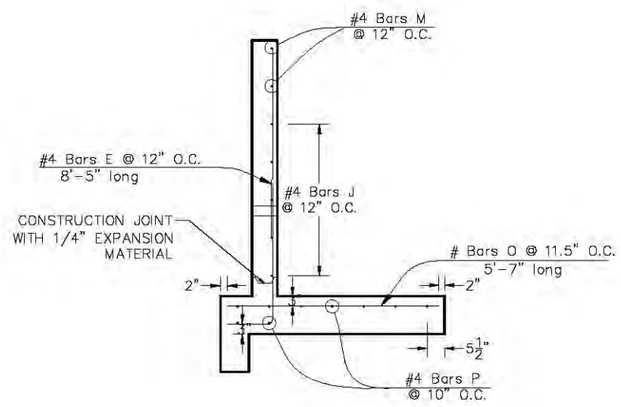
GENERAL NOTES:

1. ALL LABOR, EQUIPMENT AND MATERIALS INCLUDING CLASS "A" CONCRETE, REINFORCEMENT, FILTER CLOTH AND PVC PIPE REQUIRED FOR WEEP HOLES AND CONSTRUCTION JOINTS SHALL BE INCLUDED IN AND PAID FOR UNDER HEADWALL ITEM.
2. ALL CONCRETE SHALL BE CLASS A. ALL EXPOSED EDGES SHALL BE 3/4 INCH CHAMFERED.
3. REINFORCEMENT SHALL BE GRADE 60. BAR SPACING DIMENSIONS ARE TO BAR CENTERS. STEEL REQUIRED FOR LAP SPLICES NOT DETAILED SHALL NOT BE MEASURED FOR PAYMENT. REINFORCING STEEL SHALL HAVE A 2" COVER UNLESS OTHERWISE SPECIFIED.
4. A 1'–6" SQUARE OF GEOTEXTILE FABRIC (SEE SECTION 1019 OF LADOTD STANDARD SPECIFICATIONS) SHALL BE PLACED IN CONTACT WITH CONCRETE BEHIND EACH WEEPHOLE IN ADDITION TO APPROXIMATELY 2 CU.FT. OF CONCRETE SAND (SEE SECTION 1003.02 OF THE LADOTD STANDARD SPECIFICATIONS).
5. ALL CONSTRUCTION JOINTS SHOWN ARE OPTIONAL. FOR DETAILS OF KEYED CONSTRUCTION JOINTS SEE LADOTD STANDARD PLAN CM–49. FOR CONSTRUCTION JOINTS WITHOUT KEY, THE JOINT SURFACE SHALL BE ROUGHED. HARDENED SURFACE SHALL BE CLEANED. IMMEDIATELY BEFORE NEW CONCRETE IS PLACED, JOINT SURFACE SHALL BE SATURATED WITH WATER.



TYPICAL SECTION "B–B"
W/O REINFORCING

SCALE : 1" = 2'



TYPICAL SECTION "B–B"
SHOWING REINFORCING

SCALE : 1" = 2'

NOTE

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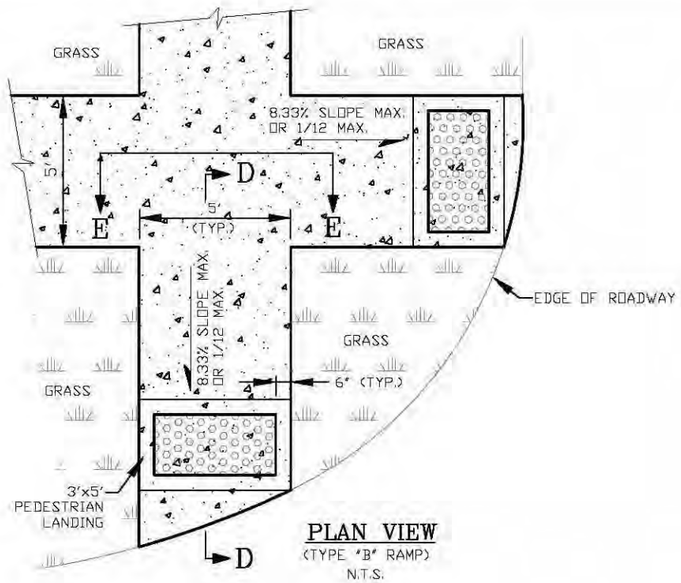
TYPICAL SECTION
REINFORCED CONCRETE
BOX CULVERT

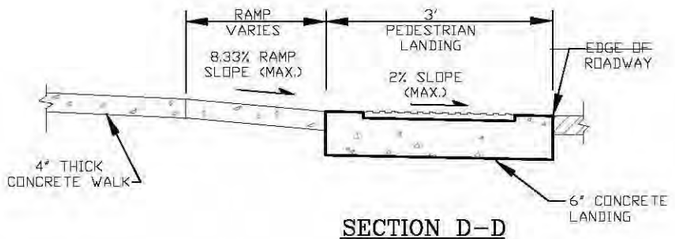
EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
2f



PLAN VIEW
(TYPE "B" RAMP)
N.T.S.



SECTION D–D
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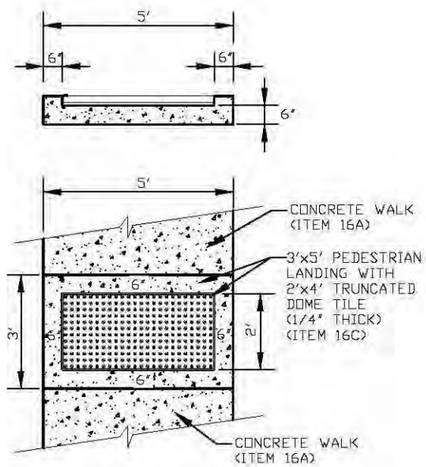

SECTION E–E
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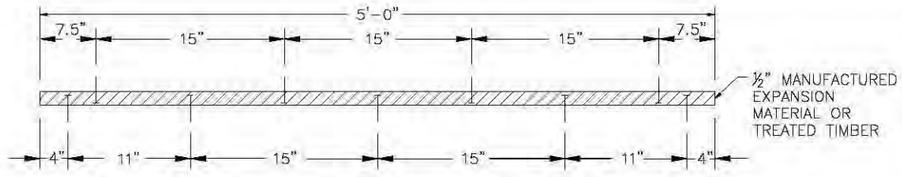
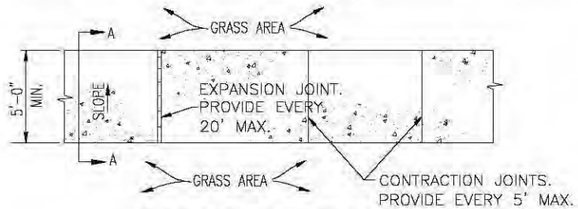
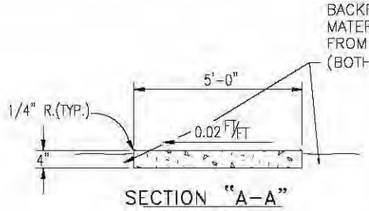


LAYOUT PLAN FOR #10 COMMON GALV. NAILS AT EXPANSION JOINTS
N.T.S.



PLAN VIEW– SIDEWALK
N.T.S.



SECTION "A–A"
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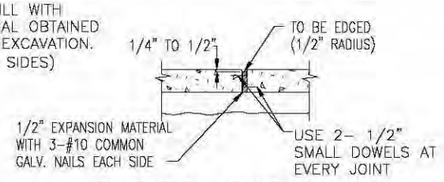
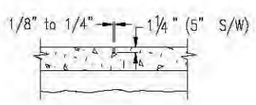
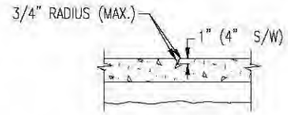


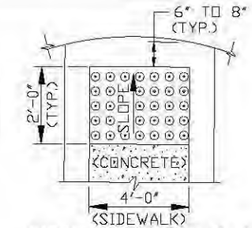
EXPANSION JOINT
MAXIMUM SPACING 20'–0"
N.T.S.



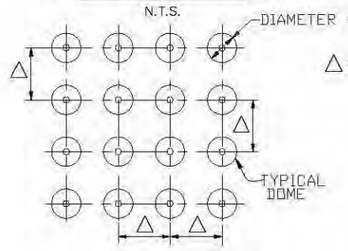
SAWED CONTRACTION JOINT
MAXIMUM SPACING 4'–0"
N.T.S.



HAND TOOLED CONTRACTION JOINT
MAXIMUM SPACING 4'–0"
N.T.S.



PARTIAL PLAN SHOWING 2'–0" OFF SET FOR TRUNCATED DOMES
N.T.S.



PARTIAL PLAN OF TRUNCATED DOMES
N.T.S.

NOTES:

1. TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL HAVE A BASE DIAMETER OF 0.9 INCHES, A TOP DIAMETER OF 0.45" INCHES AND A HEIGHT OF 0.2 INCHES.
2. TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL HAVE A CENTER–TO–CENTER SPACING OF 3" INCHES. THROUGH THE ENTIRE LENGTH OF THE TILE.
3. TRUNCATED DOMES TILE SHALL BE COLOR BRICK RED UNLESS OTHERWISE SPECIFIED.
4. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. DETECTABLE WARNINGS USED ON INTERIOR SURFACES SHALL DIFFER FROM ADJOINING WALKING SURFACES IN RESILIENCY OR SOUND–ON–CANE CONTACT.
5. TRUNCATED DOMES ON CURB RAMPS WITHIN THE STREET R.O.W. SHALL BE ONE PREFABRICATED DETECTABLE WARNING TILE UNIT ANCHORED DIRECTLY IN NEWLY POURED CONCRETE.
6. TRUNCATED DOMES SHALL COVER AT LEAST 2 FEET IN DEPTH AND EXTEND FULL WIDTH OF THE RAMP. ANY RAMP HAVING FLARED SIDES WILL NOT BE REQUIRED TO HAVE THESE DETECTABLE WARNINGS ON THE FLARES.
7. STAMPING OF TRUNCATED DOMES WITHIN THE R.O.W. WILL NOT BE ALLOWED.

TYPICAL DETAILS OF CONCRETE SIDEWALK

N.T.S.

NOTES:

1) ALL SIDEWALKS AND HANDICAP RAMPS SHALL HAVE FIBER MESH AT 1.5 LBS. PER CU.YD. OF CONCRETE.
2) THERE SHALL BE NO ADDITIONAL COMPENSATION FOR CONSTRUCTION OF CURB TRANSITIONS.

PEDESTRIAN LANDING/TRUNCATED DOME NOTES:

A. LOCATION

1. STREET INTERSECTIONS AS SHOWN ON DRAWINGS.
2. ACTUAL LOCATION OF RAMPS MAY VARY AS DIRECTED BY THE ENGINEER TO ACCOMMODATE EXISTING SITE CONDITIONS.

B. CONSTRUCTION

1. THE SLOPE OF THE RAMP SHALL NOT EXCEED 8.33%.
2. THE SLOPE OF THE SIDEWALK AND SIDEWALK TRANSITION SHALL NOT EXCEED 8.33%.
3. THE WIDTH OF THE RAMP SHALL NOT BE LESS THAN (5') BUT MAY EXCEED THIS WHERE NECESSARY.
4. SURFACE TEXTURE OF THE CONCRETE RAMP SHALL BE COMPLY WITH ADA, THE LATEST EDITION.
5. RAISED TRUNCATED DOMES SHALL BE 24"x48" TILE SYSTEMS AND MUST COMPLY WITH THE LATEST ADA REQUIREMENTS.
6. ALL CONCRETE TO BE (3000 psi) EXCEPT AS OTHERWISE INDICATED.

NOTE
THE CONTRACTOR'S ATTENTION IS CALLED TO THE PRESENCE OF OVERHEAD AND UNDERGROUND POWER LINES, UNDERGROUND GAS, AND COMMUNICATION LINES THROUGHOUT THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY AND COORDINATING HIS OPERATIONS WITH ALL UTILITY COMPANIES.

THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.

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03/12/15
FRANZ J. ZEMMER, P.E.
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DETAILED	JAC
CHECKED	RCL
DATE	03/12/15
SHEET	2g

NO.	DATE	REVISION DESCRIPTION	BY

SIDEWALK & ADA RAMP DETAILS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
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GOHSEP No: 1603n–103–0043
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SUMMARY OF ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
1	MOBILIZATION AND DEMOBILATION	LUMP SUM	LUMP
2	SITE CONDITION AUDIO/VIDEO SURVEY	LUMP SUM	LUMP
3	CONSTRUCTION LAYOUT	LUMP SUM	LUMP
4	CLEARING AND GRUBBING	LUMP SUM	LUMP
5A	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP SUM	LUMP
5B	REMOVAL OF STORM DRAIN PIPE, 24" OR LESS	LIN. FT.	408
5C	REMOVAL OF STORM DRAIN PIPE, 30" OR MORE	LIN. FT.	20
5D	REMOVAL OF 32" x 36" BOX CULVERT	LIN. FT.	60
5E	REMOVAL OF DRAIN INLET	EACH	9
5F	REMOVAL OF BOX CULVERT HEADWALL & EROSION CONTROL CONCRETE PAD	LUMP SUM	LUMP
5G	REMOVAL OF ASPHALT AND STABILIZED BASE	SQ. YD.	816
5H	REMOVAL OF CONCRETE WALKS AND DRIVES	SQ. YD.	223
5I	REMOVAL OF 6' WOODEN FENCE	LIN. FT.	131
5J	REMOVAL OF CHAIN LINK FENCE	LIN. FT.	179
5K	REMOVAL OF EXISTING TREE	EACH	16
6	DE-ENERGIZING POWER LINES	LUMP SUM	LUMP
7A	SAWCUT ASPHALT PAVEMENT - FULL DEPTH	LIN. FT.	1348
7B	SAWCUT CONCRETE PAVEMENT - FULL DEPTH	LIN. FT.	80
8	EXCAVATABLE FLOWABLE FILL	CU. YD.	342
9A	PLUG 12" RCP	EACH	1
9B	PLUG 15" RCP	EACH	1
9C	PLUG 30" RCP	EACH	1
9D	PLUG 36" RCP	EACH	1
9E	PLUG 32" x 36" RCBC	EACH	6
10A	EXCAVATION AND EMBANKMENT	LUMP SUM	LUMP
10B	EXCAVATION AND REPLACEMENT OF UNSUITABLE MATERIAL	CU. YD.	200
11	ENVIRONMENTAL PROTECTION	LUMP SUM	LUMP
12	COLD PLANING ASPHALTIC PAVEMENT - 2" DEPTH	SQ. YD.	2500
13	TRAFFIC MAINTENANCE AGGREGATE (VEHICULAR MEASUREMENT)	CU. YD.	100
14	12" THICK CLASS II BASE COURSE	SQ. YD.	890
15A	ASPHALTIC CONCRETE WEARING COURSE - 2" THICK	SQ. YD.	3316
15B	ASPHALTIC CONCRETE BINDER COURSE - 2" THICK	SQ. YD.	816
16A	CONCRETE WALK - 4" THICK	SQ. YD.	653
16B	CONCRETE DRIVE - 6" THICK	SQ. YD.	108
16C	3' x 5' PEDESTRIAN LANDING	EACH	24
17A	R-CB-11MOD DRAIN MANHOLE	EACH	2
17B	R-CB-32 DRAIN MANHOLE	EACH	3
17C	24" x 24" DRAIN INLET	EACH	9
17D	TEE INLET	EACH	9
18	REINFORCED CONCRETE HEADWALL	LUMP SUM	LUMP
19A	15" RCP STORM DRAIN PIPE	LIN. FT.	56
19B	18" RCP STORM DRAIN PIPE	LIN. FT.	149
19C	24" RCP STORM DRAIN PIPE	LIN. FT.	109
19D	24" RCPA STORM DRAIN PIPE	LIN. FT.	98
19E	42" RCP STORM DRAIN PIPE	LIN. FT.	146
19F	6' x 4' PRECAST REINFORCED CONCRETE BOX CULVERTS	LIN. FT.	1211
20	RIPRAP - 10 lb, 14" THICK	SQ. YD.	85
21	TRAFFIC REGULATION	LUMP SUM	LUMP
22	SLAB SODDING	SQ. YD.	3500
23	FIELD OFFICE	EACH	1
24A	6' WOOD FENCE	LIN. FT.	241
24B	4' CHAIN LINK FENCE	LIN. FT.	69
25	SEWER LINE PROTECTION	EACH	7
26A	OFFSET 2" WATERLINE	EACH	1
26B	OFFSET 6" WATERLINE	EACH	1
27	REPLACE SEWER SERVICE	EACH	6
28	REPLACE WATER SERVICE	EACH	6
29A	REGRADE EXISTING CHANNEL	LIN. FT.	50
29B	REGRADE EXISTING SIDE ROAD DITCH	LIN. FT.	240
30	EXPLORATORY EXCAVATION	EACH	7
31A	15" RCP STUB-OUT TIE-IN	EACH	2
31B	24" RCPA STUB-OUT TIE-IN	EACH	2

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DETAILED JAC
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SUMMARY OF ESTIMATED QUANTITIES

EASTWOOD DRAINAGE IMPROVEMENTS

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1. CONTRACTOR IS RESPONSIBLE FOR CALCULATING EXCAVATION AND EMBANKMENT QUANTITIES NECESSARY TO MEET FINAL GRADES. THERE SHALL BE NO ADJUSTMENT IN CONTRACTOR'S LUMP SUM BID FOR EXCAVATION AND EMBANKMENT.

2. DRAIN LINE BACKFILL AND BEDDING SHALL BE IN ACCORDANCE WITH PIPE BEDDING AND BACKFILL DETAIL ON SHEET 2c. ALL COSTS FOR EXCAVATION, BACKFILL, BEDDING MATERIAL AND GEOTEXTILE FABRIC OF REQUIRED STORM DRAIN PIPE AND STRUCTURES SHALL BE INCLUDED IN STORM DRAIN PIPE AND STRUCTURES ITEMS. BEDDING MATERIAL FOR DRAIN LINES AND BOX CULVERTS SHALL HAVE A MINIMUM DEPTH OF 12" INCHES AND WIDTH OF THE PIPE OUTSIDE DIAMETER OR WIDTH PLUS 36 INCHES. BEDDING MATERIAL FOR DRAIANGE STRUCTURES SHALL BE THE BASE SLAB DIMENSIONS PLUS 24" INCHES FOR A DEPTH OF 12" INCHES.

3. CONTRACTOR IS RESPONSIBLE FOR CALCULATION OF QUANTITIES FOR ALL LUMP SUM BID ITEMS.

4. PAY ITEM QUANTITIES MAY BE ADJUSTED TO SUIT SITE CONDITIONS PER DIRECTION OF PROJECT ENGINEER. THE LINES AND GRADES SHOWN ON THE PLANS MAY BE MODIFIED SLIGHTLY BY THE PROJECT ENGINEER IF FIELD CONDITIONS JUSTIFY SUCH A VARIATION. THE CONTRACTOR SHALL NOT BE ENTITLED TO EXTRA PAYMENT OTHER THAN WHATEVER INCREASE IN CONTRACT QUANTITIES ARE INVOLVED.

5. ALL SIGNS TO BE REMOVED AS DESIGNATED ON PLANS OR AS DIRECTED BY PROJECT ENGINEER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED OFF SITE.

6. ANY REQUIRED PRIVATE UTILITY MAIN RELOCATION SHALL BE BY OTHERS. CONTRACTOR SHALL NOTIFY UTILITY COMPANIES TEN WORKING DAYS PRIOR TO BEGINNINING CONSTRUCTION AND COORDINATE RELOCATION WITH PRIVATE UTILITY PROVIDER.

7. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING FENCES WITH MATERIAL EQUAL TO OR BETTER THAN EXISTED PRIOR. NO DIRECT PAY FOR THIS WORK.

8. ALL EXCESS EXCAVATION AND OTHER MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE HAULED AND LEGALLY DISPOSED OF BEYOND THE LIMITS OF THE PROJECT. EXCAVATION OF EXISTING AGGREGATE DRIVES SHALL BE INCLUDED UNDER "EXCAVATION AND EMBANKMENT" ITEM.

9. ANY DAMAGE CAUSED BY CONTRACTOR TO ADJACENT ROADWAY OR PROPERTY SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION THAN EXISTED PRIOR TO CONSTRUCTION BY CONTRACTOR AT CONTRACTOR'S EXPENSE.

10. ASPHALT WEARING AND BINDER COURSES SHALL BE IN ACCORDANCE WITH THE 2000 EDITION OF THE LOUISIANA STANDARD SPECIFICATION FOR ROADS AND BRIDGES.

11. CONCRETE DRIVEWAYS SHALL INCLUDE POLYPROPYLENE MESH @ 1.5 LBS/C.Y. OF CONCRETE CONFORMING TO ASTM C116, TYPE III.

12. CONTRACTOR SHALL COORDINATE ALL UTILITY AND UTILITY POLE RELOCATIONS.

13. MANUFACTURER OF PRECAST 24"x24" DRAIN INLET SHALL BE ON THE LADOTD QUALIFIED PRODUCTS LIST.

14. CONTINGENCY ITEMS TO BE USED AS NECESSARY PER DIRECTION FROM PROJECT ENGINEER.

15. ALL AREAS WITHIN R/W THAT ARE NOT COVERED WITH CONCRETE OR ASPHALT SHALL BE SODDED. SOD SHALL MATCH ADJACENT EXISTING SOD SPECIES UNLESS DIRECTED OTHERWISE BY PROJECT ENGINEER. THERE SHALL BE NO DIRECT PAYMENT FOR ALL NECESSARY WATERING AND FERTILIZING.

16. DRAIN LINE BACKFILL SHALL BE GRANULAR MATERIAL OR CLAYEY-SAND. ALL COSTS FOR IMPORTED GRANULAR MATERIAL BACKFILL SHALL BE INCLUDED IN ASSOCIATED ITEM OF WORK.

17. ALL SIGNS (REMOVED OR RELOCATED), DRAIN LINES, HEADWALLS AND OTHER ITEMS WITHOUT A DESIGNATED PAY ITEM THAT ARE SHOWN TO BE REMOVED SHALL BE DONE UNDER "REMOVAL OF STRUCTURES AND OBSTRUCTIONS" ITEM. ALL COSTS FOR BACKFILLING TRENCHES WITH GRANULAR MATERIAL AFTER DRAIN LINES OR BOXES HAVE BEEN REMOVED SHALL BE PAID UNDER REMOVAL ITEMS.

18. ALL TREES UNDER 7" DIAMETER BREST HEIGHT (DBH), VEGETATION, AND DEBRIS WITHIN THE PROJECT LIMITS AND IN CONFLICT WITH PROPOSED CONSTRUCTION SHALL BE REMOVED UNDER CLEARING AND GRUBBING ITEM, PER LUMP SUM. TREES TO BE REMOVED THAT ARE 7" DBH AND GREATER TO BE PAID PER EACH. BEFORE BEGINNING WORK ON REMOVAL OF ANY TREE, THE CONTRACTOR SHALL NOTIFY AND REVIEW THE TREE REMOVAL WITH THE PROJECT ENGINEER.

19. COSTS FOR ALL WORK AND ASSOCIATED ITEMS OF WORK SHALL BE INCLUDED IN ONE OF THE BID ITEMS PROVIDED.

20. GEOTEXTILE FABRIC REQUIRED UNDER ROADWAY BASE COURSE SHALL BE PAID UNDER "CLASS II BASE COURSE (12" THICK)" ITEM.

21. ALL SIGNS AND MAILBOXES THAT ARE IN CONFLICT WITH CONSTRUCTION THAT ARE TO REMAIN SHALL BE STORED AND REPLACED TO THEIR PROPER LOCATION BY THE CONTRACTOR UPON COMPLETION OF WORK AT NO DIRECT PAY.

22. SOME R-CB-11MOD AND R-CB-32 DRAIN MANHOLES MAY REQUIRE DRAIN GRATES TO ALLOW FOR SURFACE RUNOFF TO DRAIN INTO MANHOLE. LOCATIONS ARE SHOWN ON PLANS OR AS DIRECTED BY PROJECT ENGINEER IN FIELD. SOLID MANHOLE COVERS SHALL READ "DRAIN" IN LIEU OF "LDH".

23. PRIOR TO CONSTRUCTING DRAINAGE STRUCTURES, CONTRACTOR SHALL COORDINATE WITH PROJECT ENGINEER TO EXCAVATE POTENTIAL CONFLICTS WITH SEWER SERVICE LINES AND OTHER UTILITIES. INCLUDED WITHIN THIS ITEM IS EXCAVATION, LOCATION OF UTILITY, INVERT ELEVATION OF UTILITY AND BACKFILL.

24. WHERE UTILITY LINE CANNOT BE ADJUSTED, CONTRACTOR SHALL MODIFY REQUIRED DRAINAGE STRUCTURE TO ACCOMMODATE UTILITY LINE PROTECTION WITH POLYMER COATED CORRUGATED STEEL PIPE OR DUCTILE IRON IN ACCORDANCE WITH DETAILS ON SHEETS 2d.

25. ALL COSTS TO TIE IN EXISTING AND NEW DRAIN LINES TO REQUIRED DRAIN INLETS AND MANHOLES SHALL BE INCLUDED IN COST OF NEW DRAINAGE STRUCTURE. DRAIN LINE TIE-INS OF NEW AND EXISTING DRAIN LINES TO REQUIRED 6'x4' PRECAST REINFORCED CONCRETE BOX CULVERT SHALL BE PER EACH UNDER THE STUB-OUT TIE-IN ITEMS.

26. REMOVAL OF DRAIN LINES ALONG FREMAUX AVENUE AND LAKEWOOD DRIVE AND REAR OF PROPERTIES TO BE PAID UNDER REMOVAL OF STORM DRAIN PIPE ITEM AND REMOVAL OF 32"x 36" BOX CULVERT ITEM.

27. UTILITY LINE PROTECTION ITEM IS FOR WRAPPING AN EXISTING WATER OR SEWER LINE OR SERVICE WITH POLYMER COATED CORRUGATED STEEL CASING IF UTILITY LINE GOES THROUGH A DRAINAGE STRUCTURE OR UNDER A DRAINAGE STRUCTURE OR DRAIN LINE/BOX CULVERT WITH LESS THAN 12" OF COVER. DUCTILE IRON PIPE SHALL BE USED FOR UTILITY LINE PROTECTION WHEN CONFLICTING UTILITY LINE RUNS THROUGH THE 6'x4' RCBC. SPLIT CASING SHALL NOT BE USED WHEN CONFLICTING LINE RUNS THROUGH R.C. BOX CULVERT.

28. WATER SERVICE LINES SHALL BE 3/4" MINIMUM POLYETHYLENE (MATCH EXISTING SIZE).

29. OFFSET WATERMAIN ITEMS ARE FOR EXISTING WATERLINES ONLY.

30. WATER SERVICE LINES REQUIRING ADJUSTMENT SHALL BE REPLACED TO THE LIMITS DEFINED IN THE FIELD BY THE PROJECT ENGINEER AND PAID PER EACH UNDER REPLACE WATER SERVICE ITEM.

31. 6'x4' RCBC SHALL BE PRECAST. CAST IN PLACE WILL NOT BE ACCEPTED.

32. **IN THE EVENT AN ITEM OF WORK IS NOT ADDRESSED IN THESE PLANS AND SPECIFICATIONS, THE 2006 EDITION OF THE LA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES AND LATEST REVISIONS SHALL GOVERN. THIS DOCUMENT CAN BE DOWNLOADED FROM THE FOLLOWING WEB ADDRESS: http://www.dotd.louisiana.gov/doclist.asp?ID=52**

33. ALL WORK MUST CONFORM TO THE REQUIREMENTS OF CITY OF SLIDELL DEPARTMENT OF ENGINEERING.

34. THE LOCATIONS OF UNDERGROUND AND OTHER NONVISIBLE UTILITIES SHOWN HAVE BEEN DETERMINED FROM DATA EITHER FURNISHED BY THE AGENCIES CONTROLLING SUCH DATA AND/OR EXTRACTED FROM RECORDS MADE AVAILABLE TO US BY AGENCIES CONTROLLING SUCH RECORDS. WHERE FOUND, THE SURFACE FEATURES OF LOCATIONS ARE SHOWN. THE ACTUAL NONVISIBLE LOCATIONS MAY VARY FROM THOSE SHOWN. EACH AGENCY SHOULD BE CONTACTED RELATIVE TO THE PRECISE LOCATION OF ITS UNDERGROUND INSTALLATION PRIOR TO ANY RELIANCE UPON THE ACCURACY OF SUCH LOCATIONS SHOWN. PRIOR TO EXCAVATING THE CONTRACTOR SHALL CALL LOUISIANA ONE CALL (1-800-273-3020) TO MARK THE CONSTRUCTION AREA.

35. THE CONTRACTOR'S ATTENTION IS CALLED TO THE PRESENCE OF OVERHEAD AND UNDERGROUND POWER LINES, UNDERGROUND GAS, AND COMMUNICATION LINES THROUGHOUT THE PROJECT. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROJECT SAFETY AND COORDINATING HIS OPERATIONS WITH ALL UTILITY COMPANIES.

36. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE WORK AND VERIFYING ALL MEASUREMENTS AND GRADES PRIOR TO BEGINNING OF CONSTRUCTION. PROJECT VERTICAL AND HORIZONTAL CONTROLS HAVE BEEN INDICATED ON THE PLANS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH OFFSETS FROM BASE LINE AND ADDITIONAL T.B.M.s FOR CONSTRUCTION PURPOSES, FROM THE PROJECT MONUMENTS/NAILS/CROSS CUTS ETC., WITHIN THE PROJECT AREA.

36. ANY CONFLICTS BETWEEN EXISTING UTILITIES AND PROPOSED IMPROVEMENTS SHOULD BE REPORTED TO THE ENGINEER FOR COORDINATION.

37. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL SERVICES DURING CONSTRUCTION. ALL UTILITIES AND OTHER CONCERNED AGENCIES SHALL BE CONTACTED AT LEAST 4 DAYS IN ADVANCE, UNLESS OTHERWISE SPECIFIED, PRIOR TO CUTTING OR CLOSING STREETS OR OTHER TRAFFIC AREAS, EXCAVATING UNDERGROUND UTILITIES OR POLE LINES OR TEMPORARY SHUTDOWN OF EXISTING FACILITIES.

38. CONTRACTOR SHALL MAINTAIN SUBSURFACE AND OVERLAND DRAINAGE WITHIN THE PROJECT AREA DURING CONSTRUCTION. (NO DIRECT PAYMENT)

39. CONTRACTOR SHALL BE RESPONSIBLE FOR HOUSEKEEPING OF THE PROJECT SITE AND ALL ACCESS ROADS ON A DAILY BASIS AND SHALL KEEP THE AREA CLEAN AND FREE OF ALL TRASH AND DEBRIS. (NO DIRECT PAYMENT)

40. THE CONTRACTOR SHALL NOT SCALE THE DRAWINGS FOR CONSTRUCTION PURPOSES.

41. THE CONTRACTOR IS REQUIRED TO SAW CUT ALL EXISTING ASPHALT PAVEMENTS, DRIVEWAYS AND SIDEWALKS WHICH ARE TO REMAIN ADJACENT TO REQUIRED WORK. SAW CUT SHALL BE TO FULL DEPTH.

42. CONSTRUCTION TRAFFIC CONTROL SIGNS, BARRICADES, WARNING LIGHTS, DEVICES, AND METHODS, SHALL COMPLY WITH LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND THESE CONTRACT DOCUMENTS, UNLESS OTHERWISE NOTED IN THE FIELD BY SLIDELL ENGINEERING.

43. ALL TRAFFIC CONTROL DEVICES AND THEIR ASSOCIATED HARDWARE (SIGNS, SIGNALS, CONDUITS AND MARKINGS) REMOVED OR DAMAGED DURING EXECUTION OF THIS CONTRACT, OTHER THAN AS PROVIDED FOR IN THIS CONTRACT, SHALL BE REPLACED BY THE CONTRACTOR AT HIS COST.

44. NO SIGNS OR SIGNALS SHALL BE REMOVED WITHOUT THE CITY ENGINEER'S APPROVAL. THE CONTRACTOR ACCEPTS ALL RESPONSIBILITIES DURING THE TIME OF REMOVAL. THE CONTRACTOR WILL NOTIFY THE CITY ENGINEER IN WRITING WITHIN THREE (3) WORKING DAYS IN ADVANCE, WHEN CONTROLS ARE TO BE REMOVED AND REINSTALLED. ALL SIGNS, SIGNALS AND MARKINGS REMOVED WILL BE IN PLACE AT THE TIME OF FINAL INSPECTION.

45. ALL EQUIPMENT AND MATERIALS HAULED TO OR FROM THE CONSTRUCTION SITE WILL BE BY A ROUTE APPROVED OR DESIGNATED BY THE ENGINEERING DEPT., PRIOR TO THE START OF CONSTRUCTION.

46. CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO EXISTING INFRASTRUCTURE AS CONTRACTOR WILL BE LIABLE FOR DAMAGES RESULTING FROM CONSTRUCTION ACTIVITIES. ALL COSTS FOR ANTICIPATED AND UNFORESEEN CONSEQUENTIAL DAMAGES RESULTING FROM THESE ACTIVITIES SHALL BE INCLUDED IN ASSOCIATED ITEMS OF WORK.

47. CONTRACTOR SHALL FINE GRADE ALL AREAS AFFECTED BY CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE. ALL WORK SHALL BE IN A MANNER ACCEPTABLE TO THE OWNER.

48. ALL AREAS THAT PERIMETER REPLACED ASPHALT SHALL BE BACKFILLED AND GRADED TO MATCH TOP OF ASPHALT ELEVATION AND GRADED TO DRAIN. TOP 4 INCHES SHALL BE FREE OF STONE AND DEBRIS AND SUITABLE FOR GROWING GRASS.

49. THE CONTRACTOR SHALL CONTACT THE FOLLOWING ENTITIES AT LEAST FOUR (4) WORKING DAYS PRIOR TO BEGINNING OF CONSTRUCTION:

CITY OF SLIDELL

DEPT. OF ENGINEERING- MS. DONNA O'DELL, P.E.	985-646-4270
DEPT. OF PUBLIC WORKS- MR. MICHAEL NOTO	985-646-4381 985-290-7388 (Cell)
WATER & SEWER: SLIDELL PUBLIC WORKS - MR. MIKE ISENBERG	985-646-4291 (ofc.)
CHARTER COMM.- MR. MARTIN BARRAS	985-626-8426
AT&T- MR. STEVE BURGERON	985-867-1274
ATMOS ENERGY- MS. OLENE WHIDDON	985-276-6023 ext.19 985-807-4417 (cell)
LOUISIANA ONE CALL	800-273-3020

NOTE

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100% FINAL PLANS
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03/12/15
FRANZ J. ZEMMER, P.E.
La. License No. 28232

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RICHARD C. LAMBERT CONSULTANTS, L.L.C.
900 W. Causeway Approach
Mandeville, LA 70471
985-727-4440
Fax: 985-727-4447

DESIGNED	FJZ	DETAILED	JAC	DATE
CHECKED	RCL	CHECKED	RCL	03/12/15
				SHEET
				3a

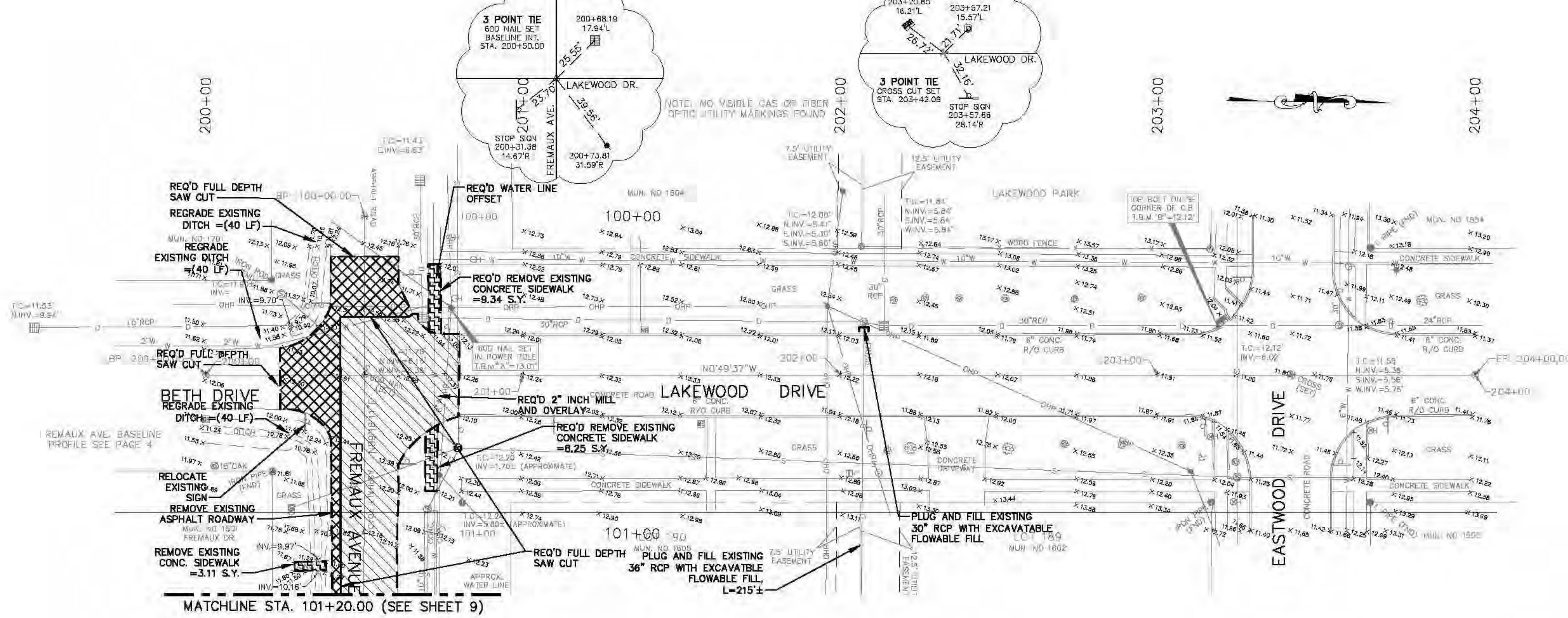
NO.	DATE	BY	REVISION DESCRIPTION

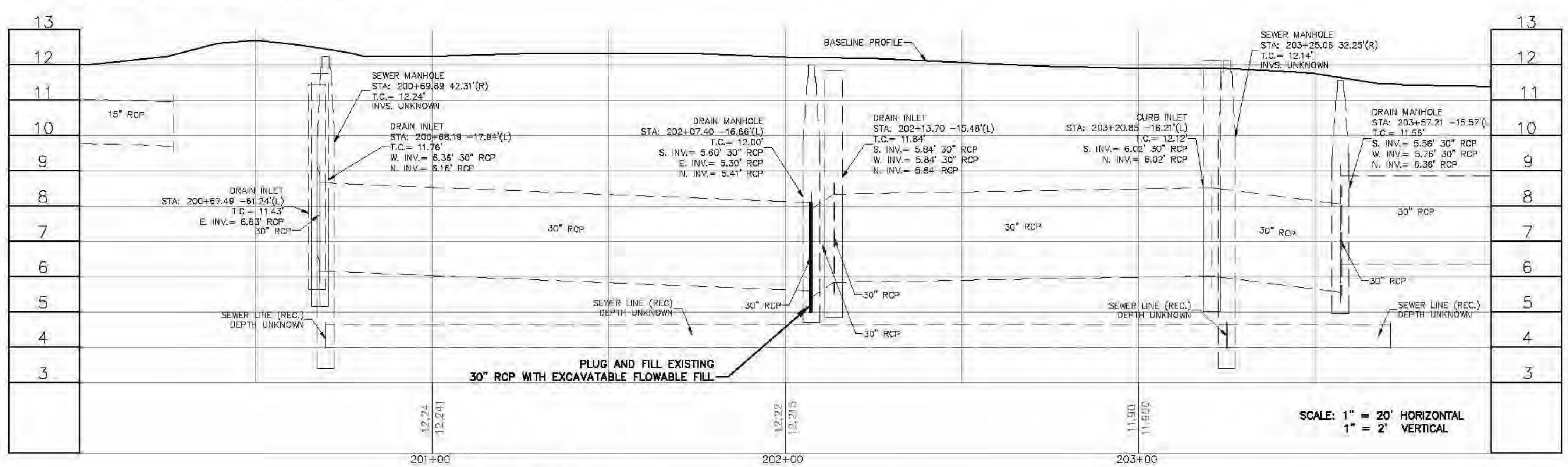
GENERAL NOTES

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
3a





SCALE: 1" = 20' HORIZONTAL
1" = 2' VERTICAL

LEGEND

- EXISTING TO BE REMOVED
- REMOVAL OF ASPHALT SURFACING AND STABILIZED BASE
- COLD PLANING ASPHALT PAVEMENT 2" DEPTH
- REMOVAL OF EXISTING CONCRETE SIDEWALK
- REMOVAL OF EXISTING CONCRETE DRIVEWAY

NOTE

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20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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SHEET	4

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DEMOLITION PLANS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

LEGEND

- EXISTING TO BE REMOVED
- REMOVAL OF ASPHALT SURFACING AND STABILIZED BASE
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SHEET	5		

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DEMOLITION PLANS

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
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Sheet Number:
5

MATCHLINE STA. 101+20.00 (SEE SHEET 8)

MATCHLINE STA. 105+10.00 (SEE SHEET 6)

SCALE: 1" = 20' HORIZONTAL
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1 inch = 20 ft.

LEGEND

- EXISTING TO BE REMOVED
- REMOVAL OF ASPHALT SURFACING AND STABILIZED BASE
- COLD PLANING ASPHALT PAVEMENT 2" DEPTH
- REMOVAL OF EXISTING CONCRETE SIDEWALK
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MATCHLINE STA. 105+10.00 (SEE SHEET 5)

MATCHLINE STA. 110+50.00 (SEE SHEET 7)

PLUG AND FILL EXISTING 32" x 36" RBC WITH EXCAVATABLE FLOWABLE FILL L=490'±

PLUG 32"x36" BOX CULVERT TO REMAIN

REMOVE 40 LF. OF EXISTING FENCE AND 30 LF. OF EXISTING 32"x36" BOX CULVERT

PLUG 32"x36" BOX CULVERT

PLUG AND FILL EXISTING 32" x 36" RBC WITH EXCAVATABLE FLOWABLE FILL, L=334'±

REMOVE EXISTING FENCE = 62 LF

REMOVE EXISTING FENCE = 9 LF

REMOVE (4) EXISTING TREES 18"LIVE OAK 15"PINE

REMOVE EXISTING SHRUBS UNDER CLEARING & GRUBBING ITEM

REMOVE EXISTING 15" CMP =18' LF

REMOVE EXISTING FENCE =54' LF

REMOVE EXISTING SIDEWALK=2.66 S.Y.

REQ'D FULL DEPTH SAW CUT (TYP.)

REMOVE EXISTING DRAIN INLET

REMOVE EXISTING DRAIN INLET

REQ'D 2" MILL AND OVERLAY

REQ'D 2" MILL AND OVERLAY

REQ'D FULL DEPTH SAW CUT

REMOVE EXISTING 4" PVC, = 3 LF.

REMOVE EXISTING CONCRETE DRIVEWAY =20.77 S.Y.

REMOVE EXISTING 12" CMP, = 21 LF.

RELOCATE EXISTING POWER POLE

REMOVE EXISTING ASPHALT ROADWAY

REQ'D REGRADE EXIST. DITCH =(40 LF)

REQ'D FULL DEPTH SAW CUT (TYP.)

RELOCATE EXISTING SIGN

REMOVE EXISTING 15" RCP, = 69 LF

REMOVE EXISTING DRAIN INLET

REMOVE EXISTING 18x12" RCP, = 75 LF

REMOVE EXISTING CONCRETE SIDEWALK =119.08 S.Y.

REMOVE EXISTING DRAIN INLET

REQ'D FULL DEPTH SAW CUT

REMOVE EXISTING CONCRETE DRIVEWAY =14.00 S.Y.

REQ'D ROOT PRUNING (NO DIRECT PAY)

REMOVE EXISTING 18"x12" RCP, = 74 LF

REMOVE EXISTING CONCRETE DRIVEWAY =15.29 S.Y.

REQ'D FULL DEPTH SAW CUT

REMOVE EXISTING DRAIN INLET

REMOVE EXISTING CONCRETE SIDEWALK =2.03 S.Y.

REMOVE EXISTING 12" RCP, = 59 LF

REMOVE EXISTING DRAIN INLET

REQ'D FULL DEPTH SAW CUT (TYP.)

REMOVE EXISTING ASPHALT ROADWAY

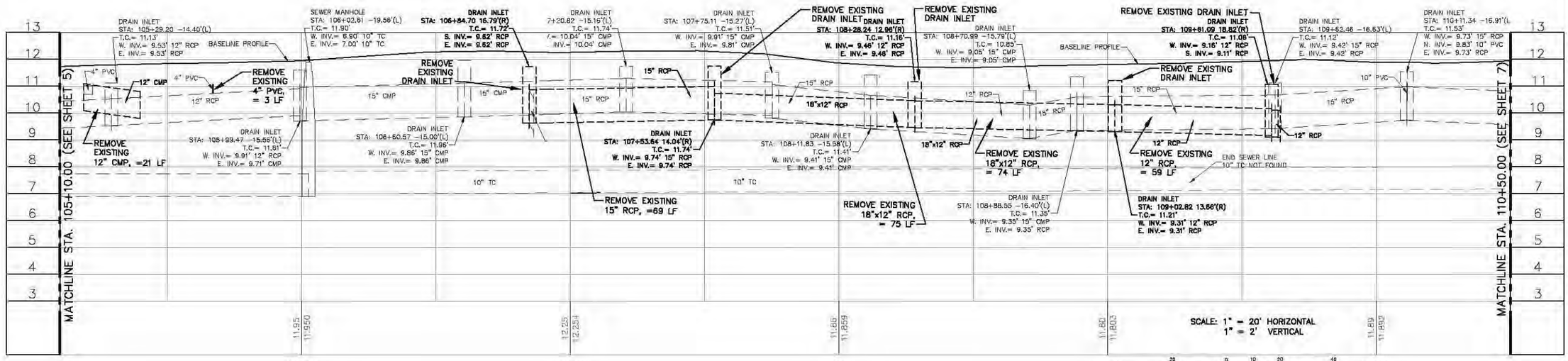
REQ'D REGRADE EXIST. DITCH =(40 LF)

RELOCATE EXISTING SIGN

FREMAUX AVE.

MARY DRIVE

MARSHA DRIVE



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DETAILED	JAC	DATE	03/12/15
CHECKED	RCL	SHEET	6

NO.	DATE	REVISION DESCRIPTION	BY

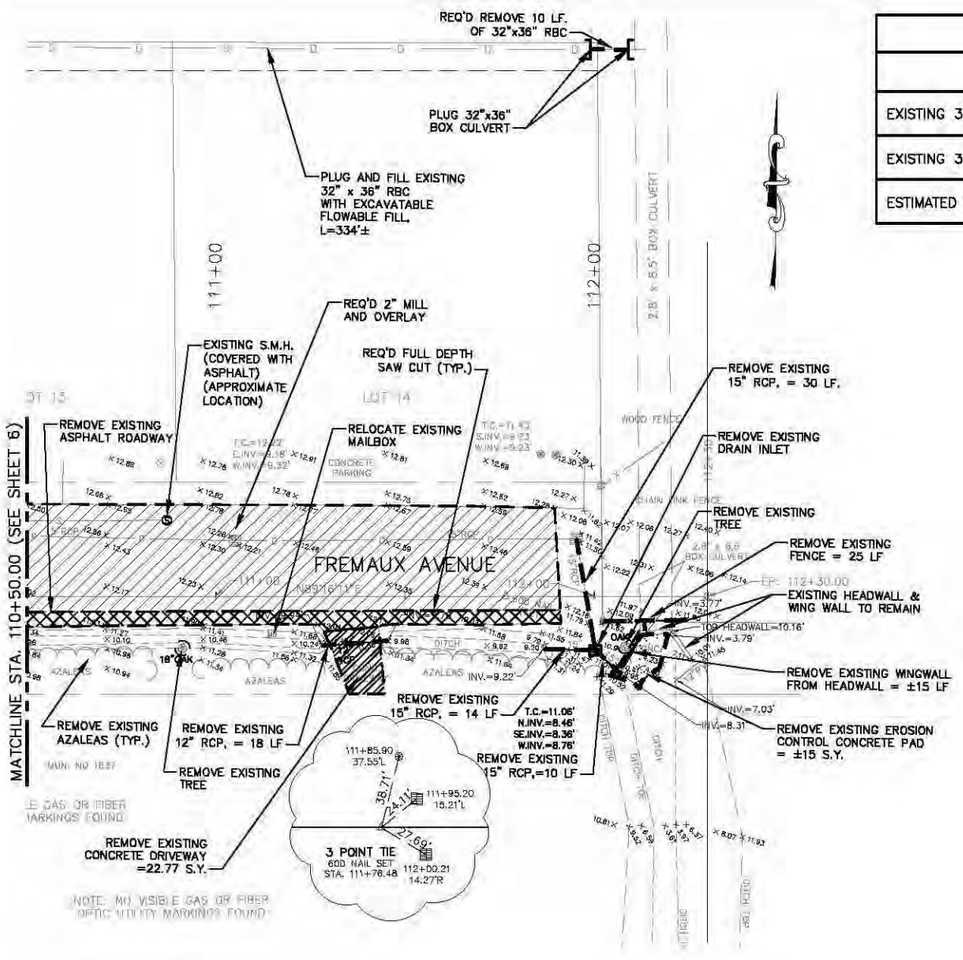
DEMOLITION PLANS

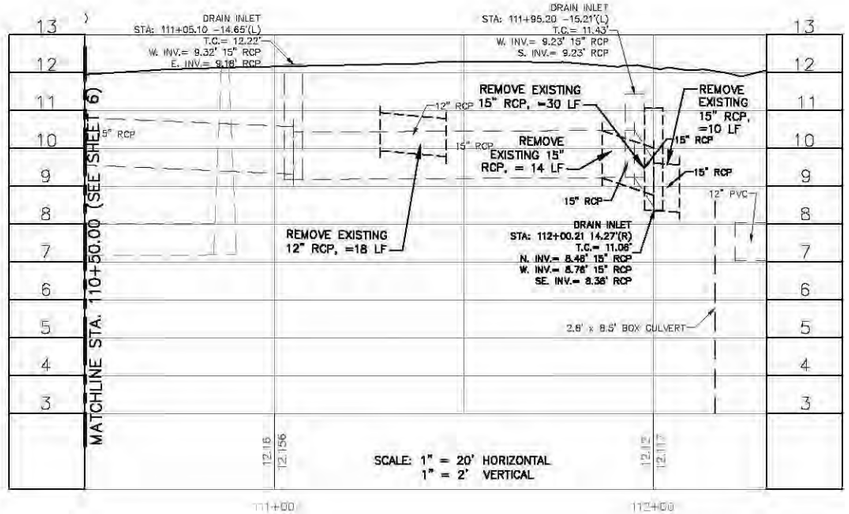
EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCL# No: 713-20

Sheet Number:
6

EXCAVATABLE FLOWABLE FILL				
	STA. to STA.	L.F.	PIPE AREA S.F.	C.F.
EXISTING 36" RCP	100+35 to 102+50	215'	7.07	56.30
EXISTING 36"x32" RCB	102+50 to 112+14	964'	8.00	285.6
ESTIMATED TOTAL		1179'	17.42	341.90





LEGEND

- EXISTING TO BE REMOVED
- REMOVAL OF ASPHALT SURFACING AND STABILIZED BASE
- COLD PLANING ASPHALT PAVEMENT 2" DEPTH
- REMOVAL OF EXISTING CONCRETE SIDEWALK
- REMOVAL OF EXISTING CONCRETE DRIVEWAY

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DETAILED	MRC
CHECKED	RCL
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SHEET	7

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DEMOLITION PLANS

EASTWOOD DRAINAGE IMPROVEMENTS

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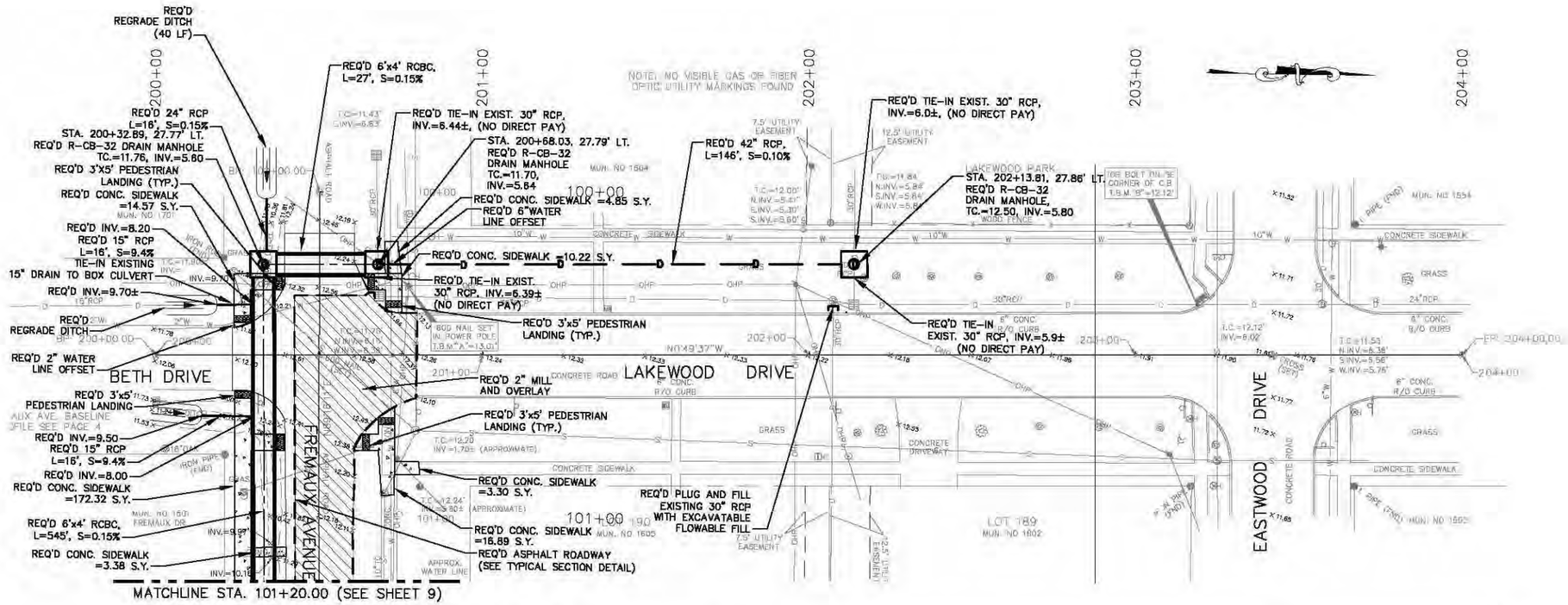
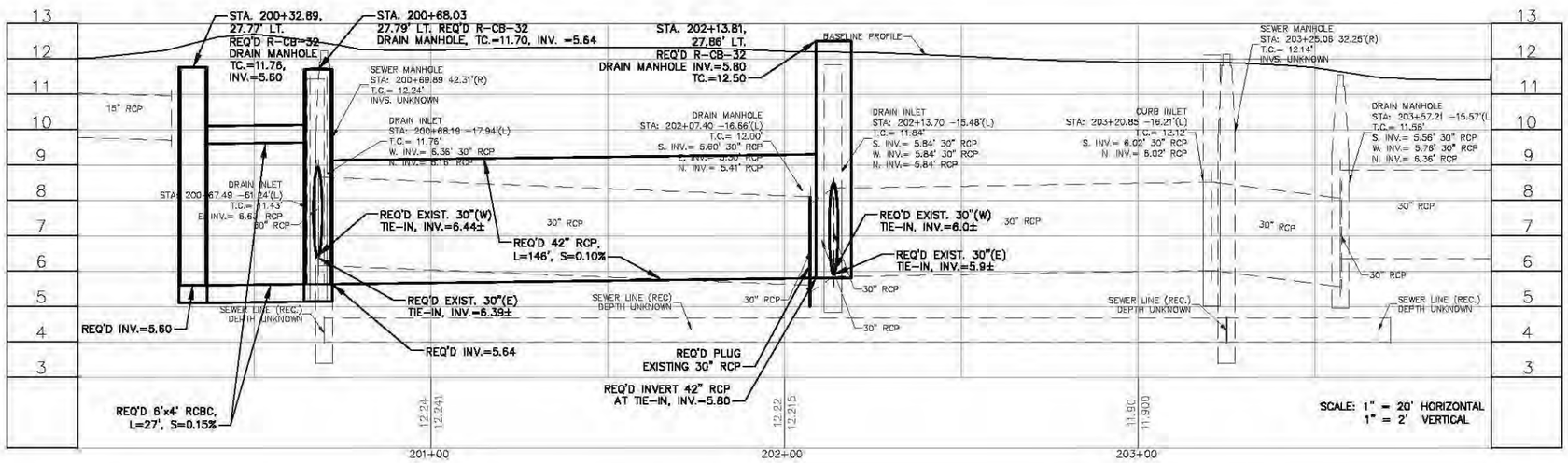
7





LEGEND

- LIMITS OF CONSTRUCTION
- EXISTING POWER POLE AND LINES
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING DRAIN LINE
- EXISTING DRAIN STRUCTURE
- EXISTING TREE APPROX. LOCATION
- REQ'D 2" MILL AND OVERLAY OF EXISTING ASPHALT
- REQ'D DRAIN MANHOLE
- REQ'D DRAIN INLET
- REQ'D DRAIN LINE
- REQ'D SODDING
- REQ'D ASPHALT PAVEMENT (2" WEARING COURSE ON 4" BINDER COURSE ON 12" CLASS II BASE COURSE)
- REQ'D CONCRETE

NOTE

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SHEET	8

NO.	DATE	REVISION DESCRIPTION	BY

PLAN & PROFILE

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
ROLZ No: 713-20

Sheet Number:
8

REQ'D TIE-IN EXIST. 30" RCP, INV.=6.0± (NO DIRECT PAY)

STA. 202+13.81, 27.86' LT. REQ'D R-CB-32 DRAIN MANHOLE TC.=12.50, INV.=5.80

REQ'D TIE-IN EXIST. 30" RCP, INV.=5.9± (NO DIRECT PAY)

REQ'D PLUG AND FILL EXISTING 30" RCP WITH EXCAVATABLE FLOWABLE FILL

REQ'D PLUG AND FILL EXISTING 36" RCP WITH EXCAVATABLE FLOWABLE FILL, L=215'±

REQ'D PLUG AND FILL EXISTING 32" x 36" RBC WITH EXCAVATABLE FLOWABLE FILL L=140'±

REQ'D PLUG EXISTING 32"x36" BOX CULVERT

STA. 103+91.64, 147.17' LT. REQ'D 24"x24" DRAIN INLET, TC.=11.00, INV.=6.51

REQ'D PLUG EXISTING 32"x36" BOX CULVERT

REQ'D 6' WOODEN FENCE, = 20' LF.

PLUG AND FILL EXISTING 32"x 36" RBC WITH EXCAVATABLE FLOWABLE FILL, L=490'±

SEE SHEET 12 FOR DETAILS

REQ'D 6' WOODEN FENCE, = 84' LF

REQ'D 24" RCP L=36', S=0.15%

STA. 103+91.71, 111.57' LT. REQ'D 24"x24" DRAIN INLET TC.=11.00, INV.=6.45

REQ'D 24" RCP L=57', S=0.15%

REQ'D GROUND ELEV =11.55

REQ'D 6' WOODEN FENCE, = 16' LF

STA. 103+91.86, 54.33' LT REQ'D 24"x24" DRAIN INLET TC.=11.00, INV.=5.41

REQ'D 24" RCPA L=38', S=0.15%

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

REQ'D CONC. SIDEWALK =10.22 S.Y.

REQ'D CONC. SIDEWALK =4.85 S.Y.

REQ'D TIE-IN EXIST. 30" RCP, INV.=6.39± (NO DIRECT PAY)

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

REQ'D CONC. SIDEWALK =3.30 S.Y.

REQ'D 2" MILL AND OVERLAY

REQ'D ASPHALT ROADWAY (SEE TYPICAL SECTION DETAIL)

REQ'D H.C. RAMP WITH 3'x5' TRUNCATED MAT (TYP.)

REQ'D TIE-IN EXISTING 15" RCP TO REQ'D R-CB-11 MOD INV.=9.14

STA. 200+68.03, 27.79' LT. REQ'D R-CB-32 DRAIN MANHOLE TC.=11.70, INV.=5.64

REQ'D TIE-IN EXIST. 30" RCP, INV.=6.44± (NO DIRECT PAY)

REQ'D CONC. SIDEWALK=16.89 S.Y.

STA. 103+91.94, 15.66 LT. REQ'D 24"x24" DRAIN INLET TC.=10.61, INV.=5.35

REQ'D CONCRETE SIDEWALK=5.22 S.Y.

REQ'D CONC. SIDEWALK =4.39 S.Y.

REQ'D 24" RCPA L=30', S=0.15%

REQ'D 6'x4' RCBC, L=546', S=0.15%

REQ'D 6'x4' RCBC, L=27', S=0.15%

STA. 100+22.25, 17.16' RT. CENTERLINE REQ'D 6'x4' RCBC

REQ'D REGRADE DITCH (40 LF)

REQ'D INV.=5.63

REQ'D 24" RCP L=16', S=0.15%

STA. 100+22.25, 17.16 RT. REQ'D R-CB-32 DRAIN MANHOLE TC.=11.76, INV.=5.50

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

STA. 100+34.52, 20.12' RT. REQ'D INV.=8.20

REQ'D 15" RCP L=16', S=9.4% INV.=9.70±

REQ'D REGRADE DITCH (40 LF, EACH DITCH)

REQ'D CONC. SIDEWALK =14.57 S.Y.

REQ'D INV.=9.50

STA. 100+68.79, 20.00'RT. REQ'D INV. 8.00 (15" RCP)

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

REQ'D 15" RCP L=16', S=9.4%

REQ'D CONC. SIDEWALK =3.38 S.Y.

REQ'D CONC. SIDEWALK =172.32 S.Y.

STA. 101+35.06, 16.77' RT. REQ'D 24"x24" TEE INLET, TC.=11.20

STA. 102+43.46, 16.40' RT. REQ'D 24"x24" TEE INLET, TC.=10.70

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

REQ'D REGRADE DITCH (40 LF)

REQ'D 6'x4' RCBC, L=319', S=0.15%

STA. 103+41.39, 16.07' RT. REQ'D R-CB-11 MOD WITH INLET GRATE TC.=11.00

REQ'D INV. 5.30 (24" RCPA)

STA. 103+91.52, 15.90' RT. REQ'D 24"x 24" TEE INLET, TC.=10.70

REQ'D 3'x5' PEDESTRIAN LANDING (TYP.)

REQ'D REGRADE DITCH (40 LF)

REQ'D CONC. DRIVEWAY =20.51 S.Y.

REQ'D CONC. SIDEWALK =62.08 S.Y.

REQ'D CONC. SIDEWALK =20.88 S.Y.

MATCHLINE STA. 101+20.00 (SEE SHEET 8)

MATCHLINE STA. 105+10.00 (SEE SHEET 10)

LAKEWOOD DRIVE

BETH DRIVE

NELLIE DRIVE

FREMAUX AVENUE

NOTE: NO VISIBLE GAS OR FIBER OPTIC UTILITY MARKINGS FOUND

NOTE: DRAIN LINE UNABLE TO BE FIELD VERIFIED

LOT 190 MUN. NO 1605 LAKEWOOD DR.

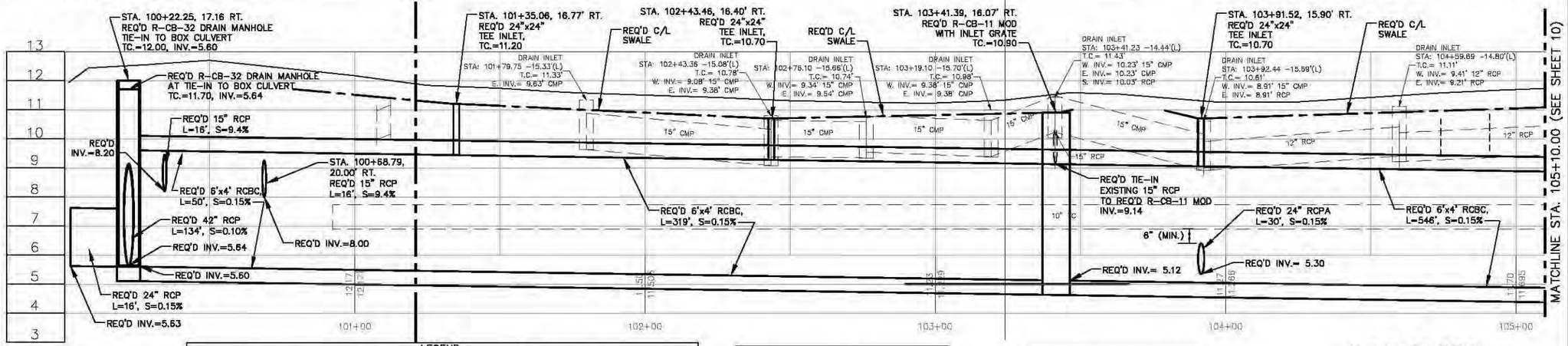
LOT 1 MUN. NO 1506

LOT 2 MUN. NO 1510

LOT 4 MUN. NO 1514

LOT 5 MUN. NO 1522

EXISTING BUILDING 1 STORY BRICK MUN. NO. 1518



LEGEND

- LIMITS OF CONSTRUCTION
- EXISTING POWER POLE AND LINES
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING DRAIN LINE
- EXISTING DRAIN STRUCTURE
- EXISTING TREE APPROX. LOCATION
- REQ'D 2" MILL AND OVERLAY OF EXISTING ASPHALT
- REQ'D DRAIN MANHOLE
- REQ'D DRAIN INLET
- REQ'D DRAIN LINE
- REQ'D SODDING
- REQ'D ASPHALT PAVEMENT (2" WEARING COURSE ON 4" BINDER COURSE ON 12" CLASS II BASE COURSE)
- REQ'D CONCRETE

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20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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Planning
Architecture
Engineering
Construction Management

RICHARD C. LAMBERT CONSULTANTS, L.L.C.
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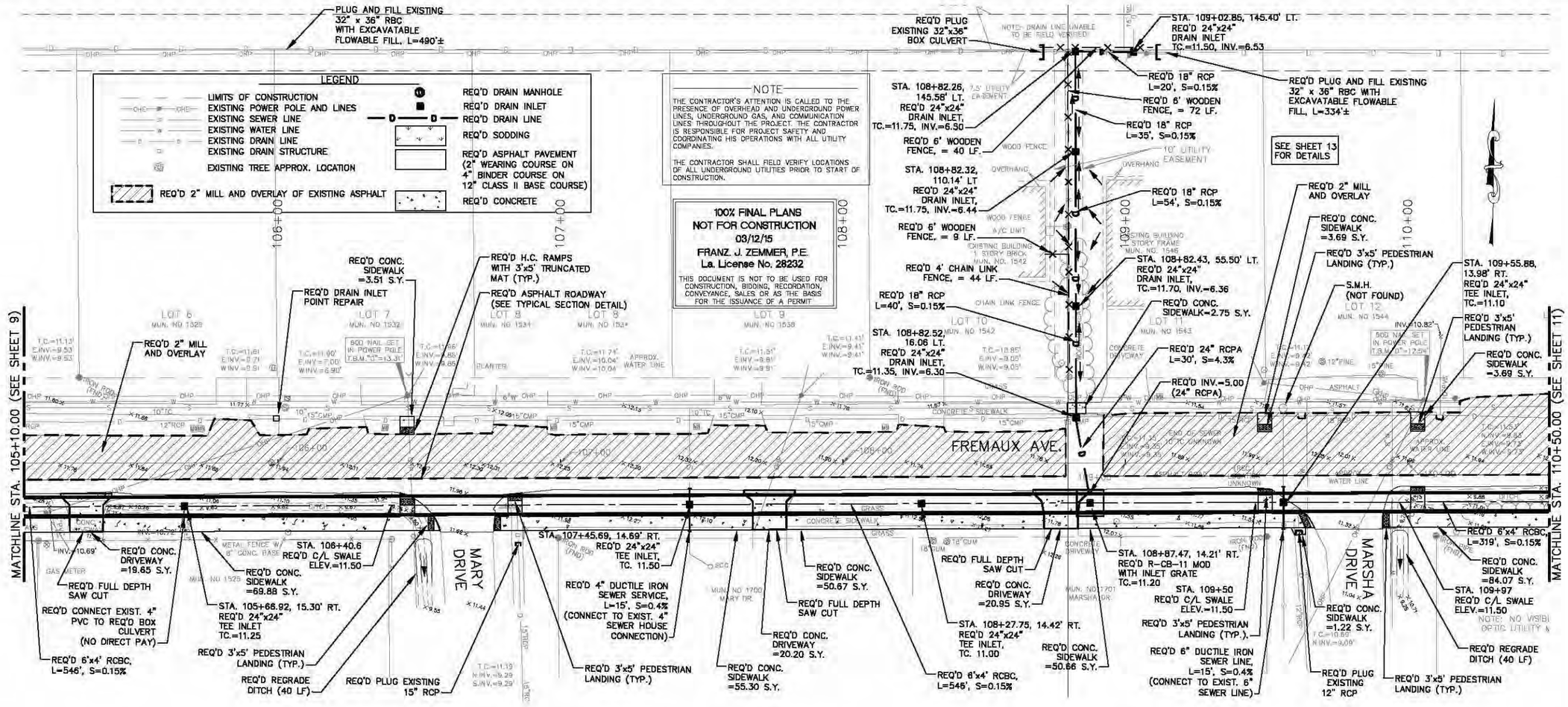
PLAN & PROFILE

EASTWOOD DRAINAGE IMPROVEMENTS

Project Number:
C.O.S. No: 100-116
GOHSEP No: 1603n-103-0043
RCLC No: 713-20

Sheet Number:
9



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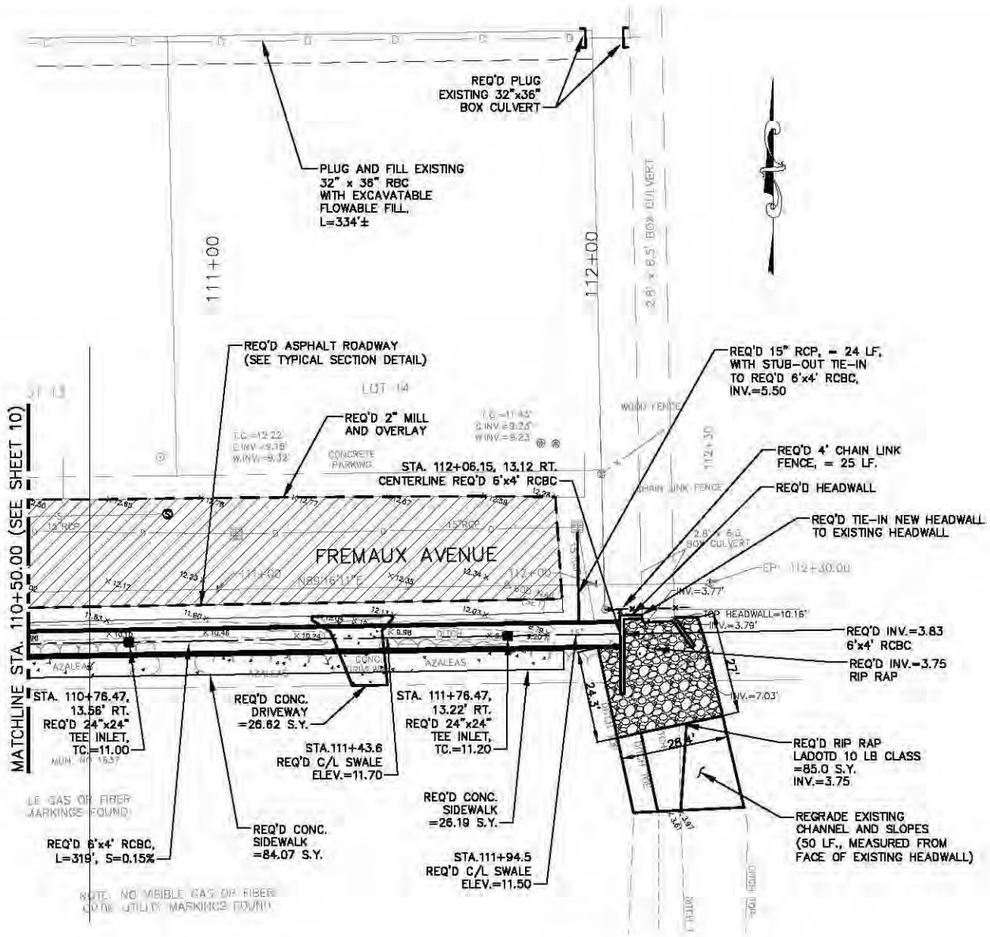

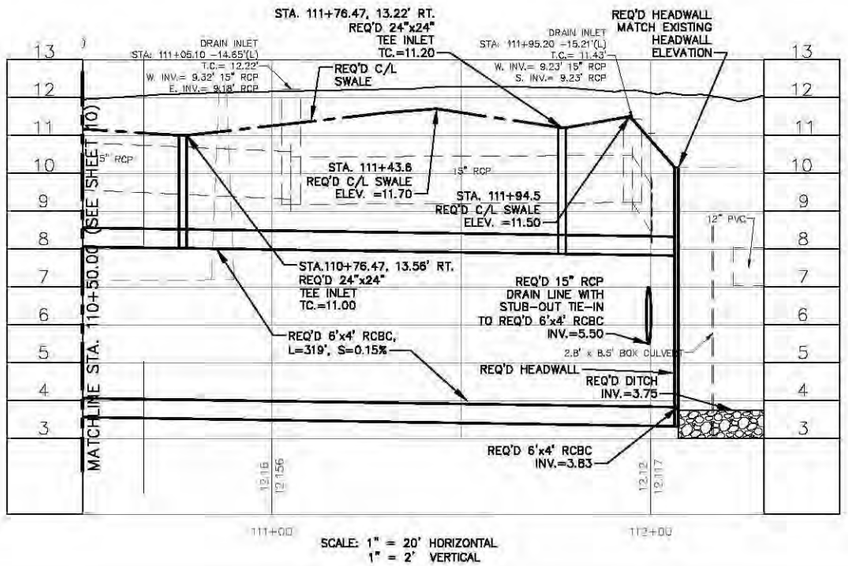

SCALE: 1" = 20' HORIZONTAL
1" = 2' VERTICAL

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NOTE

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THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.

LEGEND

- LIMITS OF CONSTRUCTION
- EXISTING POWER POLE AND LINES
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING DRAIN LINE
- EXISTING DRAIN STRUCTURE
- EXISTING TREE APPROX. LOCATION
- REQ'D 2" MILL AND OVERLAY OF EXISTING ASPHALT
- REQ'D DRAIN MANHOLE
- REQ'D DRAIN INLET
- REQ'D DRAIN LINE
- REQ'D SODDING
- REQ'D ASPHALT PAVEMENT (2" WEARING COURSE ON 4" BINDER COURSE ON 12" CLASS II BASE COURSE)
- REQ'D CONCRETE

20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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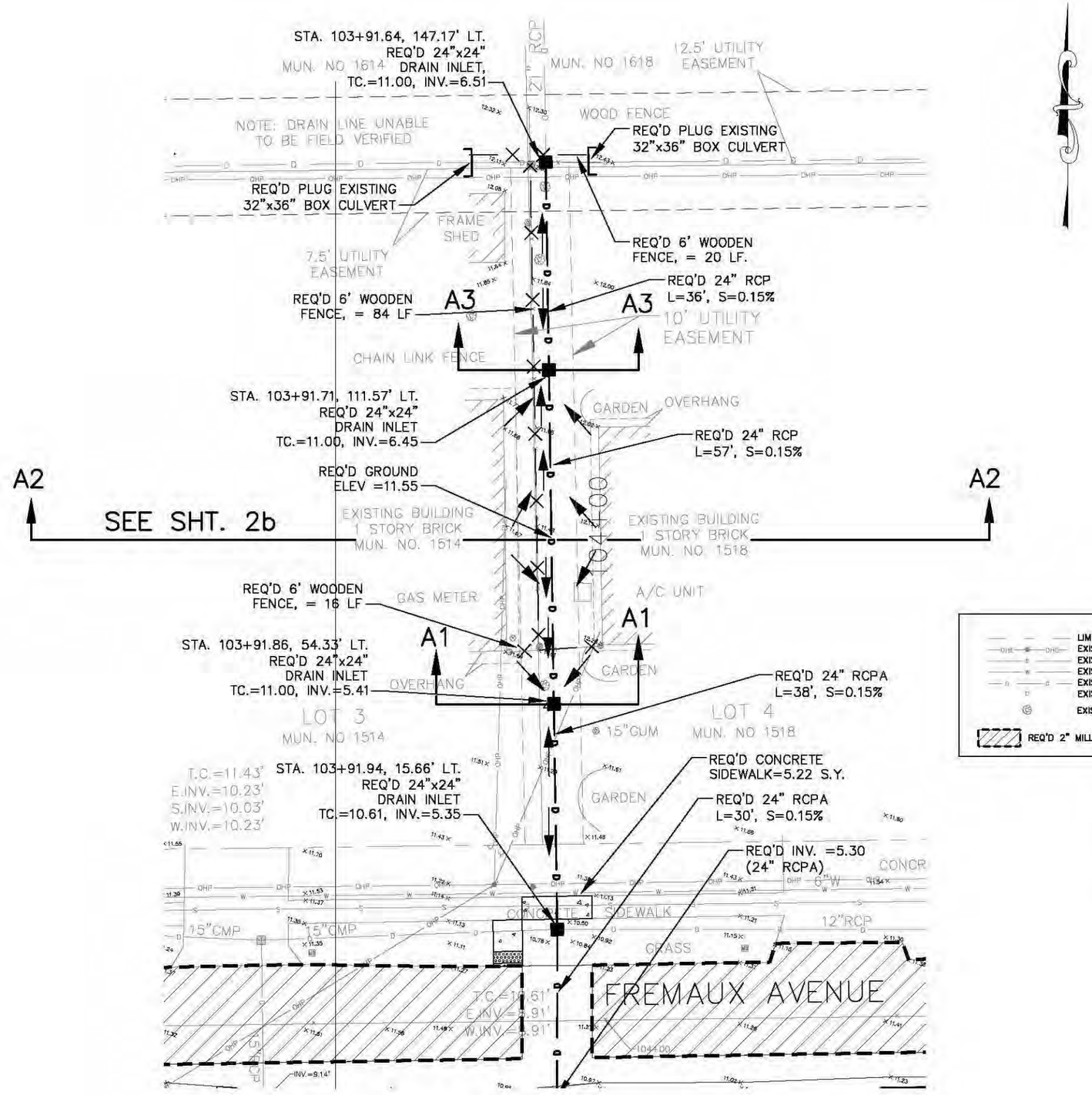

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- EXISTING SEWER LINE
- EXISTING WATER LINE
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PLAN DETAILS

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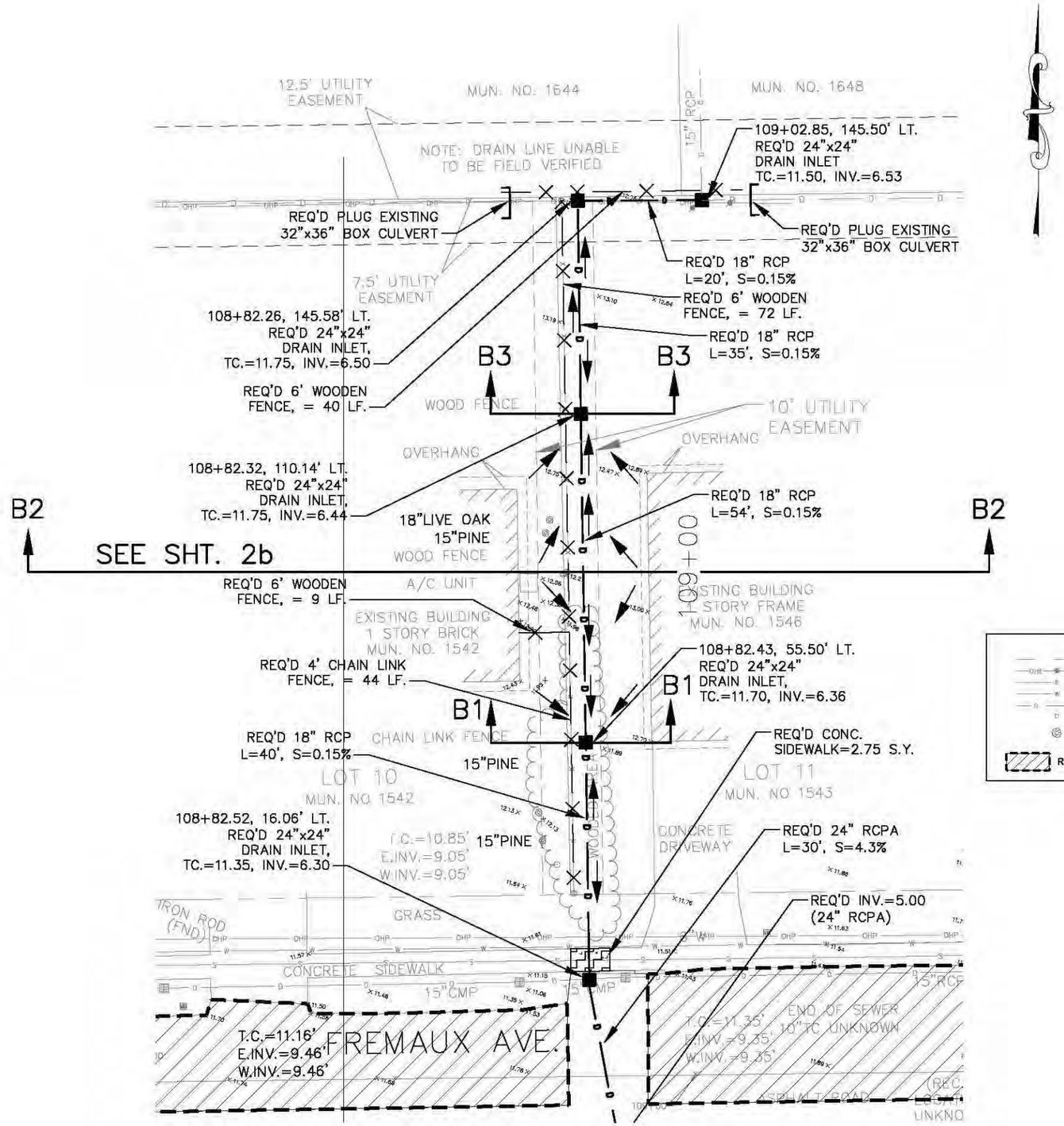

LEGEND

- LIMITS OF CONSTRUCTION
- EXISTING POWER POLE AND LINES
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WATER NOTES

1. THE CONTRACTOR SHALL FURNISH ALL LABOR, SUPERVISION, MATERIALS AND EQUIPMENT REQUIRED FOR INSTALLATION OF NEW MAINS AND HOUSE CONNECTIONS REQUIRED BY THESE DRAWINGS. ALL WORK MUST CONFORM TO THE SPECIFICATIONS OF THE UTILITY PROVIDER.

2. WATER SERVICE LINES SHALL BE DIRECTLY TAPPED INTO THE MAIN. COORDINATE WITH CITY OF SLIDELL PUBLIC OPERATIONS DEPARTMENT PRIOR TO TAPPING INTO WATER MAIN, OR OFFSET IN WATER LINE.

3. THE INSTALLATION OF THE PVC PIPE SHALL CONFORM WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE APPLICABLE REQUIREMENTS OF THE UTILITY PROVIDER. THE TRENCH BOTTOM SHALL BE RELATIVELY SMOOTH & FREE FROM ROOTS, ROCKS, ETC. THE PIPE SHALL BE LAID ON A SMOOTH BED OF GRANULAR MATERIAL SIX INCHES IN DEPTH FOR THE FULL WIDTH OF THE TRENCH AND EXTENDING TO THE TOP OF THE PIPE. THE SAND SHALL BE PLACED AND CONSOLIDATED UNDER THE PIPE HAUNCHES TO PROVIDE ADEQUATE SIDE SUPPORT TO THE PIPE WHILE AVOIDING DISPLACEMENT AND MISALIGNMENT. THE REMAINDER OF THE TRENCH SHALL BE FILLED WITH THE SELECT MATERIAL WELL COMPACTED TO THE GRADE AS REQUIRED BY THE GRADING PLAN. (THE COST OF THE SAND BEDDING AND BACKFILLING SHALL BE INCLUDED IN THE COST OF THE PIPE).

4. ALL WATER MAIN MATERIALS MUST BE PROCURED BY THE CONTRACTOR DIRECTLY FROM THE MANUFACTURER OR HIS REPRESENTATIVE.

5. THE EXISTING UTILITIES SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF SAME AND SHALL EXERCISE CAUTION AND PROTECT THEM. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR WITH EQUAL OR BETTER MATERIALS SUPPLIED BY THE CONTRACTOR AT HIS EXPENSE.

6. THE CONTRACTOR SHALL USE THE NECESSARY FITTINGS TO PROVIDE 18 INCH VERTICAL CLEARANCE AND 6 FT. HORIZONTAL CLEARANCE BETWEEN THE SANITARY SEWER LINES AND WATER MAINS. THE SAME CLEARANCE REQUIREMENTS APPLY FOR WATER AND SEWER SERVICES.

7. THE CONTRACTOR SHALL MAKE ALL TIE-INS AND SHALL PROVIDE ALL PIPING FOR TIE-INS AS SPECIFIED IN THE CONTRACT DRAWINGS.

8. "AS-BUILT" DRAWINGS SHALL SHOW THE LOCATIONS OF ALL VALVES, FITTINGS AND HYDRANTS, AND DISTANCES BETWEEN AND TO ALL WATER LINES AND BUILDINGS.

9. ALL CHANGES IN WATERLINE DIRECTION SHALL BE STABALIZED BY USE OF RESTRAINED JOINTS. RESTRAINED JOINTS SHALL BE LOCKED MECHANICAL DUCTILE IRON JOINT RETAINER GLANDS EQUIPPED WITH HARDENER CUPPED END SET SCREWS. ASSEMBLY SHALL BE RATED FOR A MINIMUM PRESSURE OF 250 PSI.

10. CONTRACTOR SHALL CONTACT ALL PUBLIC AND PRIVATE UTILITIES AND LOUISIANA ONE CALL AT 1-800-272-3020 AT LEAST 3 WORKING DAYS PRIOR TO BEGINNING OF CONSTRUCTION AROUND THEIR RESPECTIVE UTILITIES.

11. USE OF TRENCH BOXES FOR THE INSTALLATION OF SEWER, WATER OR DRAIN LINES WILL BE PERMITTED FOR TRENCH PROTECTION.

12. THE CONTRACTOR SHALL PROTECT THE EXISTING UTILITIES BY PROVIDING ADEQUATE SUPPORT AND BRACING DURING INSTALLATION OF NEW UTILITIES UNDER THOSE EXISTING LINES. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIRING OR REPLACING THE EXISTING LINES IF DAMAGED.

13. ALL NEW WATER MAIN PIPE (8") SHALL HAVE MINIMUM 3'-0" COVER AND 10" AND 12" WATER MAINS SHALL HAVE 3'-6" MINIMUM COVER BETWEEN NEW GUTTER LINE AND TOP OF PIPE, UNLESS OTHERWISE NOTED.

14. ADJUST THE ELEVATION OF NEW WATER MAINS AS REQUIRED TO AVOID CONFLICT WITH SEWER MAIN AND HOUSE CONNECTIONS AND OTHER UTILITIES.

15. ALL WATER MAINS SHALL BE 8" PVC C-900, CLASS 200 AND 2" WATER LINES SHALL BE PVC C-900, CLASS 200.

16. WATER SERVICE LINES SHALL BE 1" POLYETHERMILE TUBING.

17. PROVIDE THRUST BLOCKING FOR ALL FITTINGS AND FIRE HYDRANTS WITH A DEFLECTION OF 11.25 OR MORE.

18. WATER MAINS SHALL BE DISINFECTED ACCORDING TO LOUISIANA STATE LAW CHAPTER VIII P. 8.261 AND AWWA AND APPROVED BY THE STATE DEPARTMENT OF HEALTH AND HOSPITALS FOR POTABLE WATER.

19. ALL PERMITS TO BE OBTAINED BY CONTRACTOR AT THEIR EXPENSE.

20. A BLUE RAISED REFLECTOR SHALL BE AFFIXED ON THE ROADWAY IN PROXIMITY TO THE FIRE HYDRANT.

21. WATER IS SUPPLIED AND MAINTAINED BY CITY OF SLIDELL.

22. WATER LINE TO BE PRESSURE TESTED TO 125 PSI FOR NOT LESS THAN 4 HOURS WITH LEAKAGE NOT EXCEEDING 10 GALLONS PER INCH OF DIAMETER PER MILE PER DAY. THE TEST SHALL BE CERTIFIED BY AN ENGINEER OR TESTING LAB IF CITY OF SLIDELL IS UNABLE TO ATTEND THE TEST.

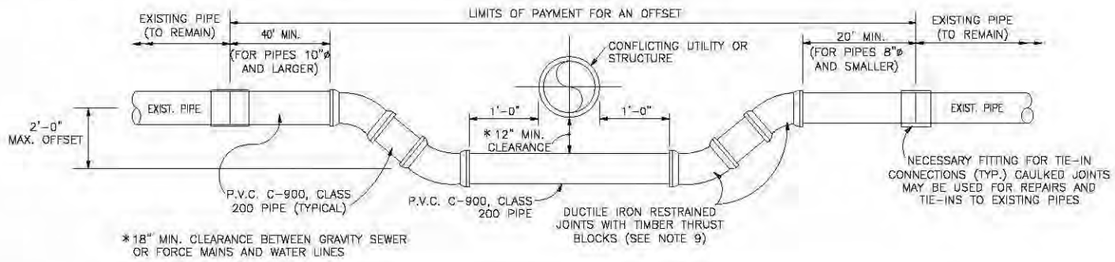
23. ALL CORPORATION STOPS SHALL BE MUELLER NO. 1115008 OR APPROVED EQUAL.

24. ALL CURB STOPS SHALL BE MUELLER B-24350R OR APPROVED EQUAL.

25. TRACER WIRE SHALL BE PLACED ON THE WATER SERVICES FROM LINE TO THE METER BOXES, ON THE MAIN LINE, AND OVER ALL WATERLINE OFFSETS.

26. THE CONTRACTOR WILL BE REQUIRED TO FURNISH AN "AS-BUILT" PLAN TO THE ENGINEER PRIOR TO ACCEPTANCE. "AS-BUILT" DRAWINGS SHALL SHOW THE LOCATION OF ALL VALVES, FITTINGS AND HYDRANTS, AND DISTANCES BETWEEN AN TO ALL WATER LINES AND BUILDINGS.

27. THE CONTRACTOR WILL WARRANTY HIS WORK FOR A PERIOD OF ONE YEAR AFTER SUBSTANTIAL COMPLETION ACCEPTANCE BY CITY OF SLIDELL.



VERTICAL OR HORIZONTAL WATER MAIN OFFSET DETAIL
N.T.S.

SEWER NOTES

NOTE: CONTRACTOR TO STAKE ALL HOUSE CONNECTIONS.

1. ALL OF THE SANITARY SEWER PIPE SHALL BE PVC PIPE CONFORMING TO ASTM PVC SEWER PIPE SPECIFICATIONS D3034 SDR 35 (THICK WALL EXTRA HEAVY SERIES), OR APPROVED EQUAL. PIPE SECTIONS AND FITTINGS SHALL BE INTEGRAL CAST BELL AND ELASTOMERIC GASKET AS RECOMMENDED BY THE MANUFACTURER AND ASTM SPEC. D-3212. INSTALLATION OF THE SEWER PIPE SHALL CONFORM TO ASTM SPEC. D-2321.

2. BEDDING FOR SEWER PIPE SHALL BE AS INDICATED ON THIS DRAWING. SEE PIPE BEDDING DETAILS.

3. A SIX (6) FOOT MINIMUM HORIZONTAL SPACING SHALL BE MAINTAINED BETWEEN THE GRAVITY SEWER LINE AND WATERLINES. GRAVITY SEWER LINES MUST BE INSTALLED BELOW WATERLINES WITH A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES BETWEEN THE TWO (2) LINES. INSPECTOR MUST WITNESS AND SHALL BE NOTIFIED AT LEAST 2 BUISNESS DAYS PRIOR TO TEST.

4. SEWER SERVICE CONNECTIONS SHALL BE PVC SDR-35 AND INSTALLED ACCORDING TO ASTM SPEC. D-2321.

5. THE LOCATIONS OF EXISTING UTILITIES SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY BOTH THEIR LOCATION AND ELEVATION, AS WELL AS TAKING THE NECESSARY PRECAUTIONS TO PROTECT THEM. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR WITH EQUAL OR BETTER MATERIALS SUPPLIED BY THE CONTRACTOR AT HIS EXPENSE.

6. THE CONTRACTOR SHALL VERIFY THE ELEVATIONS OF THE EXISTING SEWER LINES AND SEWER MANHOLES.

7. CONNECTION OF SEWER SERVICE TO EXISTING OR PROPOSED MANHOLES SHALL BE OF DROP SEWER MANHOLE TYPE IF DISTANCE BETWEEN INVERT OF PIPE AND BOTTOM OF MANHOLE EXCEEDS 3 FEET, AT NO DIRECT PAY.

8. TRENCH PROTECTION SHALL BE IN ACCORDANCE WITH OSHA REGULATIONS. USE OF TRENCH BOXES FOR THE INSTALLATION OF SEWER, WATER OR DRAIN LINES IS PERMITTED FOR TRENCH PROTECTION.

9. BACKFILL WITH SELECT EXCAVATED MATERIAL FREE OF STUMPS, DEBRIS, AND VOIDS. BACKFILL MATERIAL BENEATH AND WITHIN 24 INCHES OF ROADWAY PAVING SHALL CONSIST OF GRANULAR MATERIAL COMPACTED TO 95% MAXIMUM DENSITY.

10. THE CONTRACTOR SHALL MAKE ALL TIE-INS AND SHALL PROVIDE ALL PIPING FOR TIE-INS AS SPECIFIED IN THE CONTRACT DRAWINGS.

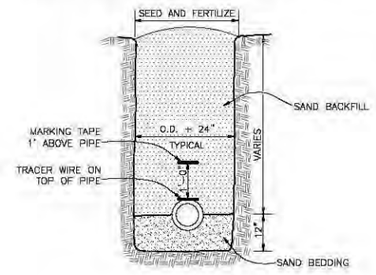
11. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER "AS-BUILT" DRAWINGS, SHOWING ANY CHANGE IN LINE OR GRADE FROM THE ORIGINAL DRAWINGS AND LOCATION OF HOUSE CONNECTIONS.

12. CONTRACTOR SHALL INSURE 18" VERTICAL CLEARANCE OF WATER LINES OVER SEWER LINES, AND 72" HORIZONTAL CLEARANCE BETWEEN WATER AND SEWER MAINS AND SERVICES.

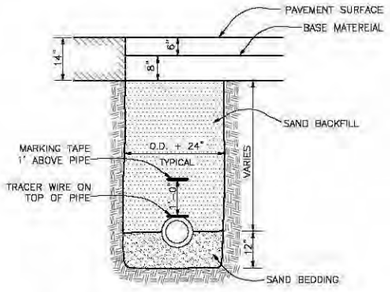
13. CONTRACTOR SHALL CONTACT ALL PUBLIC AND PRIVATE UTILITIES AND LOUISIANA ONE CALL AT 1-800-272-3020 AT LEAST 3 WORKING DAYS PRIOR TO BEGINNING OF CONSTRUCTION AROUND THEIR UTILITIES.

14. ALL CHANGES FROM THESE DRAWINGS MUST BE APPROVED BY RICHARD C. LAMBERT CONSULTANTS AND CITY OF SLIDELL.

15. ADEQUATE DRAINAGE SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION BY THE CONTRACTOR.



WATER OR SANITARY SEWER PIPE FOUNDATION IN GRASS
N.T.S.



WATER OR SANITARY SEWER PIPE FOUNDATION UNDER PAVEMENT
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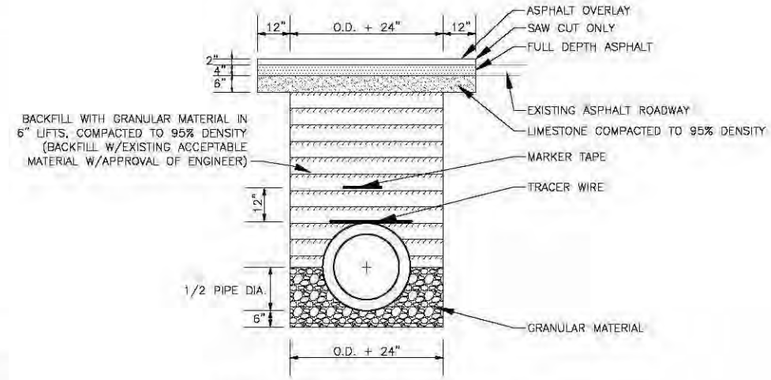

TYPICAL ASPHALT ROADWAY SAW CUT SECTION FOR WATER OR SEWER LINES
N.T.S.

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WATER DETAILS & SEWER DETAILS

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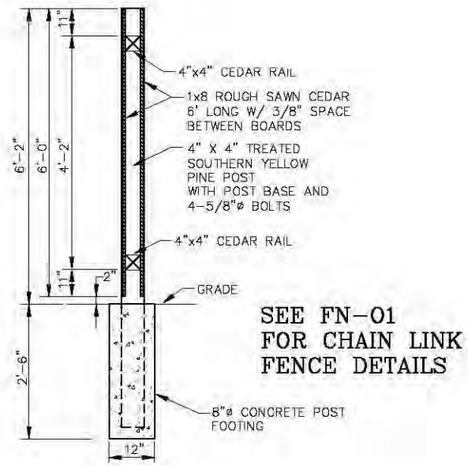

6' WOOD FENCE DETAIL

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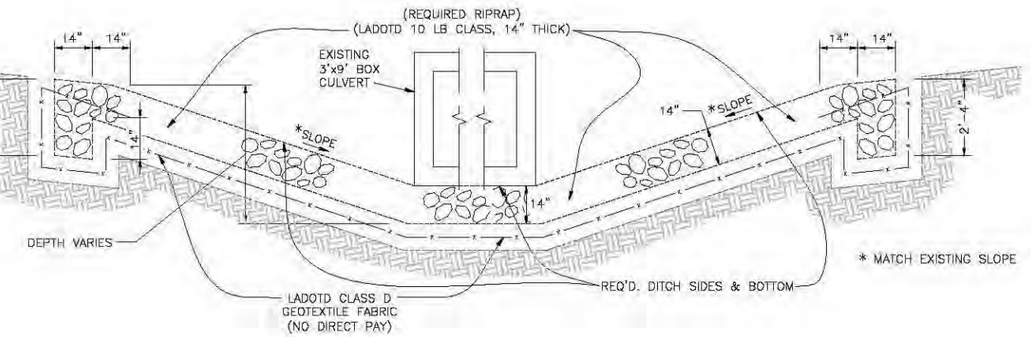

TYPICAL SECTION OF RIPRAP AT OUTFALL

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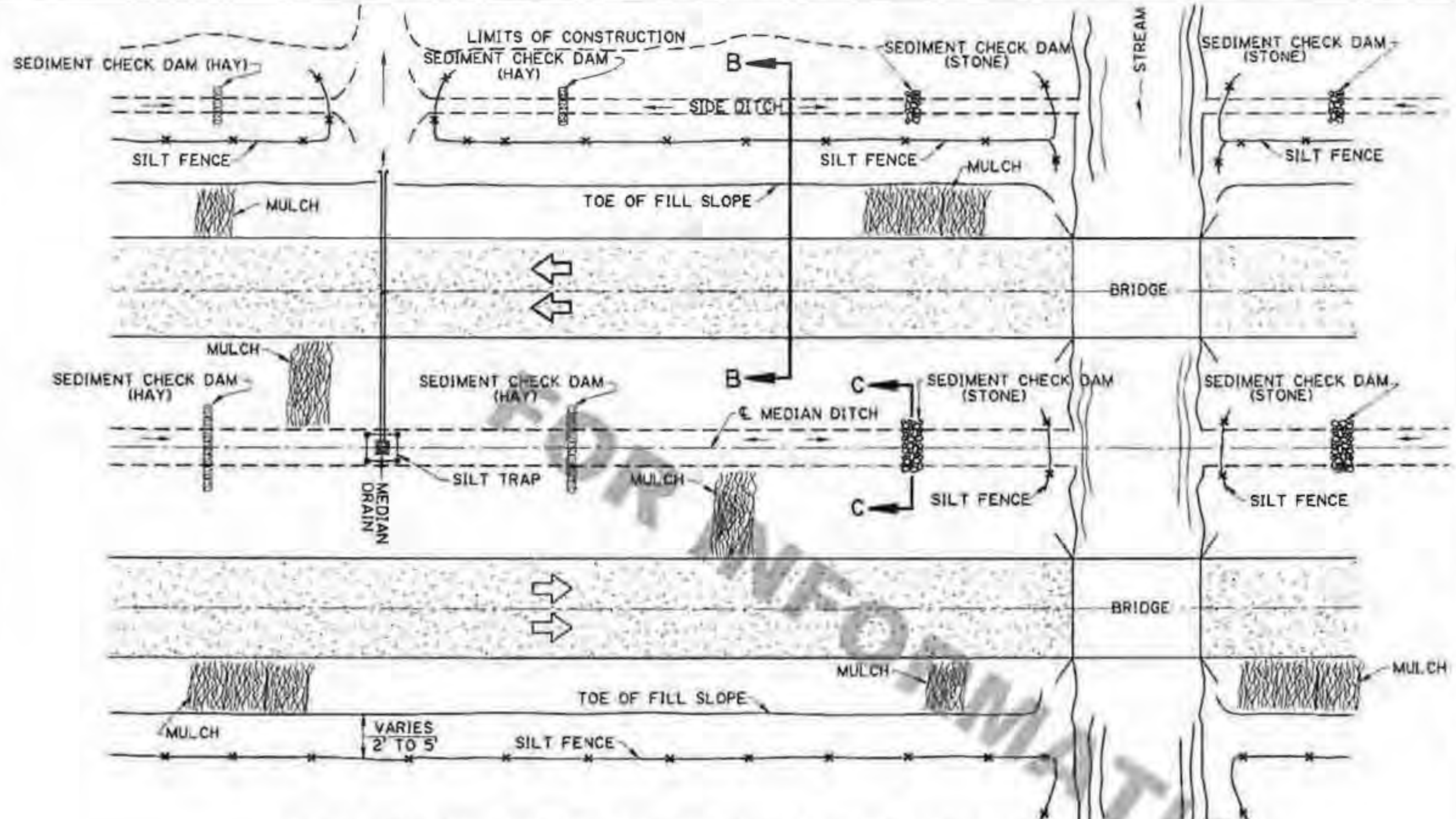
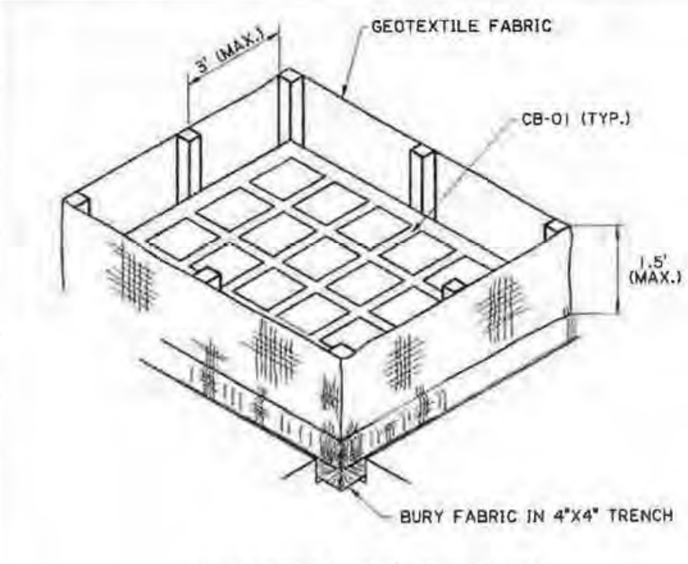


PLAN SHOWING TYPICAL TEMPORARY EROSION CONTROL

MULCHES

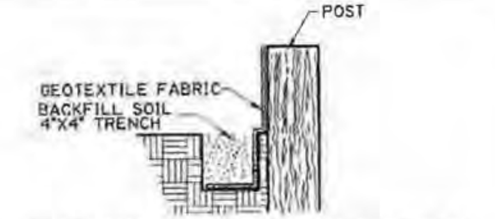
MULCHES ARE THE APPLICATION OF MATS OF MATERIAL PLACED ON THE SOIL SURFACE TO PREVENT EROSION BY PROTECTING THE SOIL SURFACE FROM RAINDROP IMPACT AND TO REDUCE THE VELOCITY OF OVERLAND FLOW. MULCHES CAN BE ORGANIC OR SYNTHETIC. MULCHES SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS FOR TEMPORARY EROSION CONTROL. A FEW GUIDELINES FOR THE USE OF MULCHES ARE:

1. USE ON CUT AND EMBANKMENT SLOPES WHICH HAVE NOT BEEN COMPLETED TO PLAN GRADE OR WHERE THE WEATHER OR SOIL CONDITIONS WILL NOT PERMIT COMPLETING THEM WITHIN A REASONABLE TIME
2. USE ON CLEARED, GRUBBED , AND SCALPED AREAS WHERE SOIL EROSION IS LIKELY TO OCCUR
3. USE WITH TEMPORARY SEEDING

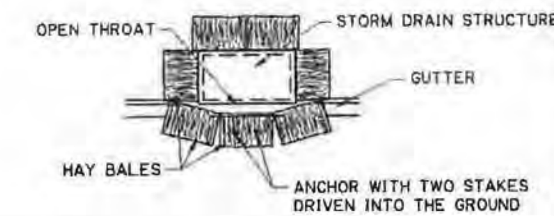


ISOMETRIC VIEW SHOWING GEOTEXTILE FABRIC

(BACKFILL SOIL NOT SHOWN)



SECTION THRU TRENCH SHOWING GEOTEXTILE FABRIC



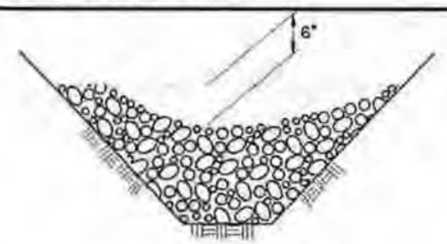
PLAN SHOWING HAY BALES

PAY ITEM: TEMPORARY HAY OR STRAW BALES

TEMPORARY INLET SILT TRAP

THE TEMPORARY DROP INLET SILT TRAP IS TO BE USED FOR SMALL DRAINAGE AREAS (LESS THAN 1 ACRE) WHERE THE STORM DRAIN IS FUNCTIONAL BEFORE THE AREA IS STABILIZED. THE TRAP CAN BE EITHER GEOTEXTILE FABRIC OR HAY BALES.

1. THE GEOTEXTILE FABRIC SHALL CONFORM TO PROJECT SPECIFICATIONS FOR GEOTEXTILE FABRIC (CLASS G).
2. WOODEN STAKES SUPPORTING THE FABRIC SHALL BE 2" X 2" OR 2" X 4" WITH A MINIMUM LENGTH OF 3 FEET. THE STAKES SHALL BE SPACED AROUND THE INLET AT A MAXIMUM SPACING OF 3 FEET.
3. THE HEIGHT OF THE FABRIC ABOVE THE INLET SHALL BE LIMITED TO 1.5' AND THE BOTTOM OF THE FABRIC SHALL BE BURIED IN A TRENCH APPROXIMATELY 4" WIDE BY 4" DEEP. THE FABRIC SHALL BE STAPLED TO THE POST WITH 1/2" STAPLES.
4. THE TRAP SHOULD BE INSPECTED REGULARLY AND AFTER EACH STORM. THE SEDIMENT SHOULD BE REMOVED AND EACH STAKE SHOULD BE FIRMLY IN THE GROUND.
5. HAY BALES SHALL BE PLACED SO THAT THE BINDING WIRE OR TWINE IS NOT IN CONTACT WITH THE GROUND.



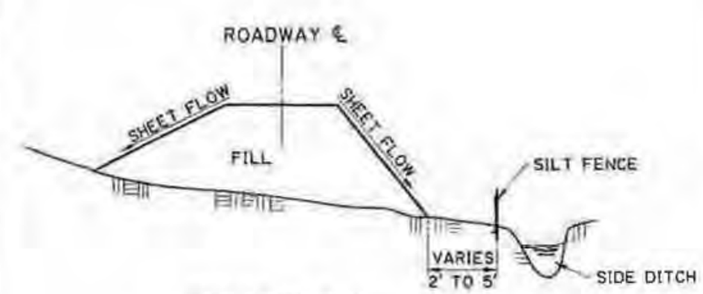
SECTION C-C

TEMPORARY SEDIMENT CHECK DAM (STONE)

PAY ITEM: TEMPORARY SEDIMENT CHECK DAM (STONE)

NOTES:
A STONE CHECK DAM IS A SMALL TEMPORARY DAM CONSTRUCTED ACROSS A SWALE OR DRAINAGE DITCH. THE PURPOSE OF THIS MEASURE IS TO REDUCE THE VELOCITY OF CONCENTRATED STORM WATER FLOWS, THEREBY REDUCING EROSION OF THE SWALE OR DITCH. THE STONE CHECK DAM WILL TRAP SMALL AMOUNTS OF SEDIMENTS GENERATED IN THE DITCH ITSELF, HOWEVER IT SHOULD NOT BE USED AS A SEDIMENT TRAPPING DEVICE. A FEW BASIC DESIGN GUIDELINES FOR THE USE OF STONE CHECK DAMS ARE:

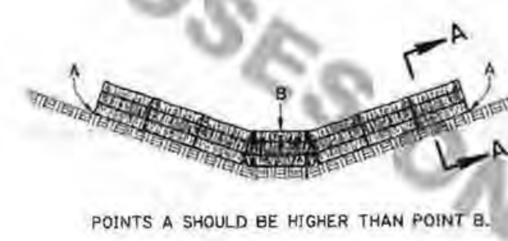
1. USE IN SMALL OPEN CHANNELS WHICH DRAIN 10 ACRES OR LESS
2. DO NOT USE IN A LIVE STREAM
3. USE IN A TEMPORARY DITCH OR SWALE WHICH, BECAUSE OF THEIR SHORT LENGTH OF SERVICE, CANNOT RECEIVE A NON- ERODIBLE LINING
4. USE IN PERMANENT DITCHES OR SWALES WHICH WILL NOT RECEIVE A PERMANENT LINING FOR AN EXTENDED PERIOD OF TIME
5. USE IN TEMPORARY OR PERMANENT DITCHES OR SWALES WHICH NEED PROTECTION DURING THE ESTABLISHMENT OF GRASS LININGS
6. FOR STONE SPECIFICATIONS, SEE PROJECT SPECIFICATIONS FOR RIPRAP. (CLASS 2 LB)



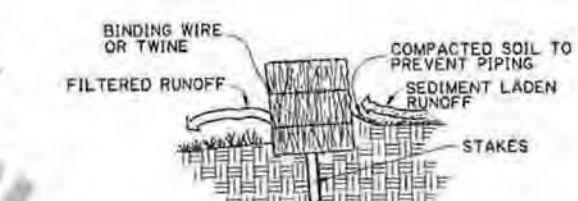
SECTION B-B

TEMPORARY SILT FENCE APPLICATION

(FOR CONSTRUCTION DETAILS AND SPECIFICATIONS SEE SHEET 2 OF 2.)



ELEVATION



SECTION A-A

TEMPORARY SEDIMENT CHECK DAM (HAY)

PAY ITEM: TEMPORARY SEDIMENT CHECK DAM (HAY)

NOTES:
A HAY BALE BARRIER IS A TEMPORARY SEDIMENT BARRIER CONSISTING OF A ROW OF ENTRENCHED AND ANCHORED BALES OF STRAW OR HAY. THE HAY BALE BARRIER IS ALSO USED AS A CHECK DAM TO REDUCE THE VELOCITY IN SMALL DITCHES OR SWALES. THE HAY BALES SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS FOR TEMPORARY EROSION CONTROL.
A FEW BASIC DESIGN GUIDELINES FOR THE USE OF A HAY BALE BARRIER ARE:

1. USE WHERE EROSION WOULD OCCUR IN THE FORM OF SHEET AND RILL EROSION
2. USE IN MINOR SWALES OR DITCHES WHERE THE MAXIMUM DRAINAGE AREA IS 2 ACRES
3. ONLY USE WHERE THE EFFECTIVENESS IS REQUIRED FOR LESS THAN 3 MONTHS
4. DO NOT USE IN LIVE STREAMS OR IN SWALES OR DITCHES WHERE THERE IS A POSSIBILITY OF A WASHOUT

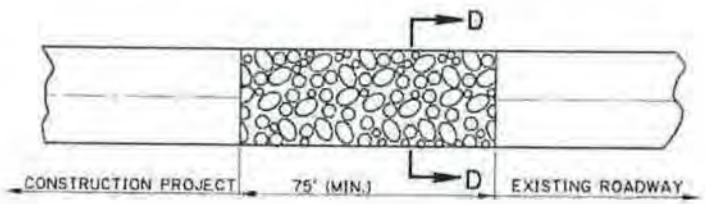
DESIGNED JCM | DETAILED KAJ | CHECKED JCM | DATE 1-14-94 | SHEET 1 OF 2

10-1-08 REMOVE SPECIFIC PAY ITEM NOS., GENERAL REVISIONS MH

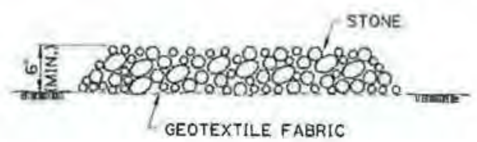
TEMPORARY EROSION CONTROL DETAILS

STANDARD PLAN EC-01

HYDRAULICS SECTION



PLAN



SECTION D-D

TEMPORARY STONE CONSTRUCTION ENTRANCE

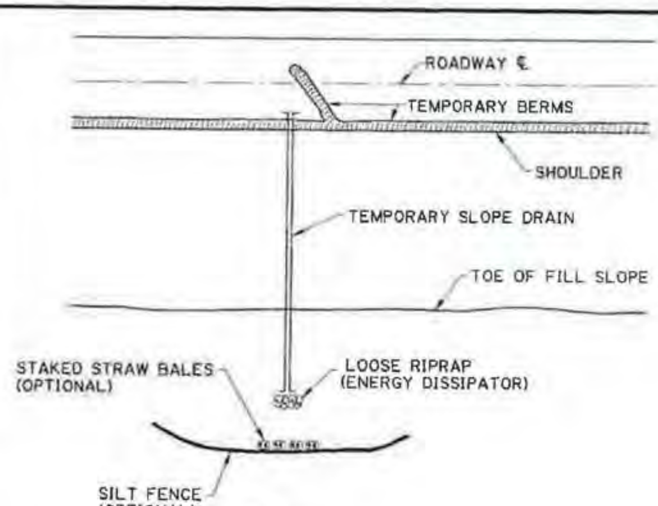
PAY ITEM: TEMPORARY STONE CONSTRUCTION ENTRANCE

NOTES:

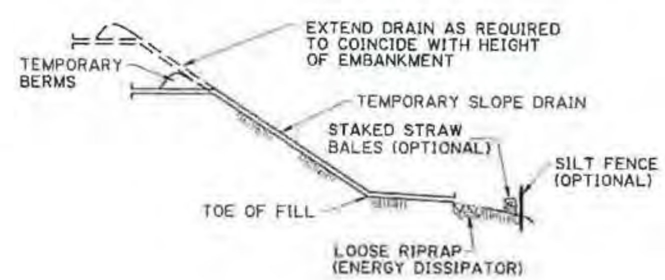
TEMPORARY STONE CONSTRUCTION ENTRANCE AND/OR WASH RACK

A STONE STABILIZED PAD LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON THE CONSTRUCTION SITE TO REDUCE THE AMOUNT OF MUD TRANSPORTED ONTO PUBLIC ROADS. IF THE ACTION OF THE VEHICLE TRAVELING OVER THE GRAVEL PAD IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF THE MUD, THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLE ENTERS A PUBLIC ROAD. A FEW BASIC DESIGN GUIDELINES FOR THE USE OF A STONE ENTRANCE AND/OR WASH RACKS ARE:

1. THE STONE LAYER MUST BE AT LEAST 6 INCHES THICK.
2. THE STONE SHALL CONFORM TO PROJECT SPECIFICATIONS FOR RIPRAP (CLASS 2 LB).
3. THE LENGTH OF THE PAD MUST BE A LEAST 75 FEET AND IT MUST EXTEND THE FULL WIDTH OF THE VEHICULAR INGRESS AND EGRESS.
4. A GEOTEXTILE FABRIC UNDERLINER IS REQUIRED. THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS FOR GEOTEXTILE FABRIC (CLASS D).
5. IF A WASH RACK IS NECESSARY, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF-SITE.



PLAN



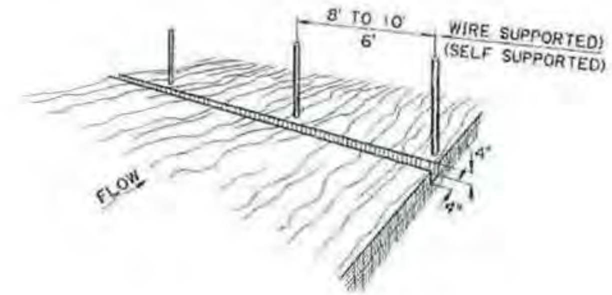
ELEVATION

TEMPORARY SLOPE DRAIN

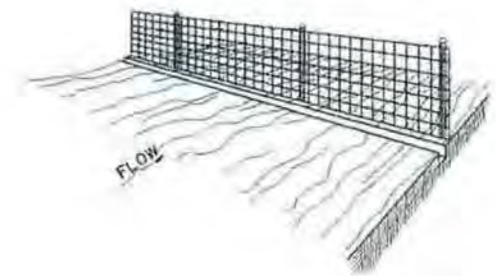
A TEMPORARY SLOPE DRAIN IS A DEVICE USED TO CARRY WATER FROM THE CONSTRUCTION WORK AREA TO A LOWER ELEVATION. SLOPE DRAINS MAY BE PLASTIC SHEET, METAL OR PLASTIC PIPE, STONE GUTTERS, FIBER MATS, OR CONCRETE OR ASPHALT DITCHES. A FEW BASIC DESIGN GUIDELINES FOR THE USE OF A TEMPORARY SLOPE DRAIN ARE:

1. THE SPACING OF THE SLOPE DRAINS VARIES WITH THE ROAD GRADE.
   FOR GRADES: 0.0% - 2.0% USE 500' SPACING
   2.1% - 5.0% USE 200' SPACING
   GREATER THAN 5.0% USE 100' SPACING
2. SLOPE DRAIN MATERIAL: SMOOTH PIPE - 8" MINIMUM - 3 MILS THICK MIN.
   CORRUGATED PIPE - 12" MINIMUM
   PLASTIC SHEETING - 4' WIDE MINIMUM
   PLASTIC SHEETING - 3 MILS THICK MIN.
3. PLASTIC SHEETING CAN BE STAKED DOWN OR WEIGHTED WITH ROCKS OR LOGS. THE AREA UNDER THE SHEETING SHOULD BE SHAPED TO PROVIDE AN ADEQUATE CHANNEL.
4. THE OUTLET END SHOULD BE PROTECTED OR HAVE SOME MEANS OF DISSIPATING ENERGY. THE FLOW SHOULD BE DIRECTED THROUGH A SEDIMENT TRAP SUCH AS A SILT FENCE, HAY BALES, OR OTHER APPROVED SEDIMENT CONTROL DEVICES.
5. TO INSURE PROPER OPERATION, TEMPORARY SLOPE DRAINS SHOULD BE INSPECTED REGULARLY AND AFTER EACH STORM, FOR CLOGGING OR DISPLACEMENT. EROSION AT THE OUTLET SHOULD BE CHECKED AND THE SILT TRAPS CLEANED IF NECESSARY.

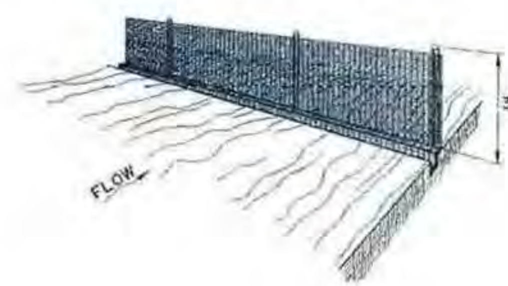
1. SET POSTS AND EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



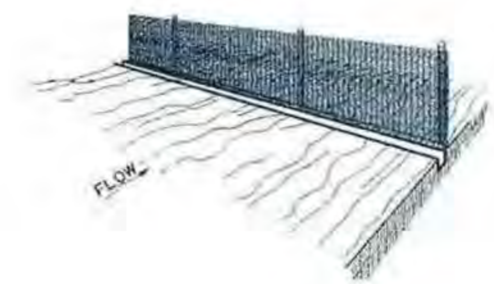
2. STAPLE WIRE FENCING TO THE POSTS.



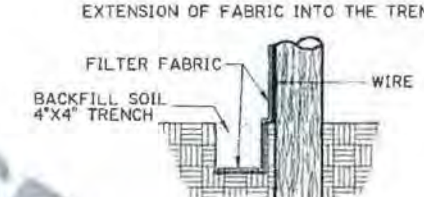
3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT EXCAVATED SOIL.



EXTENSION OF FABRIC INTO THE TRENCH.



CONSTRUCTION OF TEMPORARY SILT FENCING

(WIRE SUPPORTED SILT FENCE IS SHOWN. SELF SUPPORTED SILT FENCE WILL BE CONSTRUCTED ACCORDING TO MANUFACTURERS SPECIFICATIONS.)

NOTES:

SILT FENCING IS A TEMPORARY SEDIMENT BARRIER CONSISTING OF A FILTER FABRIC SUPPORTED BY POSTS AND STRETCHED ACROSS AN AREA TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT. THE SILT FENCING SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS FOR TEMPORARY EROSION CONTROL. A FEW BASIC GUIDELINES FOR THE USE OF SILT FENCING ARE:

1. USE WHERE EROSION WOULD OCCUR IN THE FORM OF SHEET AND RILL EROSION
2. USE WHERE THE MAXIMUM DRAINAGE AREA BEHIND THE SILT FENCE IS 1/4 ACRE PER 100 FEET OF SILT FENCE LENGTH
3. USE WHERE THE MAXIMUM SLOPE LENGTH BEHIND THE BARRIER IS 100 FEET
4. USE THERE THE MAXIMUM GRADIENT BEHIND THE BARRIER IS 2:1
5. DO NOT USE SILT FENCES IN LIVE STREAMS OR IN DITCHES OR SWALES WHERE FLOWS EXCEED ONE CUBIC FOOT PER SECOND

SHEET NUMBER

10-1-08 REMOVE SPECIFIC PAY ITEM NOS., GENERAL REVISIONS MH

DATE 10-1-08

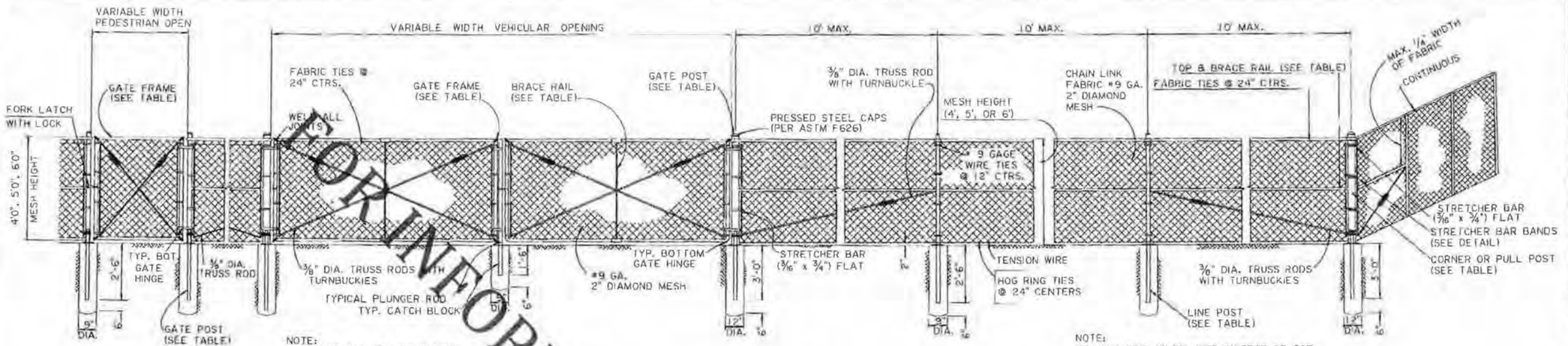
DESIGNED JCM
DETAILED KAJ
CHECKED JCM
DATE 1-14-94
SHEET 2 OF 2

TEMPORARY EROSION CONTROL DETAILS

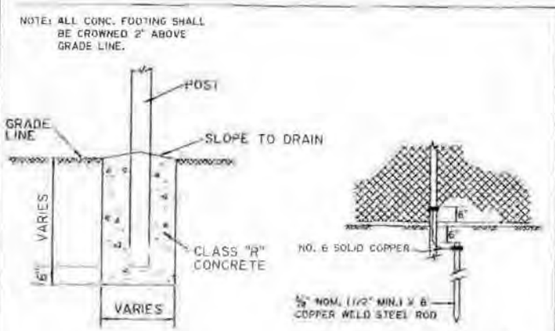
STANDARD PLAN EC-01

HYDRAULICS SECTION

IP PWP:dms09544\EC-01(2008)(SHEET 2.dgn

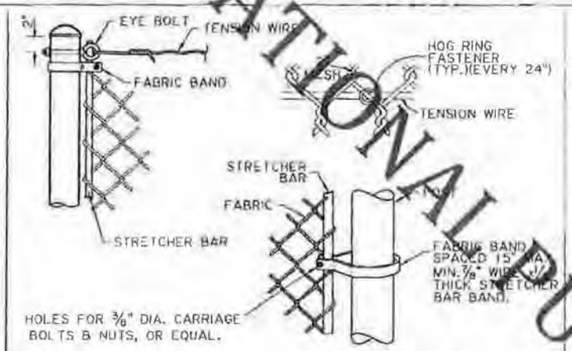


CHAIN LINK FENCE (4', 5', AND 6')

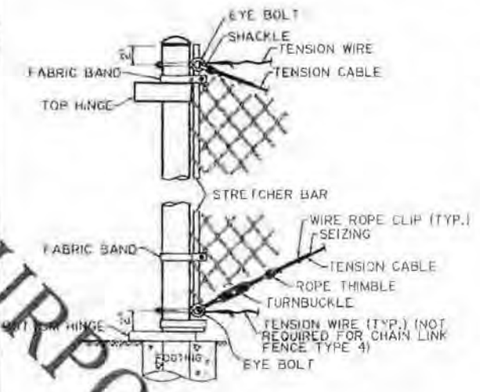


DETAIL OF POST FOOTING

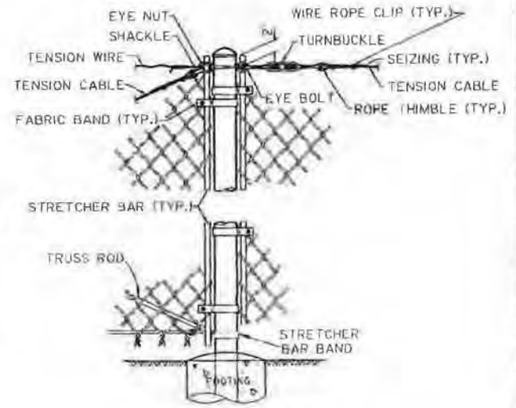
DETAIL OF GROUND WIRES FOR FENCES



FABRIC & TENSION WIRE DETAILS



GATE POST DETAIL



BRACE & TRUSS CONNECTION AT LINE POST

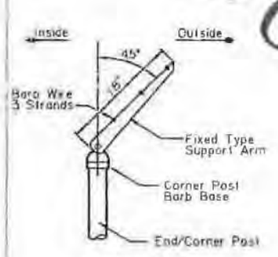
NOTES:

1. THE FENCE INSTALLATION AND DETAILS SHOWN ARE TYPICAL AND MAY VARY IN ACCORDANCE WITH DIFFERENT MANUFACTURERS, PROVIDED THEY MEET THE STANDARD SPECIFICATIONS.
2. TYPICAL INSTALLATION PLAN MAY VARY AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATION OF GATES TO BE SHOWN ON PLANS.
3. GROUNDING ROD ASSEMBLIES ARE TO BE INSTALLED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
4. ALL BOLTS TO BE UPSET TO DISCOURAGE VANDALISM.
5. ALL CONNECTION METHODS TO BE APPROVED BY THE PROJECT ENGINEER.
6. LOCATION OF GATES TO BE SHOWN ON PLANS.
7. LATERAL FENCE TO BE SAME CONSTRUCTION AS FRONTAL FENCE.
8. CONTROL OF ACCESS FENCE SHALL BE 5 FT IN HEIGHT UNLESS OTHERWISE NOTED IN THE PLANS.
9. AT EACH LOCATION WHERE AN ELECTRIC TRANSMISSION, DISTRIBUTION, OR SECONDARY LINE CROSSES A FENCE, THE CONTRACTOR SHALL FURNISH AND INSTALL A GROUND CONFORMING TO ARTICLE 250 OF THE NATIONAL ELECTRIC CODE. A GROUND SHALL ALSO BE INSTALLED AT A MAXIMUM SPACING OF 500 FT. ALONG THE FENCE. GROUNDING WILL NOT BE PAID FOR SEPERATELY BUT SHALL BE INCLUDED IN THE COST OF THE FENCE.
10. SEE AASHTO M-181 FOR ADDITIONAL REQUIREMENTS.

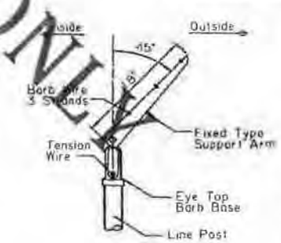
POST & RAIL TABLE

	STANDARD		ALTERNATES			
	OUTSIDE DIA. (INCHES)	LBS. (PER LIN.FT.)	DIMENSION (INCHES)	SECTION	LBS. (PER LIN.FT.)	ASTM F1043 GROUP
LINE POST	2 3/8	3.65	2.375	ROUND	3.12	
			2.25 X 1.70	H	3.26	II
			2.25 X 1.70	HEAVY C	2.78	II
			1.875 X 1.625	STD. C	2.40	II
BRACE RAIL	1 5/8	2.27	1.660	ROUND	1.84	
COR. POST	2 7/8	5.79	2.875	ROUND	4.64	
GATE POST	4.0	9.10	3.500	ROUND	5.71	IC
GATE FRAME	1 5/8	2.72	1.900	ROUND	2.28	

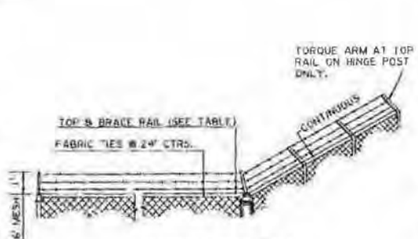
7 FT FENCE



CORNER POST SUPPORT ARM



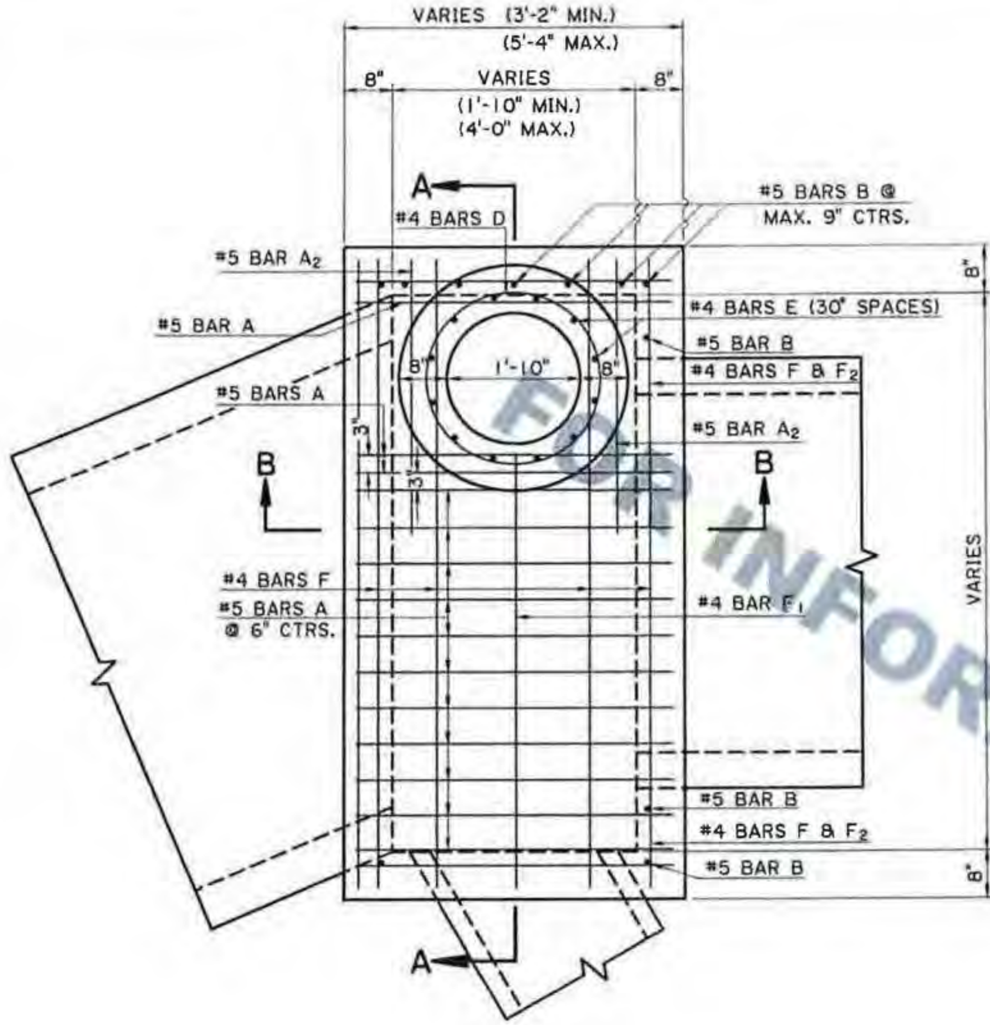
LINE POST SUPPORT ARM



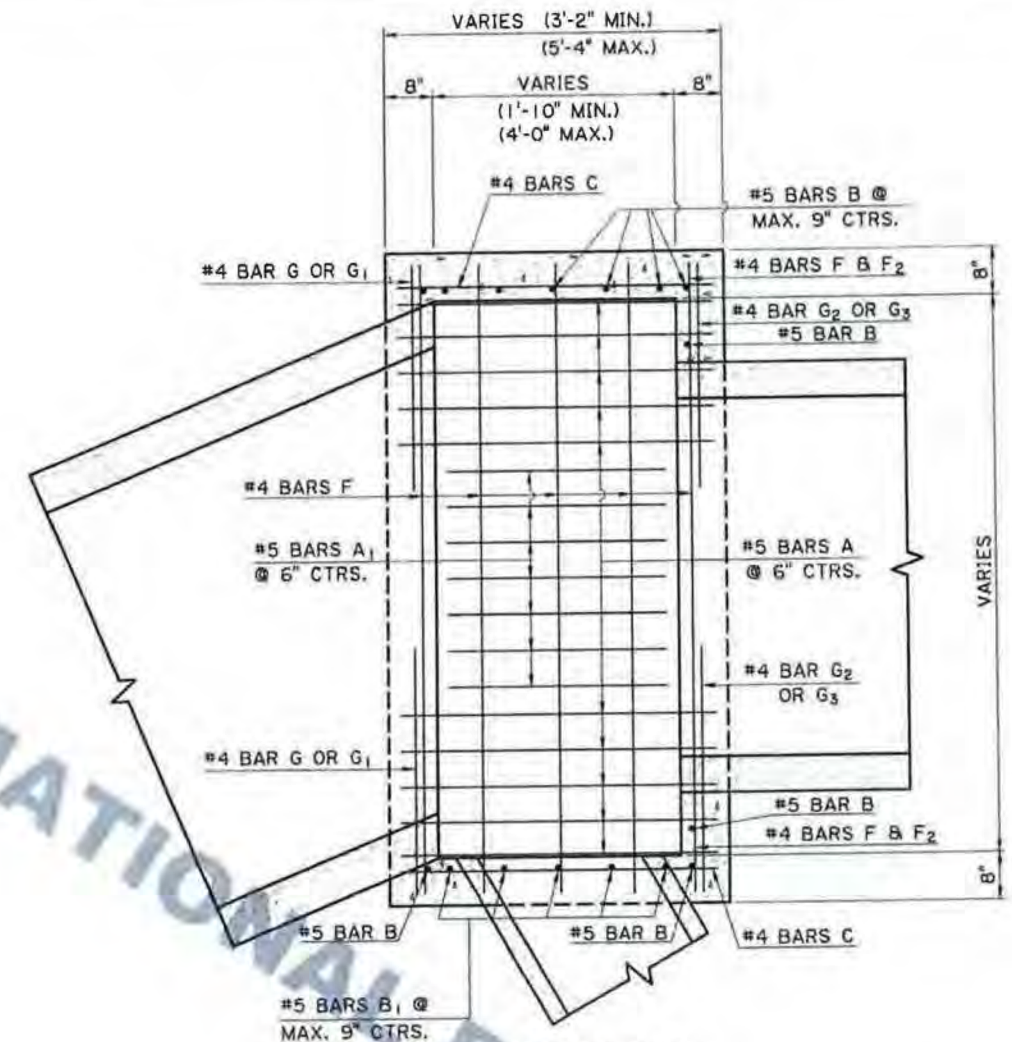
BARBED WIRE TOP

CHAIN LINK FENCE & GATES
4 FT., 5 FT., 6 FT. & 7 FT.
STANDARD PLAN: FN-01

ROAD DESIGN



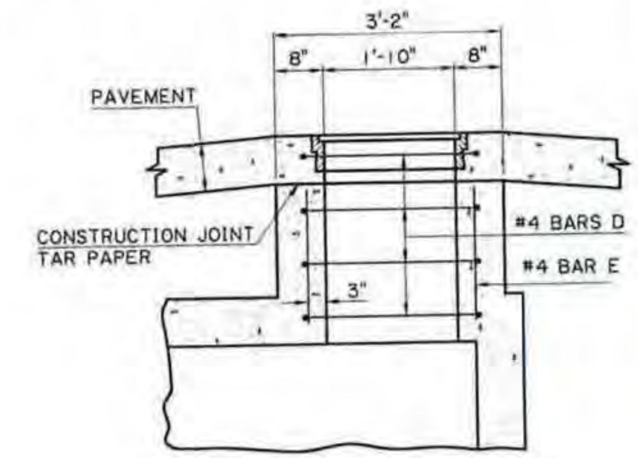
PLAN



SECTION C-C

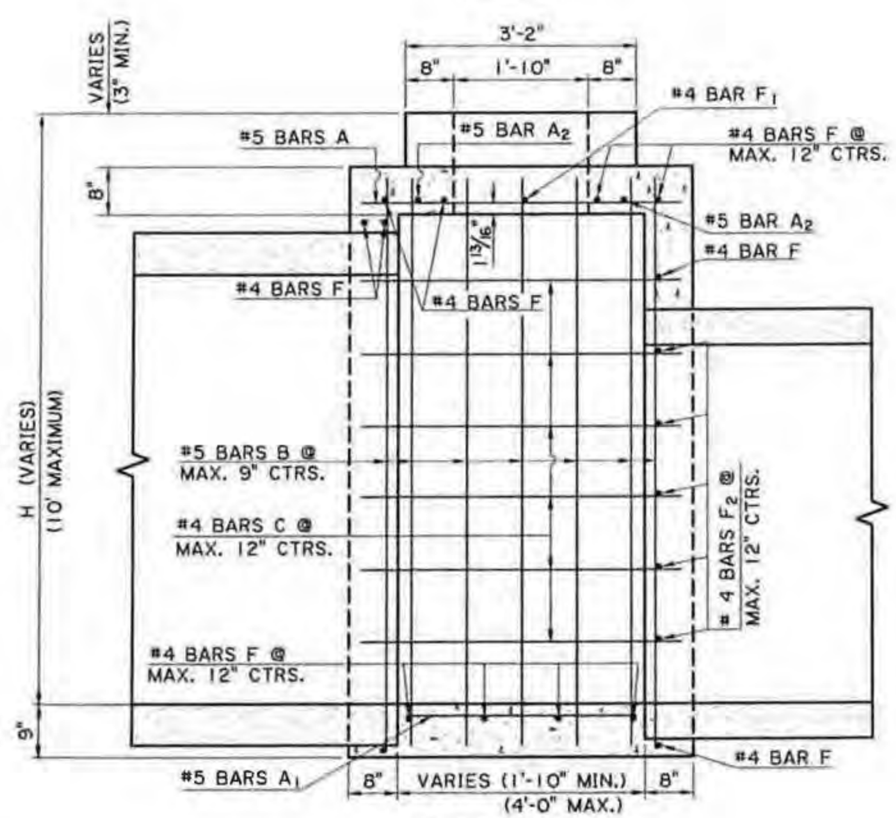
GENERAL NOTES:

1. MANHOLE IS DESIGNED ACCORDING TO 4TH ED. 2007 AASHTO LRFD PROCEDURES. SECTION 702 OF THE DOTD STANDARD SPECIFICATIONS SHALL APPLY.
2. CONCRETE: ALL CONCRETE SHALL BE CLASS "M" MINOR STRUCTURE. ALL EXPOSED EDGES SHALL BE CHAMFERED ¾ IN. EXCEPT AS NOTED.
3. REINFORCING STEEL: REINFORCING STEEL SHALL BE GRADE 60. DIMENSIONS ARE TO BAR CENTERS. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2 IN. CLEAR UNLESS SHOWN OTHERWISE.
4. SEE "DETAIL A" FOR DETAILS OF MANHOLE IN A PAVEMENT AREA.
5. THE CONTRACTOR WILL NOT POUR ABOVE THE BOTTOM OF THE SLAB UNTIL THE PAVING ADJACENT TO THE MANHOLE HAS BEEN COMPLETED.

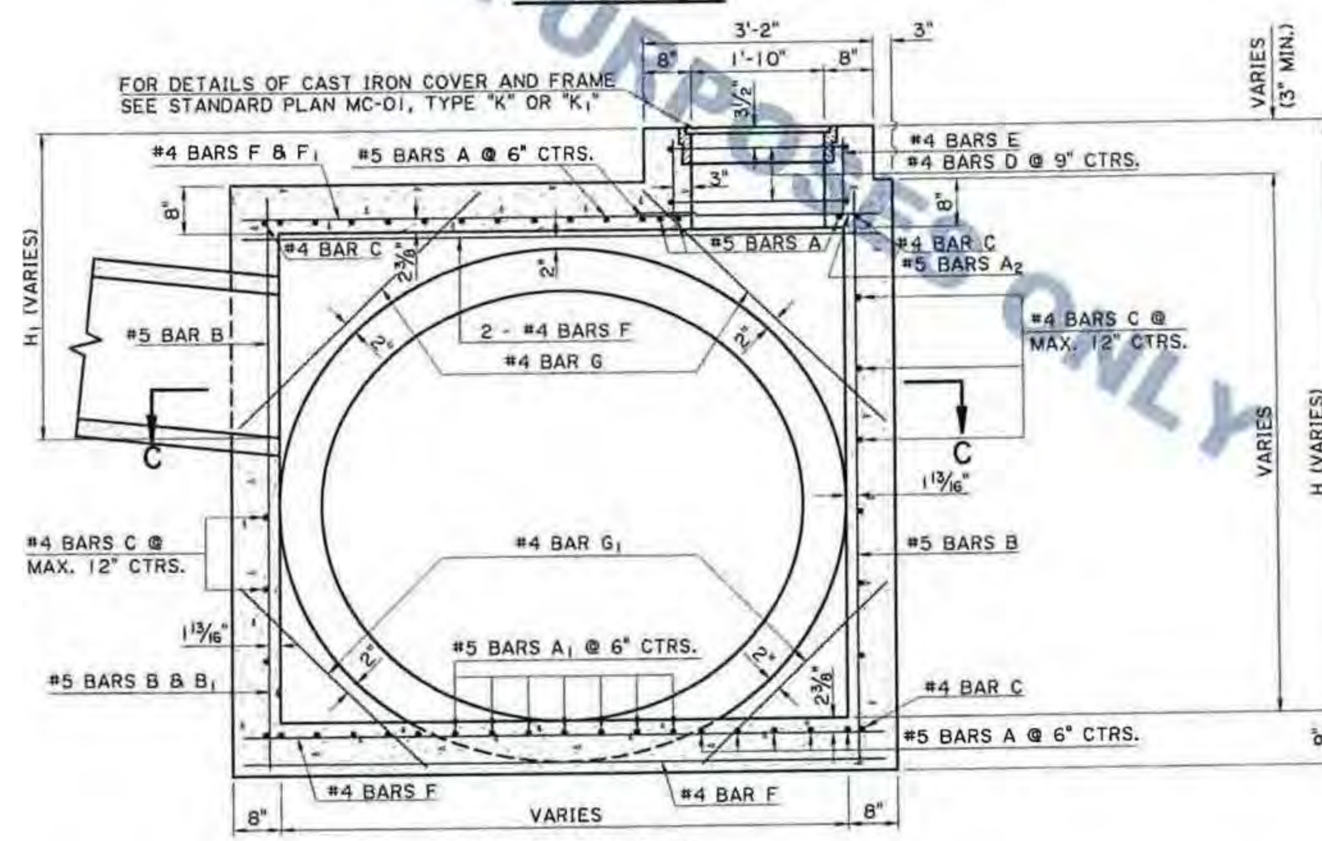


DETAIL A

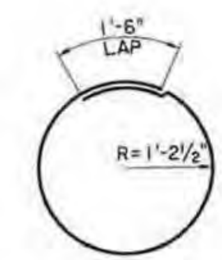
(MANHOLE IN PAVEMENT AREA)



SECTION B-B



SECTION A-A



#4 BAR D

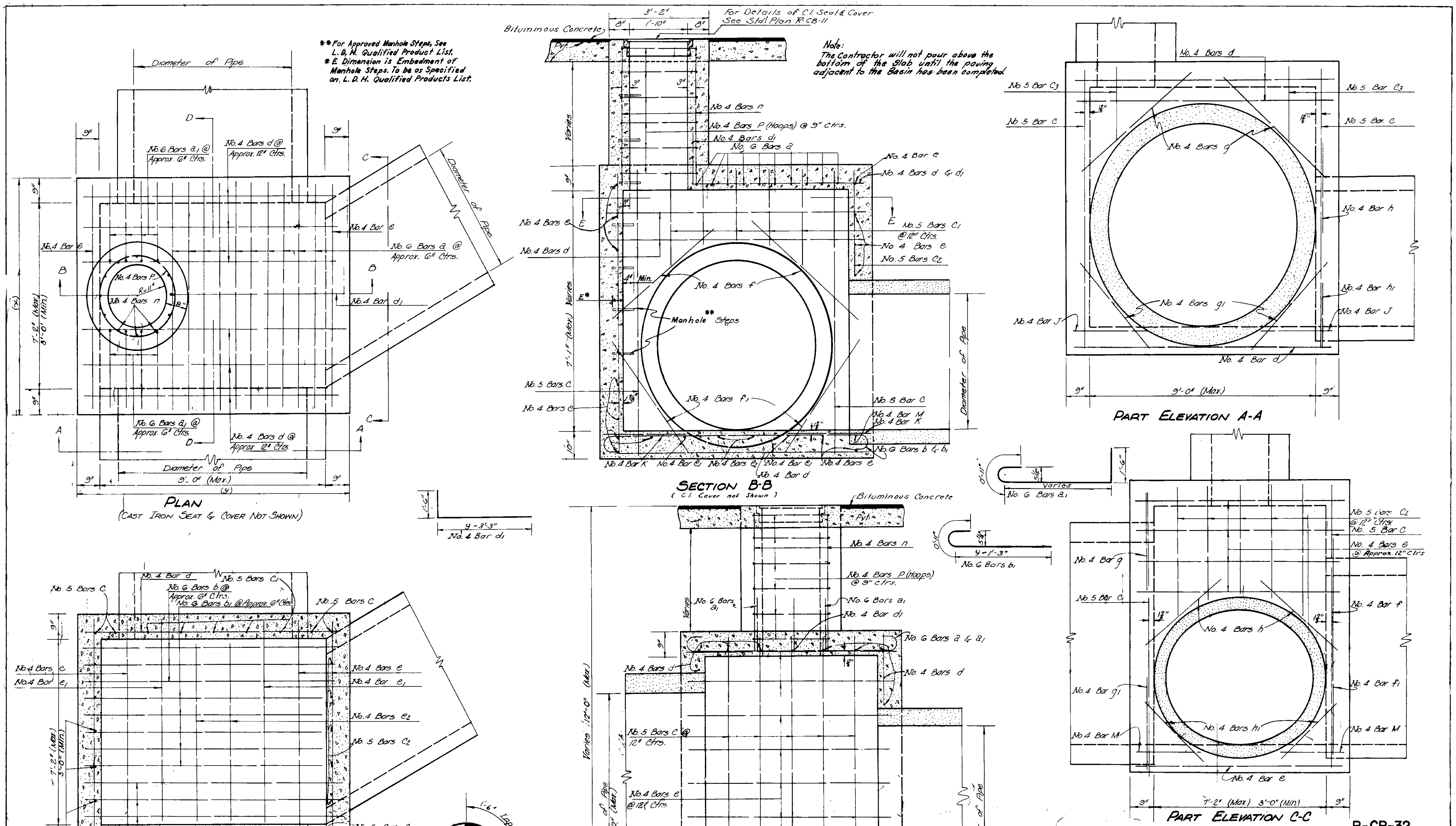
DATE	REVISION DESCRIPTION	BY
3-1-11	REVISED TO 2007 AASHTO LRFD PROCEDURES	
10-22-08	REMOVED MANHOLE STEPS, GRATES, ADDED DETAIL A	

DESIGNED WMR · DETAILED JOK · CHECKED QAH · CHECKED C. LUSK · DATE 5-26-54 · SHEET 1 OF 1 · DATE: 3-1-11

CONCRETE MANHOLE
MAX. PIPE: 36" RCP X OPEN
MAX. DEPTH: 10'

STANDARD PLAN R-CB-11MOD

HYDRAULICS SECTION



Note: For details of C.I. Seat & Cover and any other information not shown, See Std. Plan R-CB-11.

R-CB-32

STANDARD PLAN
R.C. MANHOLE
7'-0" MAXIMUM PIPE CONNECTION IN SIDE AND END WALLS

To be used in conjunction with Std. Plan R-CB-11

STATE OF LOUISIANA
DEPARTMENT OF HIGHWAYS

In Charge of: Original Signed by Chief Engineer

Revisions

Appendix C

8-Step Process

8-STEP PROCESS

DATE: 05/14/2015
PREPARED BY: Gerard H. DuCote, Environmental Floodplain Specialist
PROJECT: St. Tammany Parish Eastwood Drainage Improvement Project
Hazard Mitigation Grant Program Project No. 1603-0321, FEMA Disaster 1603-DR-LA
LOCATION: Slidell, LA

EO 11988-FLOODPLAIN MANAGEMENT
EO 11990-WETLAND PROTECTION

STEP 1 **Determine whether the proposed action is located in a wetland and/or The 100-yr floodplain (500-year floodplain for critical actions [44 CFR 9.4]), or whether it has the potential to affect or be affected by a floodplain or a wetland (see 44 CFR 9.7).**

St. Tammany Parish enrolled in the National Flood Insurance Program (NFIP) on April 23, 1971. According to Preliminary Digital Flood Insurance Rate Map (DFIRM) 22103C0495F, dated 4/30/2008, the site is located in shaded Zone X.

STEP 2 **Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision making process (see 44 CFR 9.8).**

A cumulative public notice concerning the Hazard Mitigation Grant Program (HMGP) Assistance in floodplain and wetland areas will be or has been published in the New Orleans Times-Picayune, Baton Rouge Advocate, Lafayette Daily Advertiser, Lake Charles American Press, Hammond Star, Monroe News-Star, Shreveport Times, and the Alexandria Daily Town Talk.

STEP 3 **Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions and the "no action" option) [see 44 CFR 9.9]. If a practicable alternative exists outside the floodplain or wetland, FEMA must locate the action at the alternative site.**

Storm Line Drainage Improvements (Proposed Action)

ALTERNATIVE ACTION 1: The preferred alternative is the filling and plugging of the existing 36" RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. The 36" RCP and 32" x 36" box culvert drain lines would be abandoned in place, plugged at the ends of the lines, and filled with excavatable flow-able fill. The drainline would be replaced with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. In addition, 146 linear feet of 42" RCP would be installed and connected to the existing drainage along Lakewood Drive to the new Fremaux drainage. An extension of the existing box culvert with dual 5' x 8' reinforced concrete box culverts would not be required. During design, it was determined that the 5' x 8' RCBC was not necessary; only the headwall at the outfall of the existing 2' x 9' box culvert would be required. This alternative would require the removal and replacement of the southern half of the asphalt street with mill and asphalt overlay on the remaining portion of the street; and the removal and replacement of portions of the sidewalks and driveways along Fremaux Avenue. The scope of work for this alternative also required the acquisition of four (4) five (5) foot wide drainage servitudes. The applicant has already acquired the servitudes and no additional acquisition of servitudes or right-of-ways are anticipated. This alternative does not require temporary access roads to be constructed. Furthermore, the applicant does not anticipate the demolition of residential or commercial structures. The applicant's preferred alternative, appears to be the most economical because the majority of the drain line will be placed in an existing drainage ditch which limits the amount of asphalt roadway to be removed and replaced. Such improvements to the outdated and substandard drainage systems, will not adversely affect the environment or historic concerns due to proposed measures to be taken to minimize and mitigate.

Dismissed Alternatives:

ALTERNATIVE ACTION 2 : Includes the filling and plugging of the existing 36' RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete culvert along Eastwood Drive. The existing 3' x 8' box culvert would be removed and replaced with dual 5' x 8' reinforced concrete box culverts. This Alternative would require the removal and replacement of half the roadway and all conflicting sidewalks and driveways along Eastwood Drive. This item would require the removal and replacement of water and sewer service lines along the roadway. Based on approximate field locations, the replacement of water and sewer lines along Eastwood were not required in this alternative. If this alternative were chosen, increased cost would be incurred because of the large amount of concrete roadways, sidewalks, and driveways required

for removal and replacement. Therefore, this alternative was not considered cost effective and will not be carried forward

NO ACTION: Implementation of the No Action Alternative would entail no hazard mitigation measures for the Lakewood Subdivision and surrounding residential areas. Consequently, this alternative would not provide any type of protection to residents of the area during peak flow events or other emergency situations. Under this alternative, water damage would likely continue to occur and both insured and uninsured losses would be experienced. This alternative would perpetuate the "damage-repair-damage" cycle thus requiring additional funding to be drawn from the National Flood Insurance Program as well as depleting local and National disaster funds.

STEP 4 **Identify the full range or potential direct or indirect impacts associated with, the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see 44 CFR 9.10).**

The filling and plugging of the existing box culvert and replacing the drain line with a precast reinforced concrete box culvert along Fremaux Avenue drainage improvements will be coordinated and comply with the local floodplain administration. All required permits will be obtained and kept for permanent documentation. The proposed activities will have minimal potential to impact the floodplain.

STEP 5 **Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under step # 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see 44 CFR 9.11).**

ALTERNATIVE 1: The filling and plugging of the existing box culvert and replacing the drain line with a precast reinforced concrete box culvert along Fremaux Avenue The pre-existing system would be before any drainage was ever installed and thus nonexistent other than natural drainage channels. The existing system capacity is inadequate. The proposed drainage was designed to reduce Surface Street flooding for the 10, 25, 50, and 100 year storms. The proposed 4' x 6' RCBC will discharge into the Lakewood Canal which flows to the W-14 Canal. Design plans, maps, and site photos included as attachments illustrate the work to be completed. The scope of work will not require the applicant to acquire structures for demolition, or right-of-ways. Servitudes have

already been acquired. No additional right-of ways or residential or commercial structure demolition are anticipated. Additionally, the project does not require temporary access roads to be constructed.

STEP 6 **Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others. And it's potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at step # 3 are practicable in light of the information gained in steps # 4 and # 5. FEMA shall not act in a floodplain or wetland unless it is the only practicable location (see 44 CFR 9.9).**

The actions proposed are located in the only practicable location. There are no other practicable alternate locations outside the floodplain available.

STEP 7 **Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see 44 CFR 9.12).**

The EA went out for public review in the St. Tammany Farmer on Thursday May 14, and Thursday May 21, 2015, and in The Times Picayune on Wednesday, May 13, Friday, May 15, and Sunday May 17, 2015.

STEP 8 **Review the implementation and post-implementation phases of the proposed action to ensure that the requirements of the order are fully implemented. Oversight responsibility shall be integrated into existing processes.**

APPROVAL CONDITIONED ON REVIEWS OF IMPLEMENTATION AND POST IMPLEMENTATION PHASES TO ENSURE COMPLIANCE WITH THE ORDER(S).

Project has been reviewed for compliance with 44 CFR Part 9.

Appendix D

Hydrologic & Hydraulics Drainage Report

RICHARD C. LAMBERT CONSULTANTS, L.L.C.

February 24, 2015

Donna O'Dell, P.E.
City Engineer, City of Slidell
250 Bouscaren Street, Suite 302
Slidell, LA 70458

SUBJECT: EASTWOOD DRAINAGE IMPROVEMENTS
SLIDELL, LOUISIANA
RCLC NO 713-20

Dear Ms. O'Dell:

Since culvert sizes were increased allowing for more flow, chance of negative upstream effects is minimal. Per the third paragraph in Section 2.4 Field Investigations of the H&H Drainage Report dated February 8, 2012, RCLC performed on site investigations and acquired topographic surveys to evaluate downstream effects.

Section 6.4 Downstream Impacts of the H&H Drainage Report states that due to an existing drainage structure at Shortcut Highway the impacts downstream of the improvements will have negligible surface water increases. Review of the study model estimates that water surface profile elevations for the 100 year storm could rise from elevation 10.1 for the existing condition to 10.2 for the improved condition. The water surface profile for the 25 year storm is estimated to rise from elevation 9.8 to 10.0.

Attached is a PDF comparing the limits of the elevation 10.1 water surface profile (100 year existing condition) and the elevation 10.2 water surface profile (100 year Option 3 improved condition) based on the 1998 contours and 2006 aerial. The variation of the inundation area within the developed areas appears to be minimal.

If you have any questions or require further action on our part, please contact me.

Yours truly,

RICHARD C. LAMBERT CONSULTANTS, LLC

Franz J. Zemmer, P.E.
Manager – Design

Attachments

I:\File Cabinet\71320 Eastwood Drainge Improvements\L_DonnaOdell 01-19-2015.doc

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LAKEWOOD
EASTWOOD
FREMAUX
SURFACE PROFILE EL.
10.2
10.1

RCLC Project No. 711-03
City of Slidell Project No. 100-116
GOHSEP No. 1603n-103-0043

Hydrologic & Hydraulics Drainage Report

Eastwood Storm Drain Line Improvements

Slidell, Louisiana

February 8, 2012

Prepared For:

City of Slidell
2055 Second Street
Slidell, LA 70458

Prepared by:

Richard C. Lambert Consultants, L.L.C.
900 West Causeway Approach
Mandeville, LA 70471

STATE OF LOUISIANA
DANIEL P. HILL
License No. 35556
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
2-8-2012

Table of Contents

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1.0 Project Overview

The Eastwood Storm Drain Line Improvements Project is a Federal Emergency Management Agency (FEMA Region VI) Hazard Mitigation Grant Program (HMGP) project. The FEMA HMGP, as authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The drainage improvements project will be administered by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) for the City of Slidell.

As part of the HMGP process, the City of Slidell has contracted Richard C. Lambert Consultants, L.L.C. (RCLC) to analyze the existing drainage conditions and the benefits of the proposed drainage improvements for the area. Per the HMGP Application submitted to GOHSEP by the City of Slidell, the streets, yards, and homes in the area historically experience flooding during heavier rainfall events. The flooding is attributed to the limited flow capacity of existing systems due to undersized subsurface drainage near Eastwood Drive. The City's goal for the project is to reduce the risk of flooding within the area by increasing stormwater conveyance through drainage improvements to the existing drainage system.

1.1 Project Description and Location

The Eastwood Storm Drain Line Improvements Project is located in Lakewood Subdivision in Slidell, Louisiana. Lakewood Subdivision lies within the limits of the City of Slidell approximately 0.52 miles west of Interstate 10 between Gause Boulevard (US 190) and Shortcut Highway (US 190 Business). The storm drain line improvement area is located along the rear lot lines of properties between Fremaux Avenue and Eastwood Drive. A project vicinity map is located below as Image 1 and in Appendix A on page A-10

The drainage system within Lakewood Subdivision was constructed in the early 1970's as part of the residential development. The criteria used in the design of the original drainage system are unknown. The existing subdivision drainage system is composed of reinforced concrete pipe and box culverts. Storm water enters the drainage system through curb and grate inlets along the subdivision's roadways. Portions of the drainage system within Lakewood Subdivision have been upgraded. Some drain lines within the system have been rehabilitated with pipe lining by the City of Slidell. Some drain lines have also been replaced.

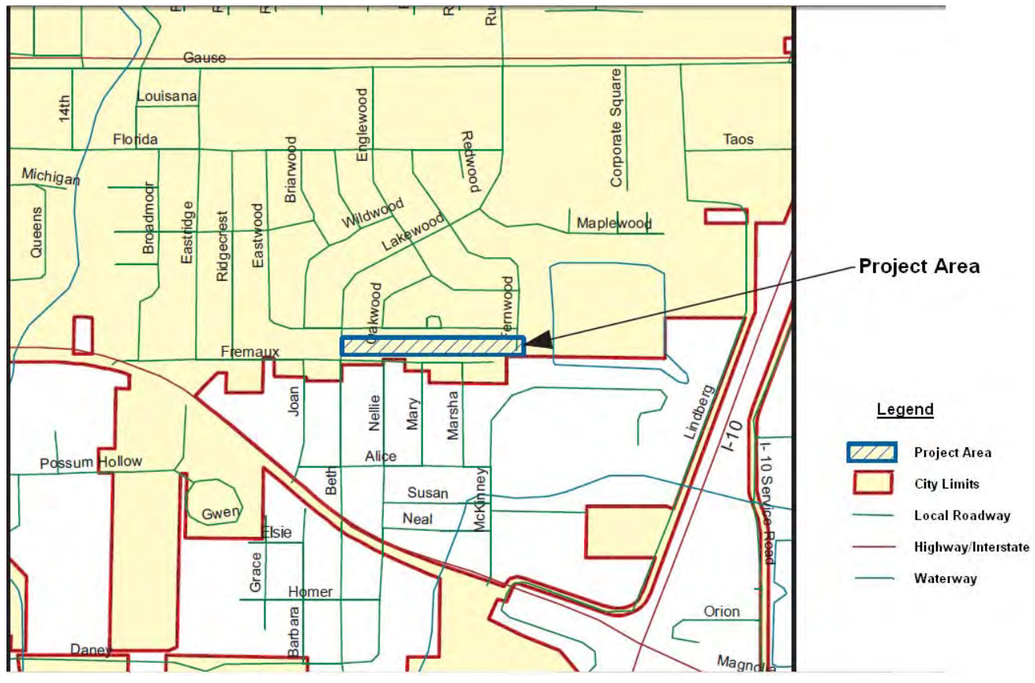

Image 1: Project vicinity map

1.2 Project Scope

The hydrology and hydraulic drainage study for the Eastwood Storm Drain Line Improvements project was performed to meet the hydrology and hydraulics study requirements of the GOHSEP HMGP 1603 Application #1603n-103-0043. Per these criteria, RCLC has performed the hydrology and hydraulic drainage study requirements as follows:

- Performed research and gathered data required for the hydrology and hydraulic study
- Conducted engineering field reconnaissance to aid in determining existing drainage patterns.
- Developed water shed map based on all acquired information.
- Prepared a hydrologic and hydraulic model of the existing Eastwood Drainage System and surrounding areas to estimate peak flows, surface storage, existing water surface elevations and problematic areas.
- Prepared a hydrologic and hydraulic model of the proposed Eastwood Drainage System and surrounding areas to estimate peak flows, surface storage, proposed water surface elevations and problematic areas remaining after proposed drainage improvements.
- Prepare conceptual project drawings for improvement options and opinions of probable costs for the options.

Work complies with standards described in the Louisiana Department of Transportation (LADOTD) Hydraulics Manual, 2011 Edition. Based on the required criteria, RCLC performed a drainage analysis using the information and methods outlined in this report.

2.0 Drainage Background Information

Background information on the drainage area was researched and compiled by RCLC using information from several sources. Some sources included in the research were the St. Tammany Parish Master Drainage Plan (1983), FEMA Flood Insurance Study (1999), and the City of Slidell Master Drainage Plan (1994). These documents were reviewed by RCLC to obtain drainage information included in this section of the report. Additional drainage background information was gathered through field investigations, topographic surveys and archived design information.

2.1 W-14 Drainage Basin

The project area is located in one of the City of Slidell's major watershed basins known as the W-14 Drainage Basin. The W-14 Drainage Basin drains the majority of the City of Slidell which is comprised of approximately 5,000 acres of mixed land use. The project area drains to the eastern branch of the W-14 Canal, also known as the Lakewood Drainage Canal. The W-14 Main Diversion Canal begins just north of Interstate Highway 12 (I-12) near Brownswitch Road. The main canal drains the northern end of Slidell before crossing US 190. After crossing US 190, the W-14 Main Diversion Canal drains the southern half of the city before crossing US 190 Business and Interstate Highway 10 (I-10). The Lakewood Drainage Canal drains into the W-14 Main Diversion Canal prior to W-14 Drainage Canal's crossing point with I-10. Once crossing I-10, the W-14 Canal drains toward the Fritchie Marsh and ultimately into Lake Ponchartrain. Image 2, below, shows the W-14 drainage basin. Maps showing the major watershed basins for the City of Slidell and ultimate disposal path of the W-14 Canal to Lake Ponchartrain can be found in Appendix A on pages A-8 and A-7 respectively.

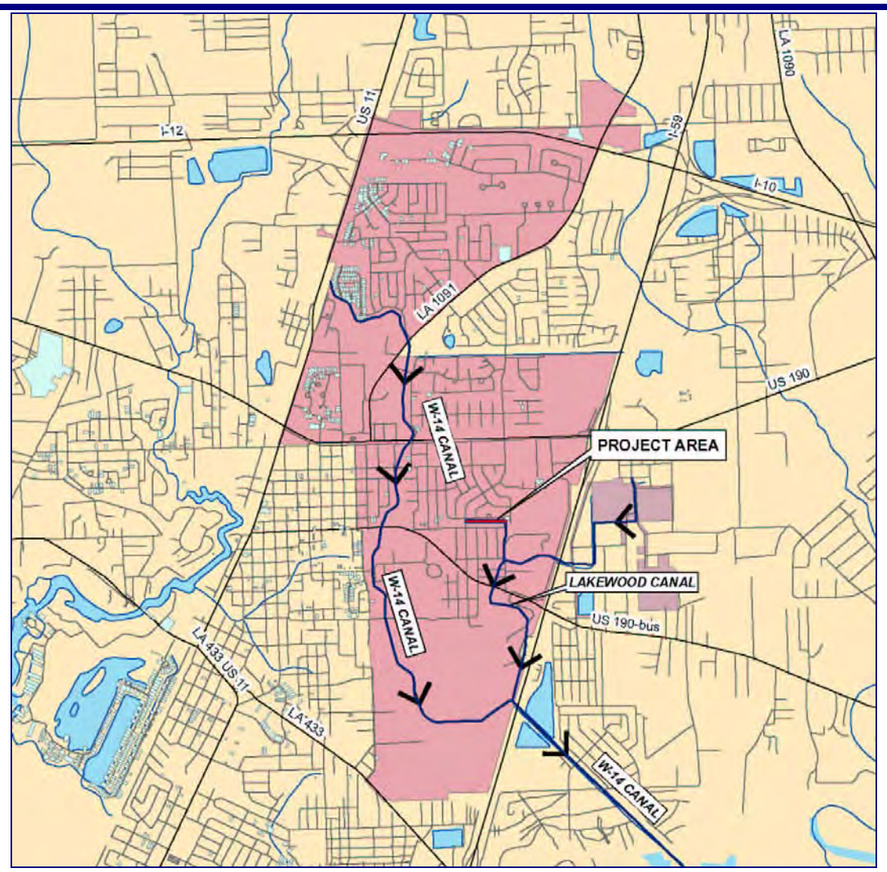

Image 2: W-14 drainage basin

2.2 Lakewood Subdivision Drainage

As stated previously, Lakewood Subdivision is a residential development built during the 1970's. Based on comments from area residents, the subdivision frequently experiences street and property flooding during rainfall events. The existing box culvert being evaluated for replacement is located in the backyards of residences located along the southern limits of the subdivision. Because of the subdivision's age, a review of archived plans and several field investigations were required to determine drainage patterns in and around the project area.

2.3 Existing Plan Review

Several plans of the existing drainage system in the vicinity of the project area were obtained from the City of Slidell's Department of Engineering and Department of Public Works. These plans include scans of design drawings and field sketches from maintenance operations. The original design drawings for the drainage within Lakewood Subdivision were produced by J.S. Boyd & Associates and are mostly illegible due to the age and quality of the scans. These drawings are located on Sheets C-2, C-3, C-4, C-5, and C-6 in Appendix C. The majority of information used for the analysis of the subsurface system was obtained from a subdivision drainage map dated 1995. This drainage map is located on page C-2 of Appendix C. This drainage map was provided to RCLC by the City of Slidell Engineering Department.

In order to verify the current condition of the system, RCLC compared the drainage map to drainage sketches used by the City of Slidell Department of Public Works for system maintenance. These sketches are shown on pages C-1 and C-10 of Appendix C. Some differences in the plan and sketches were noted, specifically, the drainage line through the project area. The drainage map does not indicate a pipe size for the drain line in the project area. The most recent sketch, on C-10, shows the drain line along the rear of the lots ranges in sizes from a 24" x24" box culvert to a 36" x 32" box culvert. These sizes do not coincide with the 36"x96" box culvert shown on page C-1. All available drainage system data obtained was compiled to create a composite drainage map for the project area. The composite drainage map is located on page A-9 of Appendix A. With the assistance of the Louisiana Department of Transportation (LADOTD), RCLC was also able to

obtain drainage maps from the I-10/Fremaux interchange and US 190 projects. These project drawings can be found on pages C-7, C-8 and C-9 of Appendix C.

During the existing plan review, several discrepancies between the existing drainage information, field conditions, and composite drainage map were discovered. The HMGP application showed an existing 3'x8' box culvert for the entire length of the improvement area. Based on the plan review, the existing drainage line in the improvement area was determined to actually consist of a combination of 36" RCP, 32"x36" box culvert, and 3' x 8' box culvert as stated in the previous paragraphs. Because of the discrepancy in drainage system information in Lakewood Subdivision, RCLC conducted several field investigations to better verify project area conditions.

Another discrepancy was noted during the basin delineation and involved the drainage maps for the LADOTD projects. The drainage maps for previous LADOTD projects in the surrounding area show different basin delineations in comparison to the basin boundaries developed by RCLC. LADOTD drainage maps show the majority of Lakewood Subdivision draining toward a box culvert located to the west of the project area instead of draining to the Lakewood Drainage Canal. This box culvert crosses US 190 Business and drains into the W-14 Main Canal. Field investigations were performed to determine actual drainage flow patterns in the area in comparison to those shown on existing plans.

2.4 Field Investigations

RCLC conducted several field investigations to verify plan review information and determine drainage patterns and conditions within the drainage system. The first full field investigation consisted of meeting with the City of Slidell Engineering Department to discuss drainage in the Lakewood area and performing field reconnaissance for drainage condition assessment. The field investigation crew visited the proposed improvement area to verify inlet locations and drainage flow directions developed during the existing plan review. The majority of the drainage patterns noted in field were consistent with the plan review; however, some revisions were required. A summary of this field investigation can be found on page D-1 of Appendix D.

The second field investigation consisted of determining the unknown sizes of existing drain lines, taking inlet depth measurements, and meeting with the City of Slidell Department of Public Works. During the meeting, Mr. Dan Yeates, Superintendent of the Department of Public Works expressed concern over issues involving the improvement area. Mr. Yeates stated that limited site access caused by the numerous residences along the drainage system restricted maintenance operations. This lack of access was also noted by the RCLC field crew when attempting to verify existing pipe sizes. A summary and markup plan from this site investigation is located on pages D-1 and D-2 of Appendix D.

Due to concern over the potential impact of downstream conditions on the project area, a third field investigation was conducted in order to evaluate drainage conditions for surrounding areas. Field crew investigated areas that may potentially contribute to stormwater flow downstream of the Lakewood Subdivision subsurface system outfall. The field crew sketched typical cross sections of the drainage canals and measured several canal roadway crossings. This information was later used to develop preliminary drainage models to evaluate downstream drainage performance. A copy of this field investigation report can be found in Appendix D on pages D-3 through D-15.

Because LIDAR contours can be inaccurate for determining channel invert elevations, additional elevation information was needed. A field survey was requested in order to further refine model

parameters. The field survey was conducted by a professional surveyor, Pyburn & Odom, Inc., to determine select drainage inlet top of casting elevations in Lakewood Subdivision and to provide several downstream drainage channel cross sections. The survey information was used to establish typical grades of the subsurface drainage system and revise preliminary channel cross section data from early drainage models. The surveyed canal cross sections showed a smaller channel section than used in the baseline drainage model created from LIDAR data. The top of casting elevations were near the approximated elevations used in the preliminary evaluation. A copy of the field survey, survey photos, and field notes can be found in Appendix E.

3.0 Drainage Boundary Conditions

For the purpose of this study, drainage boundary conditions were established in order to define a reasonable study area of the project area for the 100-year storm event. The boundary conditions were established using gathered data such as LIDAR contours, existing drainage drawings and field investigations.

Several drainage basins were delineated by determining the topographic ridgelines based on LIDAR produced contours. LIDAR contours are generated using the same principle as RADAR. The LIDAR instrument transmits light out to a target. Some of this light is reflected back to the instrument. The time for the light to travel out to the target and back to the LIDAR instrument is used to determine the range to the target. Repeating this process produces a grid of elevations commonly referred to as a Digital Elevation Model (DEM). This DEM is then processed with software to create a Triangular Irregular Network (TIN) and elevation contours. The LIDAR data available is spaced at two foot intervals. To further process the LIDAR data, RCLC recomputed the contours at a one foot interval using AutoCAD Civil 3D. In addition to the LIDAR contours, the available drainage plans and the field investigations were used to further define drainage areas for the project area.

3.1 Lakewood Canal Watershed

Due to potential for the project area to be impacted by surrounding conditions, several basins that contribute flow to the Lakewood Drainage Canal were delineated to evaluate tail water impacts on the project area. The Lakewood Drainage Canal has two roadway crossings immediately downstream of the project area outfall culvert. These two crossing consist of dual 60” corrugated metal pipe culverts at Alice Avenue and dual 6’ by 8’ reinforced concrete box culverts at US 190 Business. A total of six drainage basins were delineated for the drainage system analysis. The Lakewood Subdivision makes up one drainage basin used in the analysis. Five of the drainage basins surrounding Lakewood Subdivision contribute to drainage conditions downstream of the drainage improvement area outfall.

The Fremaux North Basin and Fremaux South Basin include approximately 32 acres and 22 acres of land respectively. Both the Fremaux North Basin and Fremaux South Basin drain from west to east through drainage ditches and outfall directly into the Lakewood Drainage Canal. The Fremaux North basin has a channel running through its center toward the Lakewood Drainage Canal. This channel may allow for storm water to overflow into the west adjacent basin during larger storm events. The I-10 East Basin is a major contributor to downstream flow conditions and includes approximately 258 acres of mixed land use. The I-10 East Basin is located on the east side of I-10 and drains through various means to an 8’x8’ RCB culvert which traverses I-10 to outfall into the Lakewood Drainage Canal located in the I-10 West Basin. The I-10 West Basin

also contributes to downstream conditions and drains approximately 167 acres. A drainage map showing the Lakewood Canal Drainage Basin is located on page A-1 in Appendix A and Image 3.

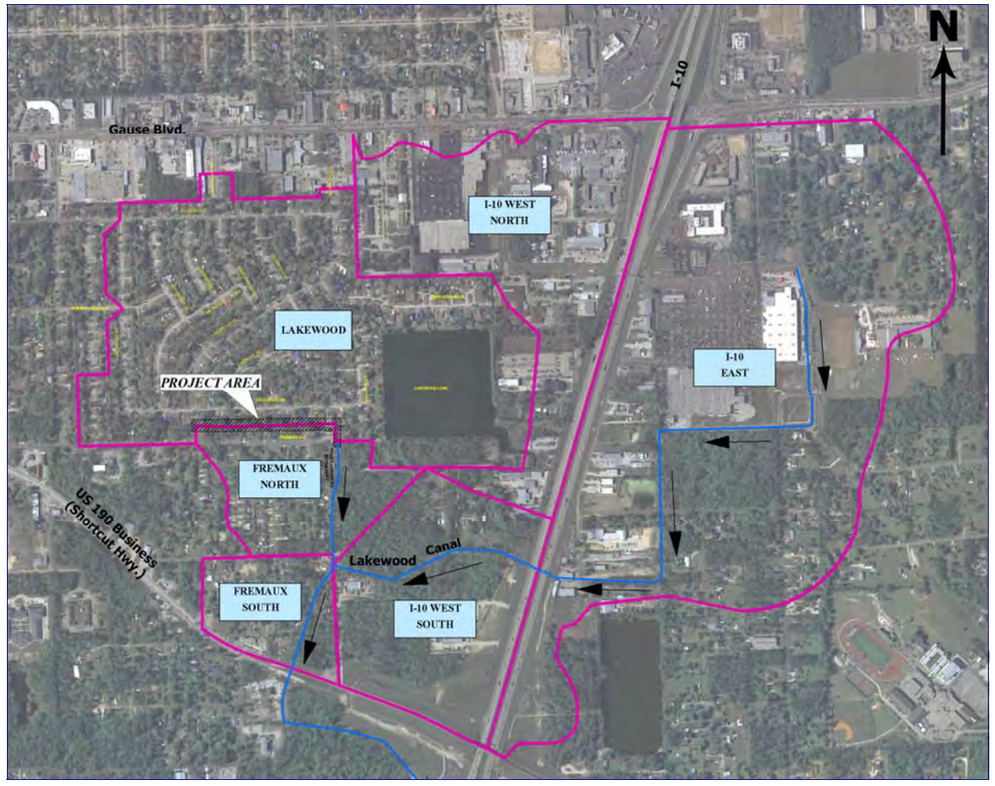

Image 3: Lakewood Canal Watershed

As mentioned in Section 2.3, several contrasts between the basins shown on the LADOTD project drawings and the basins delineated by RCLC were noticed during review of the plans. The main difference in the drainage maps is the area of land draining towards the Lakewood Drainage Canal roadway crossing at Shortcut Highway. The LADOTD maps show the majority of the Lakewood Subdivision draining toward a culvert located to the west of the Lakewood Canal roadway crossing. Per RCLC's archived plan and site investigation, the Lakewood Subdivision was determined to flow entirely to the Lakewood Drainage Canal. Due to the detail of this study, the basins delineated by RCLC should provide the more representative basin delineation of the existing conditions.

3.2 Lakewood Drainage Basin

The Lakewood Drainage Basin consists of approximately 145 acres of residential land and associated infrastructure. The Lakewood Drainage Basin is divided into three main sub-basins. Two of the three sub-basins are the Lakewood East Sub-basin which is 71.40 acres and the Lakewood West Sub-basin which is 28.60 acres. These two sub-basins are defined by two major branches of the existing subsurface drainage system within the Lakewood Subdivision. Both subsurface drainage system branches merge in the planned improvements area and flow through a single outfall into the Lakewood Drainage Canal. This 3'x8' box culvert outfall is located near the eastern end of Fremaux Avenue. A drawing showing the entire existing subsurface drainage system for Lakewood Subdivision is located on page A-9 in Appendix A. Image 4 and page A-2 of Appendix A shows an image depicting the three sub-basins of the Lakewood Drainage Basin.

The third subbasin consists of a 44.83 acre section of residential land that contains a lake of approximately 20 acres. The lake does not appear to provide any runoff stormwater storage to areas other than those along its banks. Flow into the pond is mostly surface flow from the surrounding areas with only three 12" RCP from the Lakewood Subdivision draining into the north end of the lake. The pond has two 12" RCP outfall pipes which flow into the eastern branch of the Lakewood Subdivision subsurface drainage system.

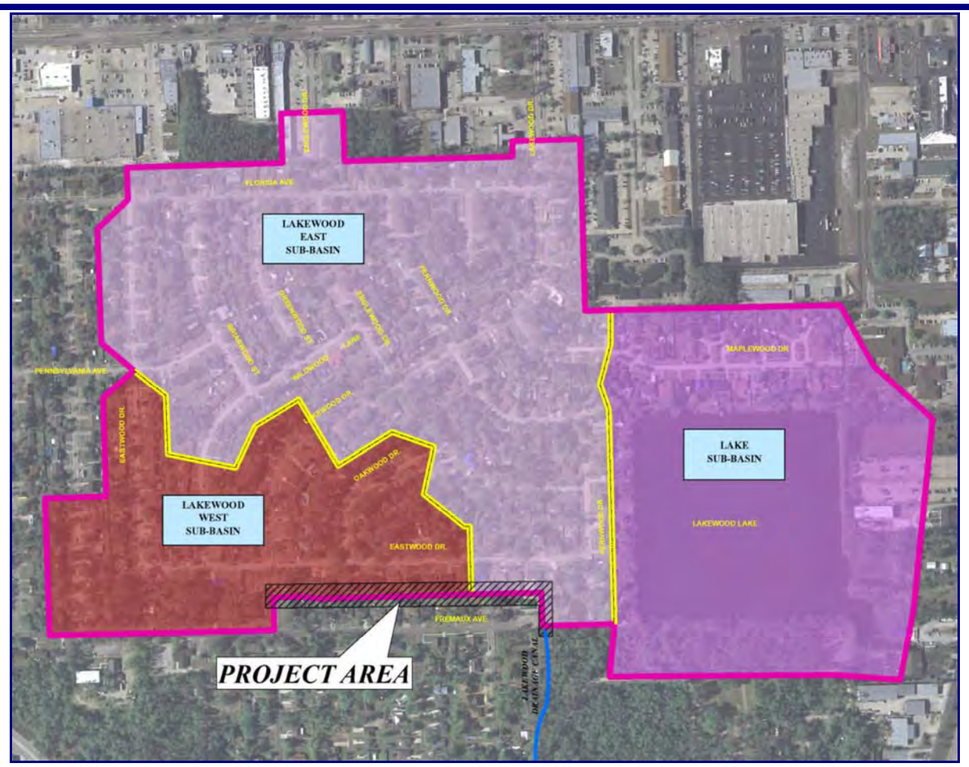

Image 4: Lakewood Drainage Basin Sub-basins

In review of the existing drainage conditions in the Lakewood Drainage Basin, one problematic drainage issues was noted. This problematic issue reflects the concern that the drainage system is undersized. The problematic area is located in the subsurface drainage system along Lakewood Drive between Fremaux Avenue and Eastwood Drive. At this point, two 36" RCP drainlines flow into one 36" RCP drainline in the project area. Because the upstream system capacity is twice that of the drain line located in the project area, the reasonable assumption can be made that the drainline in the project area is undersized. This flow restriction has the potential to cause flooding in the Lakewood West Sub-basin. Image 5 shows the area of concern. An additional issue noted in field observations, was that the drainage inlet grate is located at the corner of Ridgecrest Drive and Fremaux Avenue appears to be located higher than the roadway elevation. The inlet should be adjusted to ensure positive drainage at all times.

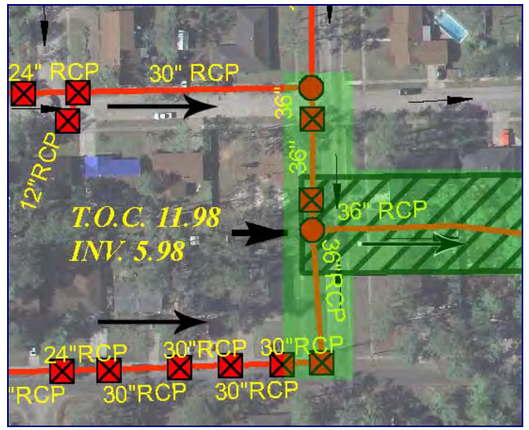

Image 5: Problematic Area (highlighted in green)

4.0 Drainage Analysis Parameters

For analysis of the drainage system, the drainage background information was used to define drainage conditions and establish drainage models. Several programs were used to develop the drainage system models. AutoCAD Civil 3D and ArcGIS 9.1 were used to find and set drainage boundary conditions. Drainage modeling was performed using HEC-HMS.

4.1 Time of Concentration

Time of concentration (Tc) is defined as the flow time from the most hydrologically remote point in a drainage area to the downstream location under consideration. Time of concentration calculations and values can be found in the Appendix F. The method for determining Tc used for

these calculations involves breaking down each part of the flow path and calculating the Tc value for each part separately. Once the Tc value for each part of the flow path is determined, the components are summed together for a total Tc value. The flow path was divided into overland sheet flow, shallow concentrated flow, and channel flow. The overland sheet flow component consists of shallow flow over an irregular plane surface. For overland sheet flow, this method uses Manning-kinematic solution to determine the Tc value for no more than the first 100' of the flow path. The Manning-kinematic wave solution is an overland flow equation developed from kinematic wave analysis of surface runoff.

Tc(hr.) = $\frac{0.94*(L^{0.6})*(n^{0.6})}{(i^{0.4})*(S^{0.3})}$ where L=hydraulic length , n= Manning's coeff.

i = rainfall intensity, S= slope

After 100 feet of travel, the overland sheet flow generally becomes shallow concentrated flow. The Tc values for both shallow concentrated flow and channel flow are determined using the following equation:

Tc (hr.) = $\frac{L}{3600V}$ where L = hydraulic length (ft.)

V = velocity (fps)

The calculated Tc values were then related to Lag Time which is required as part of the HEC-HMS input procedure. Lag time is the time differential between the effective rainfall and the peak runoff within the basin and roughly equates to 60% of the time of concentration. Table 1 shows the Time of Concentration and Lag Time for each basin and sub-basin. An in-depth spreadsheet of the time of concentration calculations can be found on page F-3 of Appendix F.

Drainage Area		Tc	T(Lag)
Lakewood Basin	Lakewood West Sub-basin	30.16	18.10
	Lakewood East Sub-basin	34.54	20.72
	Lake Area Sub-basin	22.44	13.46
Fremaux North Basin		31.49	18.89
Fremaux South Basin		26.30	15.78
I-10 West North Basin		38.59	23.15
I-10 West South Basin		26.56	15.94
I-10 East Basin		69.89	41.93

Table 1: Tc and T (lag) for each drainage basin and sub-basin

4.2 Runoff Curve Numbers

Curve number calculations were based on SCS Technical Release 55, "Urban Hydrology for Small Watersheds", June 1986 edition. According to the SCS method of determining runoff curve numbers, a basin and sub-basin is characterized as wooded (undeveloped), pastureland, parks, a residential subdivision based on dwellings per acre, commercial property, and industrial, among a few other categories. Lakewood West, Lakewood East, Pond Area, Fremaux North and Fremaux South each consist primarily of ¼ acre residential development. I-10 East and the I-10 West areas are mostly commercially developed with some of the land being used for ¼ acre residential lots and undeveloped wooded area. Each of these categories has a designated runoff curve number based on the soil type.

The drainage areas in this study consist of Myatt fine sandy soil (Mt), Myatt fine sandy soil that is frequently flooded (My), Prentiss fine sandy loam (Pr), and Stough fine sandy loam (St). These existing soils are from Class C and Class D hydrologic soil group soils. Class C and Class D soils have high runoff potential due to the slow water infiltration rate of the soils when saturated. For the

drainage runoff determination, SCS runoff curve numbers used in the calculations were as shown in Table 2. A soil map for the basin is shown on page A-6 in Appendix A.

Land Use	Hydrologic Soil Group	
	C	D
Wood or forest land	74	80
1/4 acre residential	83	87
Commercial	94	95
Open Spaces	79	84

Table 2: SCS runoff curve number based on soil group

Land Use, aerial and soil maps were referenced in order to compute composite runoff curve number values. For each drainage subbasin, the runoff curve numbers were averaged as a weighted mean to produce a composite runoff coefficient. The composite runoff curve numbers are summarized in Table 3. Calculations for the composite runoff curve numbers can be found on page F-2 in Appendix F.

Drainage Area		Composite Curve Number
Lakewood Basin	Lakewood West Sub-basin	83.70
	Lakewood East Sub-basin	83.19
	Lake Area Sub-basin	91.48
Fremaux North Basin		86.14
Fremaux South Basin		87.00
I-10 West North Basin		92.28
I-10 West South Basin		85.13
I-10 East Basin		90.72

Table 3: SCS runoff composite curve number for basins and sub-basins

4.3 Manning's Roughness Coefficients

Manning's roughness coefficients represent a factor for the resistance of channels and surfaces to stormwater flows. The values of Manning's roughness coefficients used for calculations were approximated based on the channel and surface characteristics observed during field investigation activities. Pictures showing vegetation and channel conditions can be found on page D-3 through D-11 of Appendix D. Based on the observed conditions, the Manning's roughness coefficients used in calculating storm water flows in this drainage study are shown in Table 4.

Surface Type	Manning's Coefficient
Grassed Areas	0.240
Concrete Roadway	0.013
Drainage Canal Channel	0.045
Concrete Pipe	0.013
Box Culvert	0.015

Table 4: Manning's Roughness Coefficients

5.0 Drainage Analysis Methodology

Run-off calculations were performed in accordance with the LADOTD Hydraulics Manual, 2011 Edition and utilizing Arc View, AutoCAD Civil 3D, and HEC-HMS. Functionality of these software programs and assumptions made within the programs are defined hereafter. The input data includes SCS Curve Numbers, channel characteristics, drainage slopes, Manning's coefficients, drainage areas, storage areas, and lag time. Base flow within the basin was assumed to be negligible.

After the basin delineations, HEC-HMS was used to determine the peak rainfall runoff and storage within the drainage basin systems. HEC-HMS software was designed to simulate the precipitation-runoff process of watershed systems by means of precipitation, base flow, and open channel routing. Within this program, the existing watershed was analyzed by the USDA Urban Hydrology for Small Watersheds Technical Reference 55 (TR-55) methodology simulating the SCS Type III

rainfall distribution. This rainfall distribution is used for areas of heavier rainfall with longer durations due to the coastal influences of the Gulf of Mexico.

After runoff was generated, each basin needed to be routed and combined with the downstream basin. The chosen method of reach routing was Kinematic Wave Method. The kinematic wave routing method approximates the full unsteady flow equations by ignoring inertial and pressure forces. The method also assumes that the energy slope is equal to the bed slope. This method is typically used in urban areas where natural channels have been modified to have regular shapes and slopes.

The flow lengths are the total length of the reach element. The slopes used for reach calculations are the average slope for the whole reach. The Manning's n roughness coefficient used for reaches is the average value for the whole reach. The reach side slopes were entered as the units of horizontal distance per one unit of vertical distance.

The cross section shapes used in this model include circle, rectangle, and trapezoid. The circle shape was used for representing a free water surface inside a pipe. The rectangle section was used for free water surface flow inside box culverts. The trapezoid section was used for channel and canal sections.

Basin characteristics were analyzed and input into the HEC-HMS model. With all data coded in HEC-HMS, the program was run for existing conditions and design options for the 2, 5, 10, 25, 50, and 100 year storm frequencies using the SCS Type III rainfall distribution. Precipitation amounts for this storm frequency were taken from the Louisiana Department of Transportation and Development Hydraulics Design Manual, 2011 edition for Region I. Rainfall depths in Region I with 24 hour storm durations are as follows in Table 5.

Return Period (year)	Rainfall Depth (inches)
2	4.8
5	6.5
10	7.8
25	9.6
50	11.1
100	12.6

Table 5: Rainfall depths in Region I for 24 hour duration

With the variable input into the program, HEC-HMS was then used to calculate stormwater flow rates and storage for the drainage system. Because the HMGP application stated undersized drainage system components as a possible cause for flooding in the area, RCLC created reservoirs for applicable drainage areas in order to simulate storage due to existing stormwater flow restrictions. The existing layout of the basin drainage allowed for one outlet structure to be used for each drainage basin. Storage areas within each basin used were determined from LIDAR contours. Table 6 shows basin name, area size, and outfall type for each area with a reservoir in the HEC-HMS model. Image 6 shows the location of these outfalls. A drawing showing the model layout is included on page F-4 in Appendix F.

No.	Drainage Area	Size (acres)	Outfall Structure Type
1	Lakewood West Sub-basin	28.6	32" x 36" Box Culvert
2	Lakewood East Sub-basin	71.4	3'x8' Box Culvert
3	Lake Area Sub-basin	46.63	2 - 12" RCP
4	I-10 East Basin	257.89	8'x8' RCB
5	All Basins	624.39	2 - 6'x8' Box Culvert

Table 6: Basin reservoir outfall information

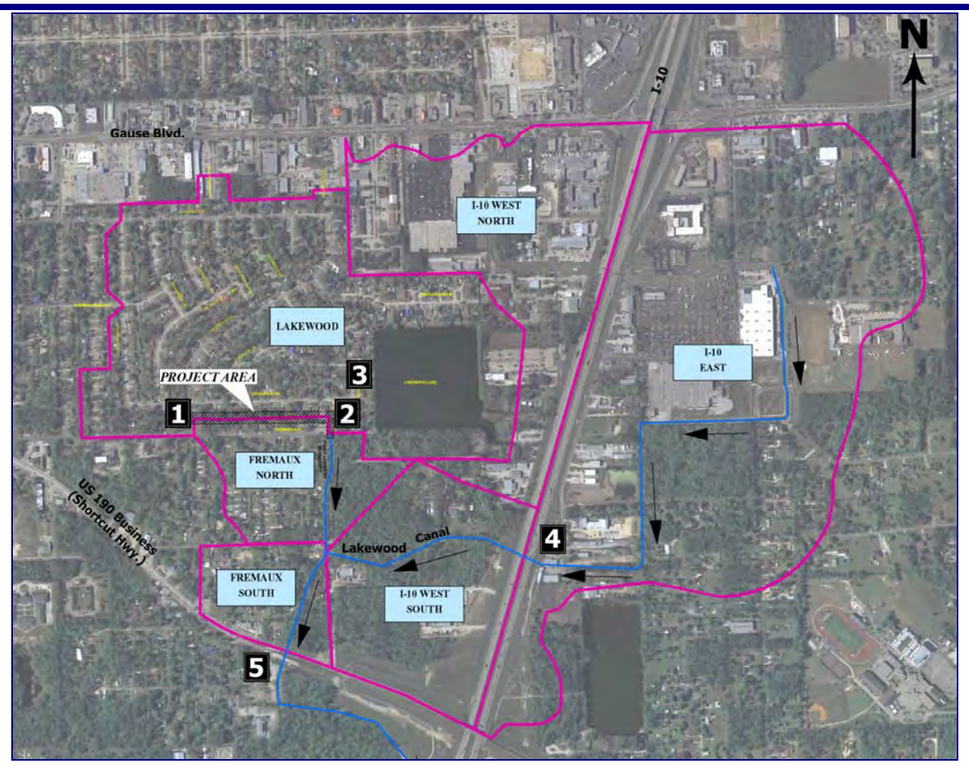

Image 6: Outfall Location Map

Downstream conditions were factored into the HEC-HMS calculations. Tail water conditions for the Lakewood Canal on the south side of US 190 Business were set based on stormwater elevation data in the 1999 FEMA Flood Insurance Study of the City of Slidell. The elevations were taken from the flood profile between Daney Street and Interstate 10 which is located near the outfall of the modeled drainage system. The Flood Insurance Study included the 500 year, 100 year, 50 year, and 10 year storm water elevations. Stormwater elevations for the 25, 5 and 2 year storm events were interpolated based on the given values for other storms. Tailwater elevations used for the reservoir are shown in Table 7.

Storm Event	Tailwater Elevation (ft)
2	5.71
5	6.31
10	7.00
25	7.51
50	8.10
100	9.00

Table 7: Lakewood Canal at US 190 Business tailwater elevations

6.0 Existing Condition Analysis Results

The existing condition drainage model analysis showed that both the project area and conditions downstream of the project area provide insufficient flow capacity during rainfall events. The lack of flow capacity in Lakewood Subdivision also causes flooding during smaller storm events. The drainage system in the project area is significantly undersized. The undersized capacity of the drain lines cause some degree of flooding in the Lakewood Subdivision for the 2, 5, 10, 25, 50 and 100 storm events.

6.1 Lakewood West Sub-basin

As discussed previously, a recognized issue in the Lakewood West Sub-basin is the insufficient size of pipe entering the project area. This undersized drain line causes significant backup in the drainage area. Table 8 shows HEC-HMS calculated stormwater elevations for the Lakewood West sub-basin.

Storm Event	Elevation (ft)
2	1
5	1
10	11.6
25	12.0
50	12.3
100	12.6

Home and street flooding

Street flooding

Table 8: Lakewood West sub-basin storm water elevations

Per LIDAR contours, the roadway in the area has elevations ranging from 9.5 feet to 11.0 feet. Home elevations, as indicated by LIDAR contours, in the Lakewood West sub-basin are between approximately 11.5 feet to 12.5 feet. Based on these elevations, roadway flooding occurs during all modeled storm events. Home flooding occurs during the 10 year, 25 year, 50 year, and 100 year storm events. The anticipated storm water elevations indicate significant risk to home and property safety in the drainage sub-basin.

6.2 Lakewood East Sub-basin

Although home and roadway elevations are higher in the Lakewood East Sub-basin, the drainage model indicates the potential for home and road flooding for the 50 and 100 year storm events as shown in Table 9. Per LIDAR contours, the roadway in the area has elevations ranging from 10.5 feet to 14.0 feet. Home elevations, as indicated by LIDAR contours, in the Lakewood East sub-basin are between approximately 11.5 feet to 15.0 feet.

Storm Event	Elevation (ft)
2	8.7
5	9.9
10	10.6
25	11.2
50	11.6
100	11.9

Home and street flooding

Street flooding

Table 9: Lakewood East sub-basin flood elevations

6.3 Lake Sub-basin

Because the Lake Sub-basin does not have any roads and most homes are at higher elevations along the lake banks, the drainage model showed no flooding potential except during the 100 year storm event. These results are shown in Table 10. The impact of this flooding is limited to the homes located along the cul-de-sac at the end of Eastwood Drive.

Storm Event	Elevation (ft)
2	9.6
5	10
10	10.2
25	10.6
50	10.8
100	11.1

Home flooding

Table 10: Lake Area sub-basin stormwater elevations

6.4 Downstream Impacts

From the HEC-HMS analysis, the downstream structure at Shortcut Highway has a noticeable impact on the Lakewood Subdivision drainage system tail water elevation. The LADOTD basin delineation, as discussed in Section 3.1, appears to have caused the Lakewood Drainage Canal

box culvert at Shortcut Highway to be designed for a smaller drainage area than determined by RCLC. Because the culvert was designed for a smaller drainage area, stormwater flow can be restricted for larger storm events. This restriction causes water to backup in the Lakewood Drainage Canal and overflow into the adjacent basin to the west of Lakewood Drainage Canal. The stormwater overflows through a small drainage ditch located in the Fremaux North Basin. The Hurricane Katrina Surge Inundation Advisory base Flood Elevation Map, located on page B-1 of Appendix B, shows the narrow channel connecting storm water from the two areas during a high water storm event.

7.0 Drainage Improvement Option Summary

Three scenarios were determined to be applicable improvement options for the drainage project. In order to analyze potential improvements in the project area, RCLC performed updates to the existing drainage model for each option and storm event. RCLC also estimated the probable construction costs for each option. Plans for these design scenarios are presented in Appendix G.

7.1 Option 1

Option 1 includes the removal of the existing drain line in the project area and installing a 4’ x 6’ box culvert and a dual 5’ x 8’ concrete box culvert in the current drainline location. This option will cause significant disturbances to all residences between Eastwood Drive and Fremaux Drive located the east of Lakewood Drive. This option will require the relocation of fences, utility poles, and small shed-type buildings. Because the work would involve working in a narrow servitude between homes, the option will also include removal of existing trees and require significant construction safety fencing during operations. Conceptual design drawings for Option 1 are shown below and in Appendix G on pages G-4 and G-5.

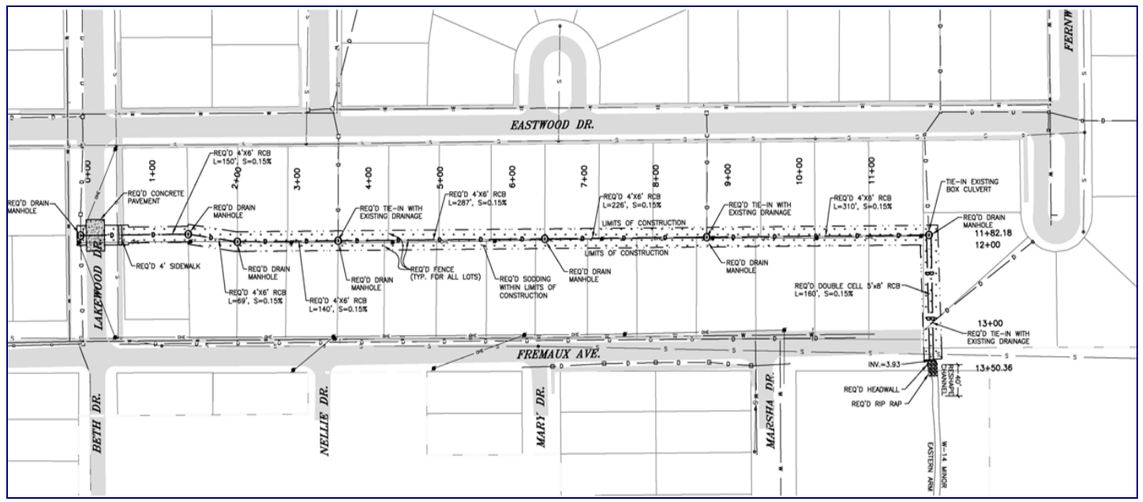

Image 7: Option 1 Conceptual Design Drawing

7.2 Option 2

Option 2 includes the filling and plugging of the existing 36” RCP and 32”x36” box culvert and replacing the drainline with a 4’ x 6’ precast reinforced concrete box culvert along Eastwood Drive. The existing 3’x8’ box culvert will be removed and replaced with dual 5’x8’ reinforced concrete box culverts. This option will require the removal and replacement of half the roadway and all conflicting sidewalks and driveways along Eastwood Drive. This item will require the removal and replacement of water and sewer service lines along the roadway. Based on approximate field locations, the replacement of water and sewer lines along Eastwood were not required in this design. Conceptual design drawings for Option 2 are located in Image 8 and in Appendix G on pages G-6 and G-7.

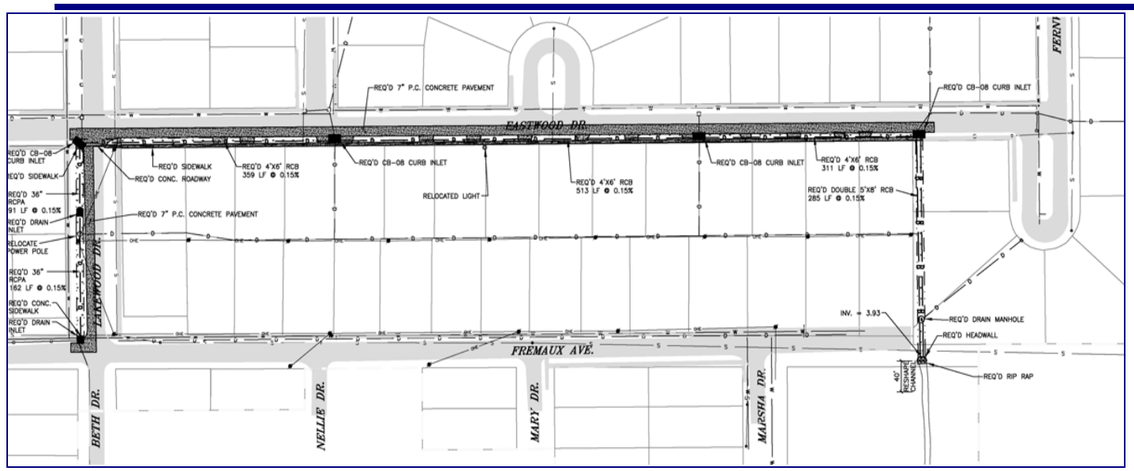

Image 8: Option 2 Conceptual Design Drawing

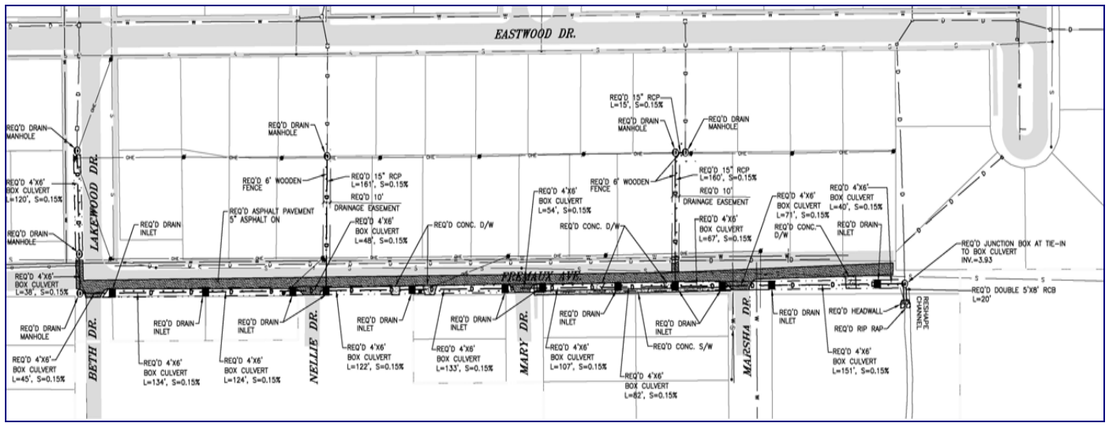

Image 9: Option 3 Conceptual Design Drawing

7.3 Option 3

Option 3 includes the filling and plugging of the existing 36" RCP and 32"x36" box culvert and replacing the drainline with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. An extension of the existing box culvert with dual 5'x8' reinforced concrete box culverts will also be required. This option will require the removal and replacement of the southern half of the asphalt street, some sidewalks and driveways, and drainage along Fremaux Avenue. In addition to the construction type work, additional servitudes will have to be obtained in order to connect a section of the existing drainage system from Eastwood Drive into the new drain line located along Fremaux Avenue. Conceptual design drawings for Option 3 are located in Image 9 and in Appendix G on pages G-8 and G-9.

8.0 Conclusion

Each conceptual design option for the Eastwood Drain Line Improvement project was evaluated based on performance and probable construction cost. Performance was determined based on reduction in storm water elevations during flood events. The inundation maps showing the performance of the existing conditions and design options are located in Appendix A. Probable construction cost was evaluated based on the item breakdown developed from the conceptual design drawings. These probable cost breakdowns are shown in Appendix H.

8.1 Performance Comparison

Option 1 consisted of removing the existing drainline and laying a new drainline in its place. Option 2 and Option 3 consisted of filling and plugging the existing drainage line and adding a new drainline along new alignments. Based on the drainage model, each of the three improvement options reduce the risk of flooding to homes and property in the area. Table 12 shows the number of properties that experience flooding during storm events for the existing and improved conditions. As shown by Table 11 and Table 12, each option improves upon the existing condition. Although roadway flooding was not eliminated by the improvements, the three drainage improvement options reduce stormwater ponding in roadways by approximately 1 foot in most areas for the

modeled storm events. This reduction of storm water on roadways allows for lower water conditions for emergency vehicle access for approximately 164 residences. Inundation maps for the 10 year and 100 year storm events are located on pages A-11 through A-18 in Appendix A.

Basin Model	Sub-basin	Elevation for Storm Event					
		100	50	25	10	5	2
Existing Condition	Lakewood West	12.6	12.3	12.0	11.6	11.1	10.2
	Lakewood East	11.9	11.6	11.2	10.6	9.9	8.7
	Pond Area	11.1	10.8	10.6	10.2	10.0	9.6
Option 1	Lakewood West	11.5	11.2	10.9	10.3	9.7	8.7
	Lakewood East	10.6	10.4	10.2	9.7	9.3	8.3
	Pond Area	11.0	10.8	10.5	10.1	9.9	9.6
Option 2	Lakewood West	11.5	11.3	11.0	10.4	9.7	8.7
	Lakewood East	10.7	10.5	10.3	9.8	9.3	8.3
	Pond Area	11.0	10.8	10.5	10.2	9.9	9.6
Option 3	Lakewood West	11.4	11.2	10.9	10.3	9.6	8.6
	Lakewood East	10.4	10.3	10.1	9.7	9.2	8.2
	Pond Area	11.0	10.7	10.5	10.1	9.9	9.6

Home and Street Flooding Occur

Street Flooding Only

Table 11: Stormwater elevations in the Lakewood Basin

Sub-basin Area	Number of Properties Affected by Floodwaters							
	Existing Condition		Option 1		Option 2		Option 3	
	10 Year	100 Year	10 Year	100 Year	10 Year	100 Year	10 Year	100 Year
Lakewood West	19	65	2	16	2	16	2	15
Lakewood East	0	10	0	0	0	0	0	0
Lake	0	3	0	1	0	1	0	1

Table 12: Number of Properties Affected by Floodwaters in the Lakewood Basin

8.2 Probable Construction Cost Comparison

Because the three options performed similarly, the controlling factor in the decision between the options was the costs and issues associated with each option. Option 1 had high costs due to the large amount of work being performed in the backyards of residents between Eastwood Drive and Fremaux Avenue. Costs for Option 1 were also driven higher due to the space restricted work area and the high potential to damage structures during the installation of the new box culvert. Option 2 incurred some increased costs because of the large amount of required removal and replacement of concrete roadways, sidewalks and driveways. Option 3 appears to be the most economical because the majority of the drainline will be placed in an existing drainage ditch which limits the amount of asphalt roadway to be removed and replaced. Option 3 also requires that four 5 foot wide drainage servitudes be acquired. These servitudes will require additional time to survey and negotiate purchase of these servitudes from the four property owners.

Improvement Option	Probable Construction Cost
Option 1	$2,845,231.50
Option 2	$2,715,998.94
Option 3	$2,291,774.94

Table 13: Engineer's Opinion of Probable Construction Costs

8.3 Recommendation

Based on the analysis summarized in this report, RCLC recommends the following:

- Proceed with Option 3 drainage improvements design drawings, drainage servitude acquisition, and construction in order to reduce the risk of flooding in Lakewood Subdivision since this option is the most economical. Because the four drainage servitudes required by Option 3 may not be made available for use from property owners, RCLC recommends that finances for the amount of Option 2 should remain available to support the construction of Option 2 in the event servitude agreements cannot be reached with property owners.
- Coordinate with St. Tammany Parish and LADOTD to improve downstream flow conditions for the Lakewood Drainage Canal and Lakewood Drainage Canal roadway crossings.

Appendix E

Agency Correspondence

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

May 18, 2015

No known historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.

Pam Breaux 5-21-15
Pam Breaux Date
State Historic Preservation Officer

Pam Breaux
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 Slidell, Louisiana**
Undertakings: **City Barn Drainage Improvements Project,**
Latitude 30.273241 and Longitude -89.788288,
Eastwood Drainage Improvements Project,
Latitude 30.277724 and Longitude -89.760399, and
Markham-Peachtree Storm Drain Line Improvements Project,
Latitude 30.253132 and Longitude -89.784820,
Slidell, Louisiana in St. Tammany Parish
(HMGP Project# 1603-0321)
Determination: No Effect to Historic Properties

Dear Ms. Breaux:

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 Declarations:

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

FEMA, through its 404 Hazard Mitigation Grant Program (HMGP) proposes to fund Drainage Improvement (Undertaking) as requested by the City of Slidell (Applicant) (see Figure 1 for project locations). FEMA is initiating Section 106 review for the above referenced properties in accordance with the Louisiana State-Specific Programmatic Agreement among FEMA, the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the Louisiana State Historic Preservation Officer of the Department of Culture Recreation and Tourism (SHPO), the Alabama-Coushatta Tribe of Texas (ACTT), the Chitimacha Tribe of Louisiana (CTL), the Choctaw Nation of Oklahoma (CNO), the Jena Band of Choctaw Indians (JBCI), the Mississippi Band of Choctaw Indians (MBCI), the Seminole Tribe of Florida (STF), and the Advisory Council on Historic Preservation (ACHP) regarding FEMA's Hazard Mitigation Grant Program (2011 LA HMGP PA) dated January 31st, 2011 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(d).

Description of the Undertaking

The undertaking is intended to improve drainage infrastructure in three (3) separate areas of the City of Slidell. The locations referenced include: 1) the City Barn Drainage Improvements Project, 2) the Eastwood Drainage Improvements Project, and 3) the Markham-Peachtree Storm Drain Line Improvements Project. See

Figure 1 showing locations and Right-of-Ways (ROW) and/or Areas of Potential Effect (APE) for the proposed projects.

The City Barn Drainage Pump
The City Barn Drainage Pump Station is located near the historic area of Slidell between the railroad and Bayou Bonfouca. The Scope of Work (SOW) for the City Barn Drainage Improvements Project APE at the station calls for removing and reconstructing an access ramp from a parking area to a pumping station situated on the confluence of Bayous Pattosat and Bonfouca, expanding the size of the station from approximately 8.5 x 14 meters (28 x 45 feet) to 8.5 x 20 meters (28 x 65 feet) by adding a precast working deck measuring approximately 6 x 8.5 meters (20 x 28 feet) to the existing deck, installing a new diesel driven vertical-type drainage pump, dredging the channel bottom of the Bayou Pattosat to allow for the installation of the new pump, installing an outlet pipe from the new pump through a levee and into Bayou Bonfouca, and excavating an area measuring approximately 12 x 61 meter (40 x 200 feet) along the western side of Bayou Pattosat in order to expand the width of the inlet channel. See Figures 2-3, details for the design plans for details of the SOW.

Eastwood Storm Drain Line
The St. Tammany Parish Eastwood Storm Drain Line Improvements Project is located in Lakewood Subdivision in Slidell. The existing drainage system is composed of reinforced concrete pipe and box culverts buried along the back yards of properties between Fremaux Avenue and Eastwood Drive and storm water enters the system through curb and grate inlets along the roadways of the subdivision. The SOW for this project includes the filling and plugging of the existing 36 inch reinforced concrete pipe and 32 by 36 inch box culvert and replacing the drain system with a four by six feet precast reinforced concrete box culvert along the southern side Fremaux Avenue. An extension of the existing box culvert with dual five by eight feet reinforced concrete box culverts is also required. As part of the project, the southern part of the asphalt street, some sidewalks and driveways, and drainage inlets along Fremaux Avenue will be removed and replaced. The SOW meets allowances defined in the Louisiana State-Specific Programmatic Agreement Regarding FEMA's Hazard Mitigation Grant Program dated January 31, 2011 (2011 LA HMGP PA), Appendix C: Programmatic Allowances, Items I.A., II.B.1, V.D., and V.G. Due to this, FEMA will not be developing an APE nor will we be consulting further on this portion of the Undertaking.

Markham-Peachtree Storm Drain Line
The SOW for the Markham-Peachtree Storm Drain Line Improvement Project APE calls for re-grading and shaping 55 meters (180 feet) of a drainage ditch from an existing box culvert to an existing bridge located on Olive Drive, removing 103 meters (337 feet) of existing underground box culvert which is to be replaced with an open ditch, and removing 286 meters (939 feet) of existing box culvert which is to be replaced with an open top flume structure measuring six feet in height by ten feet in width. Additional ground disturbing activities will include clearing vegetation and debris; removing trees and obstructions such as two metal sheds, two frame sheds, two aboveground swimming pools, and fences from the utility easement or servitude; excavation and embankment; scarification and compaction that will include undercutting and replacing unsuitable soils; building storm drains; rerouting pool drainage; construction of erosion control systems using granular material as backfill; relocating and adjusting water distribution systems; removing materials for building retaining walls and foundations; and sheet piling driving for flume walls and wing walls. Additionally, a wooded area adjacent to the ROW, on property owned by the Lakeside Swim Club, will be used during construction as a staging and/or parking area.

Areas of Potential Effect (APE)

In accordance with Stipulation VII.B.1 of the 2011 LA HMGP PA, the APE for both the standing structures and archaeology is defined as the individual facility when an undertaking is limited to retrofit as defined in

36 CFR 68.2(b) of an individual facility's interior or exterior as defined in 44 CFR 206.201(c) with associated ground disturbance.

The City Barn Drainage Pump: APE
The APE for the City Barn Drainage Improvements Project consists of two areas where excavating will be done and an area that will be used as a staging area. A plan view encompassing all the areas is shown in Figure 2. Photos of the area attached (Figures 4-8).

The first area is situated on the levee containing outlet pipes extending west from the pumps into Bayou Bonfouca and the Bayou Pattosat channel adjacent to the levee. The a section of levee that will be excavated in order for a new outlet pipe to be set in measures approximately eight meters (26 feet) from north to south by 14 meters (46 feet) from west to east encompassing a total of 112 square meters (0.03 acres). Figure 3 is profile view of new pump and outlet pipe running through the levee and Figure 4, 5 and 6 are photographs of the existing pumping station and levee between Bayous Pattosat and Bonfouca. The second area is located on the southern bankline of Bayou Pattosat where soil will be dredged from the bayou and hauled away along a road situated between the bayou and the neighboring Textron facility (Figure 7). The bankline that will be removed measures approximately 28 meters (92 feet) from north to south by 127 meters (417 feet) from west to east encompassing a total of 3,556 square meters (0.36 acres). The area to be used for staging purposes is situated within an open area northwest of the pumping station and is presently being used for storing pipes and other drainage maintenance type materials (Figure 8). The area measures approximately 72 meters (236 feet) from northwest to southeast by 83 meters (272 feet) from southwest to northeast including areas that are presently being used for storage purposes. The area equals 5,976 square meters (1.48 acres).

Markham-Peachtree Storm Drain Line: APE
The APE for the Markham-Peachtree Improvements Project consists of the construction Right-of-Way (ROW) and the wooded area to the north of the Lakeside Swim Club, located at 497 Cumberland Street. The location of the APE is shown in Figure 9. The APE encompasses all construction work and staging for this project and is approximately 1.69 acres in size.

Identification and Evaluation

Historic Properties within the APE were identified based on FEMA's review of the National Register of Historic Places (NRHP) database, the Louisiana Cultural Resources Map, historic map research conducted on March 4, 2015, and a site visit conducted on November 1, 2009 and March 17, 2015 by FEMA Historic Preservation staff. This data was evaluated by FEMA using the National Register (NR) Criteria.

The City Barn Drainage Pump
Based on data provided by the LA SHPO's Office, FEMA learned that Sites 16ST145, 16ST152, 16ST205, and 16ST228 were located within one half of a mile of the APE of the City Barn Drainage Improvements Project and Site 16ST225 was located within one mile of the APE (Figure 10 and Figure 11). Site 16ST145 is the presently used Our Lady of Lourdes Catholic Cemetery with the earliest grave marker dating to 1835 and the eligibility status of the site being listed on the National Register of Historic Places (NRHP) has not been determined. Site 16ST152, the Salmen Brick Factory or Salmen Brothers Brick and Lumber Company was reported as a brick and lumber yard with remains of multiple brick floors, a foundation, and four machinery piers (Williams et al 1996; Hunter and Duay 1998; Ryan and Duplantis 2001; Eberwine et al. 2007) and had previously been determined as being eligible for listing on the NRHP. Site 16ST205, Brock Elementary Locus 1, was an historic artifact scatter dating from the early to mid-20th century and lacking in depositional integrity to consider it eligible for listing on the NRHP (Eberwine et al. 2007). Site 16ST228 was the former Our Lady of Lourdes Catholic Church Compound which consisted of late 19th to early 20th century features representing a brick facade foundation footing, brick pier footings, and a concrete swimming pool and had been determined as being ineligible for listing on the (NRHP) (Martin and Wolke 2010). Site

16ST225 was an historic artifact scatter representing a circa 1900 dump that had been determined as being ineligible for listing on the NRHP.

Additionally, FEMA reviewed a series of aerial images and historic topographic maps for this location provided via NETR Online (www.historicalaerials.com). Aerial Images and USGS Topo maps reflect the current landscape from the present to c. 1980, when the current drainage way is photo revised on to the location. Prior to 1980, land form to be removed is either non-existent as represented through the 1969 aerial image or partially non-existent as demonstrated on the USGS quad maps that date from 1964 to 1935. Generally speaking, the drainage area is larger and towards the south. The earliest available 7.5' USGS map of this location is the Slidell Quad from 1935. On this map the location appears to be an extension of Bayou Bonfouca into a turning basin to support the Salmen Bick Factor (Figure 13).

Because of the APE's close proximity to Bayou Bonfouca and the former location of the Salmen Brick Factory, Site 16ST152 two visits to the APE were conducted. The first visit was done on October 1, 2009 by Jason Emery, FEMA's SHPO liaison, and Pamela Pyatt, an HMGP Specialist/Archaeologist for FEMA. During the visit, three shovel tests were excavated along the section of property on the west side of the bayou. No intact cultural deposits were identified and the soils appeared to mottled mixture of sediments deposited during the last few decades of the twentieth century (Figure 12). FEMA Archaeologists Jason Emery and Maria Tavaszi revisited the APE on March 17, 2006 and confirmed that the newly proposed ground disturbing activities would be confined to previously disturbed or recently deposited areas.

Markham-Peachtree Storm Drain Line
FEMA Archaeologists Jason Emery and Maria Tavaszi revisited the APE on March 17, 2006 and confirmed that the newly proposed ground disturbing activities appeared to be confined to previously disturbed areas and found no indication of archaeological deposits within the linear APE or the Staging APE.

Records review indicate that two archaeological sites: 16ST153, the Guzman site, and 16ST225 are within approximately 1.15 miles and 0.90 miles APE of the Markham-Peachtree project (Figure 13) and (Figure 14). Site 16ST153, the Guzman site, was a sparse brick and artifact scatter most likely representing an early 20th century house or camp and had been determined as being ineligible for listing on the NRHP and a stated before, Site 16ST225 was an historic artifact scatter representing a circa 1900 dump that had been determined as being ineligible for listing on the NRHP.

As noted in the undertaking, obstructions such as two metal sheds, two frame sheds, two above-ground swimming pools, and fences will be removed from the utility easement or servitude. All of these were built in the last 20 years and none of them meet the NRHP-eligibility criteria.

Additionally, FEMA archaeologists investigated the triangular Staging APE on May 1, 2015. The area was predominantly inundated with water (Figure 15) and contained shrubs and saplings (Figure 16), testing of the soils was limited to two shovel tests excavated in areas that were higher in elevation and dry enough to be tested. The first shovel test was dug near the westernmost extent of the property and the second was dug near the southeastern side of the property. See Figure 9 for locations of the shovel tests (STP1 and STP2). Soils in both tests were a mottled mixture of recently deposited sediments (Figure 17) most likely associated with the construction of the buried box culvert adjacent to the wooded area and no intact cultural deposits were identified.

Based on the available evidence, it is unlikely that intact NRHP-eligible archaeological deposits would encountered during the implementation of this undertaking, as the Slidell City Barn APE is either man-made berm, heavily utilized industrial area, or not containing archaeological deposits; and the Markham-Peachtree APE is either heavily disturbed by earlier drainage activities or not void of archaeological deposits as demonstrated through limited shovel testing.

Assessment of Effects

Based on the aforementioned identification and evaluation, FEMA has determined that there are no historic properties as defined in 36 CFR 800.16(l) within the APEs of the City Barn Drainage Improvements Project, the Eastwood Drainage Improvements Project, or the Markham-Peachtree Storm Drain Line Improvement Project. Therefore, FEMA has determined a finding of **No Historic Properties Affected** 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) 247-7771 or jerame.cramer@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,

TIFFANY R SPANN WINFIELD

Digitally signed by TIFFANY R SPANN WINFIELD
DN: c=US, o=US. Government, ou=Department of Homeland Security, ou=FEMA, ou=People, cn=TIFFANY R SPANN WINFIELD, 0.9.2342.19200300.100.1.1=01782673O6,FEMA.1
Date: 2015.06.18 14:32:36 -05'00'

Jeramé J. Cramer
Environmental Liaison Officer
FEMA-DR-1603-LA, FEMA-DR-1607-LA

References

Eberwine, James E, George Abry and William P. Athens
2007 *Results of the 2007 Phase I Cultural Resources Survey and Archaeological Inventory of the Brock Elementary School Project in St. Tammany Parish, Louisiana*. R. Christopher Goodwin and Associates, Inc. Submitted to the St. Tammany Parish School Board. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Hunter, Don G. and Sylvia Duay
1998 *Cultural Resources Survey and Significance Evaluations of a Proposed Electrical Substation Site and Power Transmission Corridor, Slidell, St. Tammany Parish, Louisiana*. Coastal Environments, Inc. Submitted to the Central Louisiana Electric Company (CLECO). Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Martin, Robert W. and Dale Wolke
2010 *Cultural Reconnaissance Survey and Archaeological Monitoring of the Slidell City Hall Administrative Complex Building #2, St. Tammany Parish, Louisiana*. Department of Homeland Security, Federal Emergency Management Agency, New Orleans. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Ryan, Joanne and Brad Duplantis
2001 *The Salmen Brick Factory, Archaeological Data Recovery at 16ST152, Slidell, St. Tammany Parish, Louisiana*. Coastal Environments, Inc. Submitted to the Central Louisiana Electric Company (CLECO). Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Williams, Luis, Katherine Grandine, Kevin Hymel, Thomas Fenn, and William P. Athens
1996 *Cultural Resources Survey and Testing of the Schneider Canal Hurricane Protection Project, Slidell, St. Tammany Parish, Louisiana*. R. Christopher Goodwin and Associates, Inc. Submitted to NODCOE. Report on file at the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

CC: File
State Historic Preservation Office

Enclosures

Figure 1. Aerial Image showing the proposed locations of the City Barn, Eastwood, and Markham-Peachtree Drainage Improvements Projects in Slidell, Louisiana.

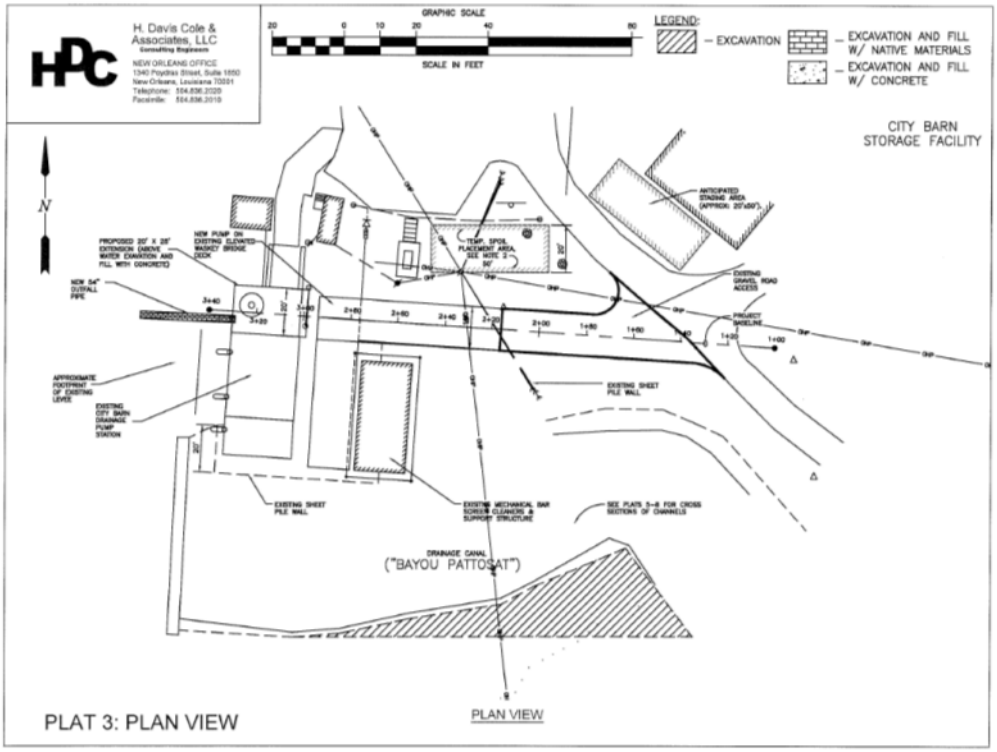

Figure 2. H. Davis Cole & Associates Consulting Engineers plan view for the **City Barn Drainage** Improvements Project in Slidell.

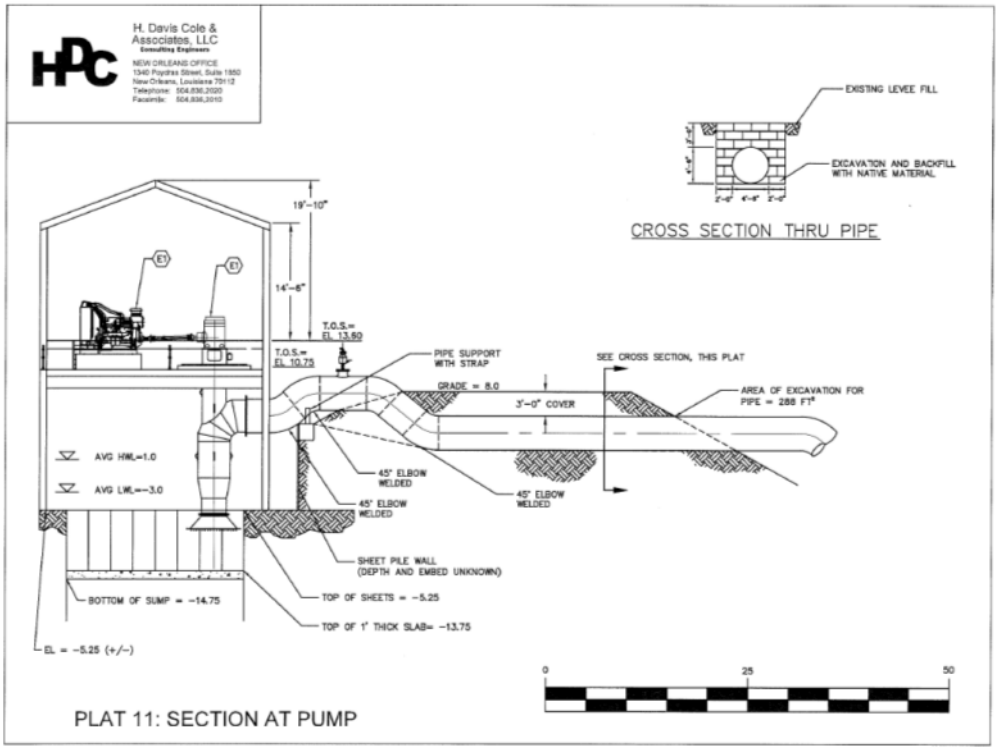

Figure 3. H. Davis Cole & Associates Consulting Engineers profile view of new pump and outlet pipe running through levee for the **City Barn Drainage** Improvements Project in Slidell.

Figure 4. View of outlet pipes from pumping station for **City Barn Drainage** on Bayou Pattosat through earthen embankment facing southwest.

Figure 5. **City Barn Drainage** : Northwest facing view of earthen embankment (overlooking Bayou Bonfouca) that will be impacted during construction.

Figure 6. **City Barn Drainage**: Northwest facing view of an existing outlet pipe on the Bayou Bonfouca side of the earthen embankment.

Figure 7. **City Barn Drainage**: Land along Bayou Pattosat facing south and road between the land along Bayou Pattosat and the Textron facility facing south.

Figure 8. **City Barn Drainage**: Area east of the pumping station proposed to be used as a staging area for the City Barn Drainage Improvements Project in Slidell.

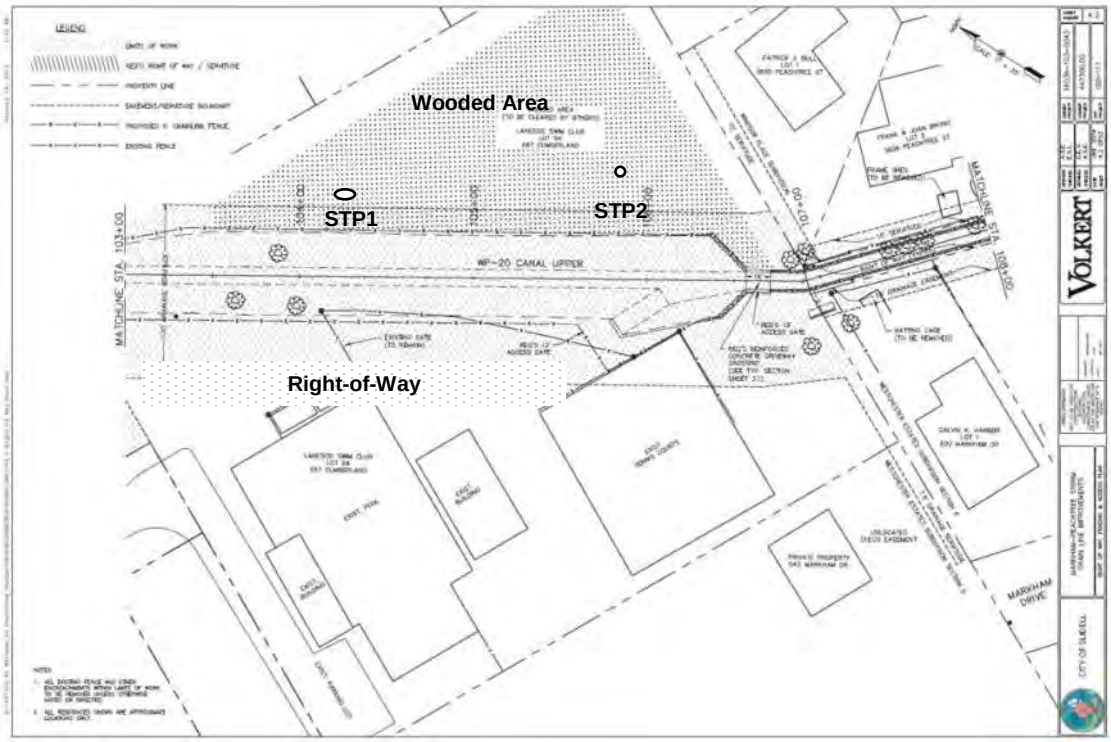

Figure 9. **Markham-Peachtree Drainage Way**: Staging Area APE shown in relation to the construction Right-of-Way (adapted from Volkert Engineering Services' construction plan).

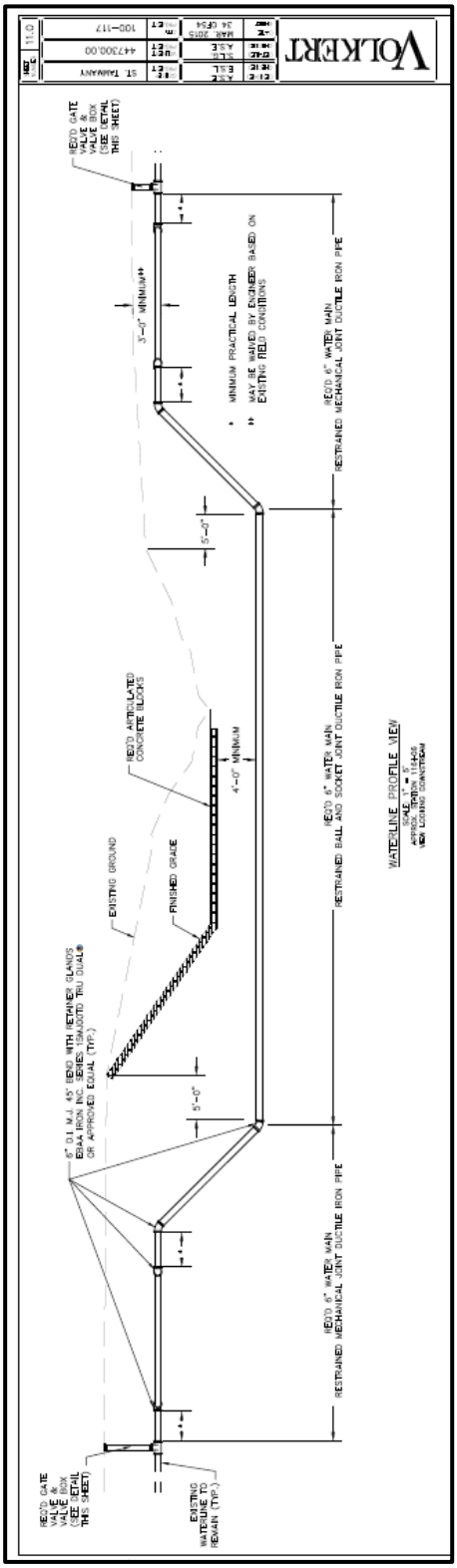

Figure 10. **Markham-Peachtree Drainage Way**: Detail of how the current drainage way will be typically altered to increase the drainage capacity. The dashed line is the existing ditch profile and the dark-hashed line is the intended final profile. Also, shows how the project addresses pipeline crossings.

Figure 11. **Markham-Peachtree Drain Line**: Photograph of the Staging APE for the Drain Line Improvements Project shown on the left in relation to the construction Right-of-Way shown in the center.

Figures 12, 13, 16 and 17, prepared by the Environmental and Historic Preservation section of FEMA contain confidential, non-disclosed archaeological information. The maps are 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).

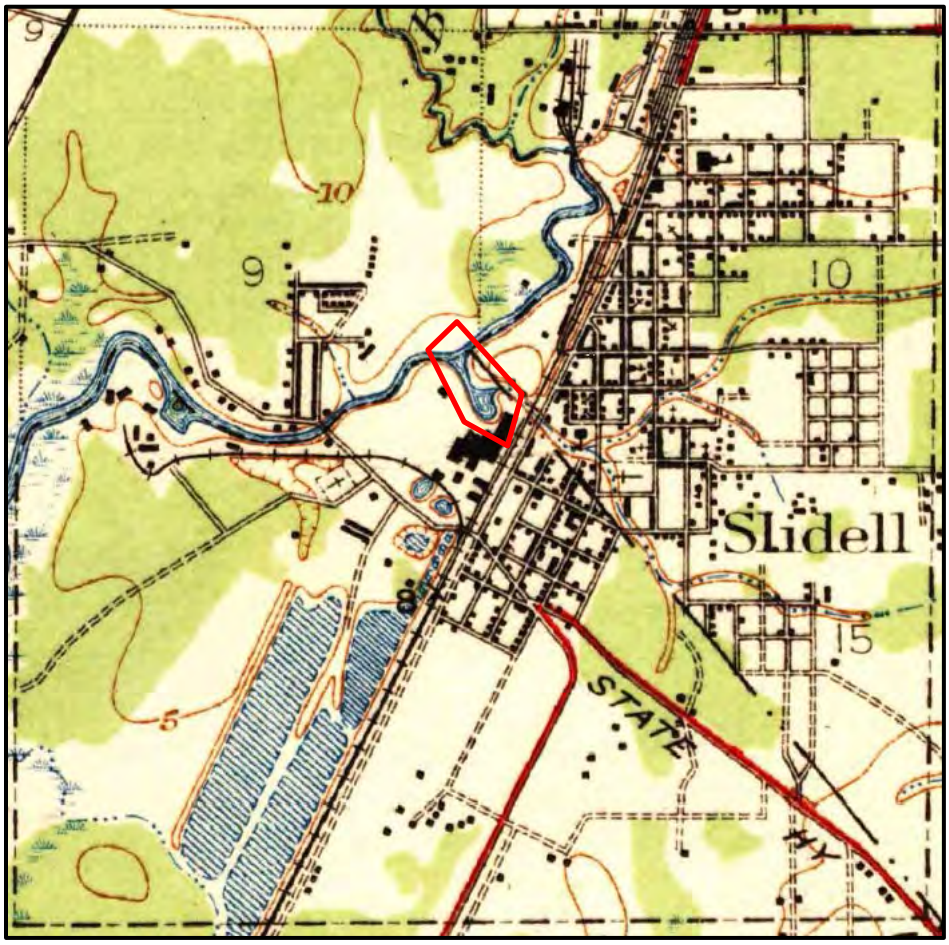

Figure 14. Detail of the 1935 15' Slidell Map, Note the interpreted turning basin outlined in red.

Figure 15. Shovel test along Bayou Pattosat shoving the mottled mixture of sediments.

Figure 18. Photograph showing an example of areas inundated with water in the APE of the Markham-Peachtree Drainage Improvements Project APE facing northwest.

Figure 19. Photograph showing dense shrubs and saplings in the APE of the Markham-Peachtree Drainage Improvements Project APE facing northwest.

Figure 20. Photograph of STP2 in the APE of the Markham-Peachtree Drainage Improvements Project facing east.

May 12, 2015

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: Michale Lindsey, NRCS, USDA
Michale.lindsey@la.usda.gov

SUBJECT: Scoping Notification/Solicitation of Views
St. Tammany Parish, Hazard Mitigation Project 1603-0321 Eastwood Drainage Improvements
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 Public Assistance Program to provide emergency temporary administrative, educational, medical, or other support facilities for areas impacted by disasters while repairs and reconstruction of storm damaged facilities are being undertaken.

The attached scope of work and drawings correspond to a proposed hazard mitigation project for which FEMA funding has been requested.

On August 29, 2005 the intense tidal surge and high winds from Hurricane Katrina caused extensive flood damage to St. Tammany Parish, incapacitating outdated drainage systems. As a result of flooding and subsequent damage in the surrounding areas, St. Tammany Parish has applied for hazard mitigation to improve drainage along the 1500 block of Fremaux Avenue in the Lakewood Subdivision for better conveyance of flows. The scope of work for this project includes the installation of subsurface drainage in an existing ditch on the south side of the existing roadway. Improvements are within the existing right of way and drainage servitudes. The work would also require the removal and replacement of a portion of the eastbound travel lane and sidewalks. The drainage improvements would continue along Fremaux Avenue to an outfall of an existing ditch to the east.

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, FEMA-EHP requests that your office review the attached documents for a determination as to the requirements of any formal consultations, regulatory permits, determinations, or authorizations.

The applicant's agent previously submitted a Joint Permit Application for Work Within the Louisiana Coastal Zone (Request for Determination) on March 30, 2015. It is included in the attachments for your reference.

Please respond within forty-five (45) 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 bianca.kinglondon@fema.dhs.gov or mailed to the attention of Bianca King London, Environmental Department, at the address above.

For questions regarding this matter, please contact Bianca King London, Environmental Specialist at (225)202-5463.

Sincerely,

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

Distribution: NRCS

Attachments: Damage Description/ Eastwood Proposed Scope of Work
Site Plans at the Proposed Project Area
AD 1006

Bianca King London
Environmental Protection Specialist
DHS – FEMA LA Recovery Office
1500 Main Street
Baton Rouge, LA 70802

U.S. Department of Agriculture

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 05/12/2015	
Name of Project Eastwood Drainage Imprvmt 1603-0300		Federal Agency Involved FEMA	
Proposed Land Use Residential Subdivision		County and State St. Tammany Parish, Slidell, LA 70458	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form:
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		
Name of Land Evaluation System Used	Name of State or Local Site Assessment System		

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	0			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	2.5			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐
Reason For Selection:		
Name of Federal agency representative completing this form:		Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

May 5, 2015

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

SUBJECT: Scoping Notification/Solicitation of Views
St. Tammany Parish, Hazard Mitigation Project 1603-0321 Eastwood Drainage Improvements
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 Public Assistance Program to provide emergency temporary administrative, educational, medical, or other support facilities for areas impacted by disasters while repairs and reconstruction of storm damaged facilities are being undertaken.

The attached scope of work and drawings correspond to a proposed hazard mitigation project for which FEMA funding has been requested.

On August 29, 2005 the intense tidal surge and high winds from Hurricane Katrina caused extensive flood damage to St. Tammany Parish, incapacitating outdated drainage systems. As a result of flooding and subsequent damage in the surrounding areas, St. Tammany Parish has applied for hazard mitigation to improve drainage along the 1500 block of Fremaux Avenue in the Eastwood Subdivision for better conveyance of flows. The scope of work for this project includes the installation of subsurface drainage in an existing ditch on the south side of the existing roadway. Improvements are within the existing right of way and drainage servitudes. The work would also require the removal and replacement of a portion of the eastbound travel lane and sidewalks. The drainage improvements would continue along Fremaux Avenue to an outfall of an existing ditch to the east.

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, FEMA-EHP

requests that your office review the attached documents for a determination as to the requirements of any formal consultations, regulatory permits, determinations, or authorizations.

The applicant's agent previously submitted a Joint Permit Application for Work Within the Louisiana Coastal Zone (Request for Determination) on March 30, 2015. It is included in the attachments for your reference.

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 bianca.kinglondon@fema.dhs.gov or mailed to the attention of Bianca King London, Environmental Department, at the address above.

For questions regarding this matter, please contact Bianca King London, Environmental Specialist at (225)202-5463.

Sincerely,

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

Distribution: LDEQ, USEPA, LDWF, LDNR, USACE

Attachments: Damage Description/ Eastwood Proposed Scope of Work
Site Drawings at the Proposed Project Areas

Bianca King London
Environmental Protection Specialist
DHS – FEMA LA Recovery Office
1500 Main Street
Baton Rouge, LA 70802

Appendix F

Public Notice

PUBLIC NOTICE
FEMA NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
DRAFT FINDING OF NO SIGNIFICANT IMPACT
EASTWOOD STORM DRAINAGE IMPROVEMENTS PROJECT - LAKEWOOD SUBDIVISION
SLIDELL, ST. TAMMANY PARISH, 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 and FONSI is to assess the effects on the human and natural environment for improvements to the storm drainage of the Lakewood subdivision, along Fremaux Avenue starting at Beth Drive, ending east an unnamed stream near Summit Boulevard, in St. Tammany Parish, Slidell, Louisiana, a proposed action for which FEMA is considering providing funding assistance.

The proposed drainage improvement project is intended to reduce the frequency of flooding within the Eastwood Subdivision in Slidell, Louisiana. This project entails the installation of subsurface drainage along the 1500 block of Fremaux Ave. Drainage improvements will be installed in an existing ditch on the south side of the existing roadway. Improvements are within the existing right of way and drainage servitudes. Installation of drainage improvements will require removal and replacement of a portion of the eastbound travel lane. This system will continue to outfall into an existing ditch to the east.

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 is to replace the existing substandard cinder box culvert with an upgraded pre-cast concrete box, and an Alternative Action which is to remove the existing drain line in the project area and install a 4’ x 6’ box culvert and a dual 5’ x 8’ concrete box culvert in the current drain location.

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 in the following two publications: 1) St. Tammany Farmer and The Times-Picayune. This public notice will run in the St. Tammany Farmer on Thursday, May 14, and Thursday, May 21, 2015, and in the Times Picayune on Wednesday, May 13, Friday, May 15, and Sunday, May 17, 2015. 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 May 14, 2015, and concluding on May 30, 2015 at 4 p.m. Comments may be mailed to: DEPARTMENT OF HOMELAND SECURITY-FEMA EHP-Eastwood Drainage Improvements, 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 504-427-8000. If no substantive comments are received, the draft EA and associated FONSI will become final.

U.S. Department of Homeland Security
Louisiana Recovery Office
1 Seine Court, 4th Floor
New Orleans, Louisiana 70114

FEMA

DRAFT FINDING OF NO SIGNIFICANT IMPACT
for the
ST. TAMMANY PARISH EASTWOOD DRAINAGE IMPROVEMENT PROJECT
SLIDELL, LOUISIANA
HAZARD MITIGATION GRANT PROGRAM
PROJECT NUMBER 1603-0321
FEMA-1603-DR-LA

BACKGROUND

The Eastwood Storm Line Drainage Improvement project is located in the residential area along Fremaux drive between Beth Drive and Marsha Drive in Slidell, LA (between 30.27795, -89.762255 and 30.277817, -89.757901). This residential area, served by substandard, outdated drainage lines and culverts that were constructed in the 1970s, was damaged by flooding as a direct result of multiple storms in 2005, 2001, and 1995. As a result, St. Tammany Parish (Applicant) has requested Federal funding through FEMA's 404 Hazard Mitigation Grant Program to install new drain lines and box culverts that would adequately convey storm water flows and protect the area against the 100 year storm.

In accordance with 44 CFR Part 10, FEMA regulations to implement the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) was prepared. The purpose of the EA was to analyze the potential environmental impacts associated with the filling and plugging of the existing 36" RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete box culvert along the rear of homes in the Lakewood Subdivision 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 project watershed area by replacing substandard drain lines and box culverts with drain lines and box culverts of current codes and standards; thereby, reducing the risk of future damage from flooding. If left unprotected, future storm events have the potential to repeatedly damage homes and property in this area. The alternatives considered include 1) No Action, 2) Removal of the existing 3' x 8' box culvert and replacement with dual 5' x 8' reinforced concrete box culverts. This Alternative would require the removal and replacement of half the roadway and all conflicting sidewalks and driveways along Eastwood Drive, and the removal and replacement of water and sewer service lines along the roadway (Eliminated from further consideration), and 3) the filling and plugging of the existing 36" RCP and 32" x 36" box culvert and replacing the drain line with a 4' x 6' precast reinforced concrete box culvert along Fremaux Avenue. The 36" RCP and 32" x 36" box culvert drain lines would be abandoned in place, plugged at the ends of the lines, and filled with excavatable flow-able fill. The drainline would be replaced with a 4' x 6'

precast reinforced concrete box culvert along Fremaux Avenue. In addition, 146 linear feet of 42" RCP would be installed and connected to the existing drainage along Lakewood Drive to the new Fremaux drainage (Proposed Action).
A headwall at the outfall of an existing 2' x 9' box culvert would be required and the removal and replacement of the southern half of the asphalt street with mill and asphalt overlay on the remaining portion of the street would be required, in addition to the removal and replacement of portions of the sidewalks and driveways along Fremaux Avenue. Servitudes have already been obtained by the parish to connect a section of the existing drainage system from Eastwood Drive into the new drain line along Fremaux Avenue. The drainage that currently runs along the rear of lots along Fremaux Avenue will be replaced with drainage that will be installed within the ROW of Fremaux Avenue.

FINDINGS

FEMA has evaluated the proposed project for significant adverse impacts to geology, 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, socioeconomics (including minority and low income populations), safety, noise, and hazardous materials. 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:

- 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 stormwater 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. The contractor is required to implement BMPs that meet the LDEQ permitting specifications for storm water discharge regulated under Section 402 of the CWA.

- Any changes or modifications to the proposed project would require a revised USACE determination. Off-site locations of activities such as borrow disposals, 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.

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

- 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.

- Construction traffic should be closely monitored and controlled as appropriate. All construction activities would be conducted in a safe manner in accordance with Occupational Safety and Health Act (OSHA) requirements. To alert motorists and pedestrians of project activities, appropriate signage and barriers should be used during construction.

- If archaeological artifacts or features (prehistoric or historic) are discovered during the course of FEMA funded work at the Forked Island/East Broussard Elementary School, the Applicant must ensure that their Contractor stops work in the vicinity of the discovery and takes all reasonable measures to avoid and minimize harm to the discovery. The Applicant shall inform Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) and FEMA of the discovery and FEMA will deploy an archaeologist to the location to conduct a site condition assessment. The Applicant will not proceed with work until FEMA has completed consultation with the State Historic Preservation Officer (SHPO) and other appropriate consulting parties on the treatment of the discovery.

- In addition, if human remains are discovered during the course of FEMA funded work, the Applicant and the Applicant's Contractor are responsible for immediately halting work within the vicinity of the human remains finding. The Applicant will immediately notify GOHSEP, FEMA, the local Police Department, and the local Coroner's Office of the discovery. The local Coroner's Office will assess the nature and age of the human skeletal remains. If the Coroner's Office determines that the human skeletal remains are older than 50 years of age, the Louisiana Division of Archaeology will take jurisdiction over the remains. Within seventy-two (72) hours, the applicant will notify FEMA and the Louisiana Division of Archaeology (225-342-8170) of the finding. FEMA will assist, as requested, the Louisiana Division of Archaeology and other interested parties, as necessary, to ensure compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 *et seq.*) and other applicable laws. In addition, the Applicant must afford FEMA the opportunity to comply with the "Human Remains Policy" set forth by the ACHP.

- The applicant must follow all applicable local, state, and federal laws, regulations and requirements and obtain and comply with all required permits and approvals prior to initiating 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 Part 10.8) and the proposed action alternative as described in the EA may proceed.

APPROVALS

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Kevin Jaynes Date
Regional Environmental Officer
Region VI

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Thomas "Mike" Womack Date
Director of the Louisiana Recovery Office
FEMA 1603-1607-DR-LA