

ANNEX K

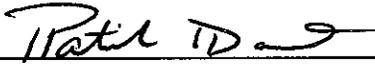
PUBLIC WORKS & ENGINEERING

CITY OF BEAUMONT

APPROVAL & IMPLEMENTATION

Annex K

PUBLIC WORKS & ENGINEERING



Signature (Patrick Donart)

Public Works Director

2/9/12
Date



Signature (Ryan Slott)

Parks Director

2/9/12
Date



Signature (Hani Tehme)

Water Utilities Director

2/9/2012
Date



Signature (Tim Ocnaschek)

EMC

2/13/2012
Date

NOTE: The signature(s) will be based upon local administrative practices. Typically, the first signature block is used by the individual having primary responsibility for this emergency function and the second signature block is used by the Emergency Management Coordinator, Mayor, or County Judge. Alternatively, each department head assigned tasks within the annex may sign the annex.

ANNEX K

Public Works & Engineering

I. AUTHORITY

See Section I of the Basic Plan for general authorities.

Texas Government Code, Section 418.023, Clearance of Debris.

Local Government Code, Section 252.022

II. PURPOSE

The purpose of this annex is to outline the local organization, operational concepts, responsibilities, and procedures to accomplish coordinated public works and engineering activities during emergency situations.

III. EXPLANATION OF TERMS

A. Acronyms

DD#6	Drainage District #6, Jefferson County, Tx
DPS	Texas Department of Public Safety
EOC	Emergency Operations Center
EMC	Emergency Management Coordinator
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
TDEM	Texas Division of Emergency Management
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
NIMS	National Incident Management System
NRF	National Response Framework
SAR	Search and Rescue
SNCA	Sabine Neches Chief's Association
SOP	Standard Operating Procedures
SOG	Standard Operating Guidelines
TAHC	Texas Animal Health Commission
DSHS	Texas Department of State Health Services
TCEQ	Texas Commission on Environmental Quality
TDSR	Temporary Debris Storage and Reduction
TRRN	Texas Regional Resource Network
TxDOT	Texas Department of Transportation

B. Definitions

1. Debris Clearance. Clearing roads of debris by pushing debris to the roadside.
2. Debris Disposal. Placing mixed debris and or the residue of debris volume reduction operations into an approved landfill.
3. Debris Removal. Debris collection and transport to a temporary storage site for sorting and/or volume reduction or to a permanent disposal site. Debris removal also includes damaged structure demolition and removal.

IV. SITUATION & ASSUMPTIONS
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A. Situation

1. See the general situation statement and hazard summary in Section IV.A of the Basic Plan.
2. This jurisdiction anticipates emergency situations may occur which threaten public health, safety, and property. An emergency situation of this nature may require emergency public works and engineering services.

B. Assumptions

1. Employing public works and engineering personnel and equipment during pre-disaster operations should minimize disaster damage. Advance preparation of personnel and equipment may also hasten restoration efforts.
2. Local departments and agencies responsible for the public works and engineering function may have insufficient resources to remove the debris created by a major emergency or disaster and accomplish other recovery tasks.
3. Public Works responsibilities incorporated in this annex for the City of Beaumont are shared by Public Works, Fleet, Water Utilities and Parks Department.
4. Public works & engineering departments and agencies are expected to accomplish expedient repair and restoration of essential services and vital facilities. Dependent on the scale of the operation(s), major reconstruction initiatives will likely require contract assistance.
5. Public works and engineering will be able to organize and carry out debris clearance in the aftermath of an emergency. Large scale debris and/or hazardous material operations, however, will likely require external assistance.
6. Private construction companies, engineering firms, and equipment rental contractors have staff and equipment resources that may be contracted to carry out public works and engineering activities during emergency situations. However, local government may have to compete with businesses and individuals seeking those resources for repairs or rebuilding.

6. Assistance may be available from other jurisdictions through inter-local agreements and from commercial firms through contingency contracts. Some types of emergency situations, including earthquakes, hurricanes, and floods may affect large areas, making it difficult to obtain assistance from usual sources.
7. Damage to chemical plants, power lines, sewer and water distribution systems, and secondary hazards, such as fires, may result in health and safety hazards. These hazards could pose a threat to public works and engineering personnel and impede operational capabilities.
8. Alternate disposal methods and facilities may be needed as local landfills and waste disposal facilities may prove inadequate to deal with large amounts of debris. Special considerations must be made if the debris has been contaminated with chemicals or petroleum products.
9. If local capabilities prove inadequate to deal with a major emergency or disaster, state, and/or federal resources will be available to assist in debris removal and restoration of essential services.

V. CONCEPT OF OPERATIONS

A. General

The general public works and engineering tasks to be performed during emergency situations include:

1. For slowly developing emergency situations, take actions to protect government facilities, equipment, and supplies prior to the onset of hazardous conditions.
2. Provide heavy equipment support for search and rescue operations.
3. Conduct damage-assessment surveys of public facilities, roads, bridges, and other infrastructure.
4. Inspect damaged structures.
5. Clear debris from roadways and make repairs to reopen transportation arteries.
6. Make expedient repairs to essential public facilities to restore operations or protect them from further damage.
7. Remove debris from public property and manage debris disposal operations for public and private property.
8. Assist in controlling public access to hazardous areas.

B. Protecting Resources and Preserving Capabilities

1. Public works and engineering resources may be employed during slow developing emergency situations to protect and limit damage to government facilities, equipment, and essential utilities. Protective actions may include sandbagging, building protective levees, ditching, installing protective window coverings, clearing debris from drains, grates and ditches or removing vital equipment. Public works and engineering elements are expected to identify buildings and other infrastructure that will benefit from protective

measures and, in coordination with the departments or agencies that occupy those facilities, carry out necessary protective actions.

2. If time permits, public works and engineering elements are also expected to take action in advance of an emergency situation to preserve response and recovery capabilities by protecting vital equipment and supplies, either in place or by relocating them to a safe location. It is desirable for agencies to enter into advanced agreements with other agencies or jurisdictions to ensure the safety and security of vital equipment and resources.

C. Search & Rescue (SAR) Support

Public works and engineering crews may be required to provide heavy equipment support for search and rescue operations, particularly support for search operations in collapsed buildings.

D. Damage Assessment

1. Public works and engineering departments will lead preliminary damage assessments of public buildings, homes, businesses, roads, bridges, and other infrastructure following a disaster. Damage assessment procedures and forms used in the assessment processes are discussed in Annex J, Recovery.
2. Public works and engineering personnel shall inspect damaged structures. Inspections are conducted to identify unsafe structures and, if necessary, take actions to restrict entry and occupancy until the structures can be made safe.
3. Damaged buildings posing an immediate threat to public health and safety should be appropriately posted to restrict public access pending repairs or demolition.

E. Debris Clearance and Removal

See Appendix 2, Debris Management.

F. Temporary Repairs and Restoration

1. The public works and engineering staff is expected to make timely temporary repairs to government-owned buildings and other infrastructure essential to emergency response and recovery operations. Building contents should be removed or restricted until the restoration process is complete. Personnel should coordinate with building occupants to determine which areas and equipment have the highest priority for protection.
2. Hazardous situations may result in damage to computers storing vital government records and/or hard copy records, such as building plans, legal documents, tax records, and other documents. When computers or paper records are damaged, it is essential to obtain professional technical assistance for restoration as soon as possible.
3. It is generally impractical to restore buildings sustaining major damage during the emergency response phase. Major repairs will normally be postponed until recovery operations commence and will typically be performed by contract personnel.

G. Actions by Phases of Emergency Management:

1. Prevention

- a. Identify vulnerabilities of existing public buildings, roads, bridges, water systems, and sewer systems to known hazards and take steps to lessen vulnerabilities.
- b. Reduce vulnerability of new public facilities to known hazards through proper design and site selection.
- c. Develop plans to protect facilities and equipment at risk from known hazards.
- d. Install emergency generators in key facilities and have portable generators available to meet unexpected needs. Ensure procedures are in place to maintain and periodically test back-up sources of power, such as generators and fuel, in the event of an emergency power loss.

2. Preparedness

- a. Ensure government buildings, roads and bridges, and public works equipment are in good repair
- b. Keep good records on regular/routine maintenance work on clearing ditches, upkeep of roadways, bridges, culverts, buildings and equipment.
- c. Ensure an adequate number of personnel are trained to operate heavy equipment and other specialized equipment.
- d. Stockpile materials needed to protect and repair structures, roads, bridges, and other infrastructure.
- e. Develop general priorities for clearing debris from roads.
- f. Maintain an adequate quantity of barricades and temporary fencing.
- g. Maintain current maps and plans of government facilities, roads, bridges, and utilities. Identify on maps roadways designated as FHWA.
- h. Review plans, evaluate emergency staffing needs in light of potential requirements, and make tentative emergency task assignments.
- i. Establish and train damage survey teams.
- j. Execute contingency contracts for emergency equipment and services with local contractors and execute agreements with individuals and businesses to borrow equipment.
- k. Develop procedures to support or accomplish the tasks outlined in this annex.
- l. Ensure government-owned vehicles and other equipment can be fueled during an electrical outage.

m. Provide for sufficient high water vehicles to support critical patrol operations in preparation for expected flooding incidents.

n. Take pictures of critical infrastructure and areas prone to damage.

3. Response

a. If warning is available, take actions to protect government facilities and equipment.

b. Survey areas affected by a hazard, assess damage, and determine the need and priority for expedient repair or protection to prevent further damage. Report damage assessments to the EOC.

c. Upon request, provide heavy equipment support for SAR operations. See Annex R, Search and Rescue.

d. Clear roads of debris. See Appendix 2.

e. Inspect damaged buildings to determine if they are safe for occupancy.

f. Remove debris from public property and manage proper debris disposal. See Appendix 2.

g. Make repairs to damaged government facilities and equipment, as needed.

h. Coordinate with the Energy & Utilities staff to arrange for emergency electrical service, if required, to support emergency operations.

i. Assist the Water Utility Department in making emergency repairs to government-owned utility systems, as necessary. See Annex L, Utilities.

j. Restrict access to hazardous areas, using barricades, signs and temporary fencing, upon request.

k. Document emergency work through completion of work for federal funding processes available. See Appendix 3.

4. Recovery

a. Repair or contract repairs to government-owned buildings, roads, bridges, and other infrastructure.

b. Support and conduct community cleanup efforts, as applicable.

c. Participate in compiling estimates of damage and response and recovery costs.

d. Participate in post-incident review of emergency operations and make necessary changes to improve emergency plans and procedures.

VI. ORGANIZATION & ASSIGNMENT OF RESPONSIBILITIES

A. Organization

1. The function of public works and engineering during emergency situations shall be carried out in the framework of our normal emergency organization described in Section VI.A of the Basic Plan, and in accordance with National Incident Management System (NIMS)/National Response Framework(NRF) protocols. Preplanning for emergency public works and engineering tasks shall be conducted to ensure staff and procedures needed to manage resources in an emergency situation are in place.
2. During an Incident of National Significance or Disaster Declaration under the Stafford Act Public Assistance Program, Public Works and Engineering may integrate, as required, with the National Response Framework (NR), Emergency Support Function (ESF) #3 activities. The Federal ESF #3 will develop work priorities in cooperation with state, local, and/or tribal governments and in coordination with the Federal Coordinating Officer and/or the Federal Resource Coordinator. (See Annex 3, Public Works and Engineering – National Response Framework).

B. Assignment of Responsibilities

1. The City of Beaumont Public Works Director will serve as the Public Works Officer during emergencies and will:
 - a. Coordinate certain pre-emergency programs to reduce the vulnerability of local facilities and other infrastructure to known hazards. See Annex P, Hazard Mitigation.
 - b. Manage the public works and engineering function during emergency situations in accordance with the NIMS.
 - c. Oversee the restoration of key facilities and systems and debris removal following a disaster.
 - d. Develop and implement procedures to ensure a coordinated effort between the various local departments and agencies that perform the public works and engineering functions. Ensure appropriate emergency response training for assigned personnel in accordance with Section IX.D of the Basic Plan.
 - e. Identify contractors who can provide heavy and specialized equipment support during emergencies and individuals and businesses that may be willing to lend equipment to local government during emergencies.
 - f. Assist the Resource Manager in maintaining a current list of public works and engineering resources. See Annex M, Resource Management. In an effort to facilitate assistance pursuant to mutual aid agreements, our available resources are typed according to NIMS and a part of the Texas Regional Response Network (TRRN).
 - g. Maintain this annex.

2. The Public Works Department will:

- a. Carry out pre-disaster protective actions for impending hazards, including identifying possible facilities for debris storage and reduction.
- b. Conduct damage assessments in the aftermath of disaster.
- c. Repair and protect damaged government facilities.
- d. Provide heavy and specialized equipment support for SAR operations.
- e. Carry out debris clearance and removal. See Appendix 2.
- f. With the assistance of the Legal Officer and Emergency Management, negotiate inter-local agreements for public works and engineering support.
- g. Maintain stockpiles of disaster supplies such as sandbags, plastic sheeting, and plywood.
- h. Safeguard vital engineering records.

3. Engineering Division will:

- a. In concert with the Emergency Management Coordinator and Building Codes Division, develop damage assessment procedures and provide training for damage survey teams.
- b. Provide engineering services and advice to the Incident Commander and EOC staff.
- c. Assist in conducting damage assessments in the aftermath of an emergency. See Annex J, Recovery.

4. Streets and Drainage Division will:

- a. Maintain reasonable stockpiles of emergency paving materials.
- b. Make emergency repairs city roads, bridges, culverts, and drainage systems.
- c. Supervise debris clearance from the public right-of-way and support debris removal operations.
- d. Emplace barricades, signage and temporary fencing where needed for safety.
- e. Provide personnel and equipment to aid in SAR operations as needed.
- f. Provide heavy equipment support for protective actions taken prior to an emergency and for response and recovery operations.
- g. Assist in repairs to government-owned utilities and drainage systems.

5. Solid Waste Division will:

- a. Collect and properly dispose of refuse.
 - b. Support emergency public works and engineering operations with available resources.
6. Community Development Department, Building Codes Division will:
- a. Conduct damage assessment operations.
 - b. Determine if access to damaged structures should be restricted or if they should be condemned and demolished.
 - c. Inspect expedient shelter and mass care facilities for safety.
7. Information Technology Department, Communications Division, will:
- a. Restore damaged communications systems.
 - b. Provide communications technical and equipment support for emergency operations.
8. Parks Department, Recreation Division will:
- a. Assess damage to parks and recreation facilities and assist in assessing damage to other facilities.
 - b. Provide personnel and light equipment support for public works and engineering operations, road clearing and debris removal as needed.
 - c. Upon request, establish and staff a facility to sort and catalog property removed from damaged government-owned facilities.
9. Water Utility Department will:
- a. Provide personnel and light equipment support for public works and engineering operations, road clearing and debris removal as needed.
 - b. Upon request, establish and staff a facility to sort and catalog property removed from damaged government-owned facilities.
10. Fleet Department, Finance Division will:
- a. Maintain an updated listing of citywide transportation and motorized equipment assets (i.e. generators).
 - b. Coordinate high water vehicles for support of critical operations in preparation of expected flooding incidents.

VII. DIRECTION & CONTROL

- A. The Mayor shall, pursuant to NIMS, provide general guidance for the public works and engineering function and, when necessary, approve requests for state or federal resources.
- B. The Incident Commander (IC) will manage public works and engineering emergency resources committed to an incident site and shall be assisted by a staff commensurate with the tasks to be performed and resources committed to the operation. If the EOC is not activated, the IC may request additional resources from local departments and agencies. The IC may also request authorized officials to activate mutual aid agreements or emergency response contracts to obtain additional resources.
- C. The EOC will be activated for major emergencies and events as well as disasters. When the EOC is activated, the Public Works Officer will manage the emergency public works and engineering function from the EOC. The IC shall direct resources committed to the incident site and coordinate resource requests through the Logistics Section. The Public Works Officer shall manage resources not committed to the incident site and coordinate the provision of additional resources from external sources with the help of the Logistics Section.
- D. As applicable, the Public Works Branch Director will respond to mission priorities established by the Operations Section Chief, IC or the EMC, direct departments and agencies with public works and engineering resources to accomplish specific tasks, and coordinate task assignments to achieve overall objectives.
- E. The Public Works Officer will identify public and private sources from which needed resources can be obtained during an emergency and coordinate with the Logistics and/or Finance Section(s) to originate emergency procurements or to obtain such resources by lease, rental, borrowing, donation, or other means.
- F. A major emergency or disaster may produce substantial property damage and debris requiring a lengthy recovery operation. In such incidents, it may be desirable to establish a Debris Removal Task Force to manage debris removal and disposal. The task force may continue to operate even after the EOC deactivates. See Appendix 2 for the organization and responsibilities of this element.
- G. Normal supervisors of public works and engineering personnel participating in emergency operations will exercise their usual supervisory responsibilities over assigned personnel, subject to NIMS span of control guidelines. Organized crews from other jurisdictions responding pursuant to inter-local agreements will normally operate under the direct supervision of their own supervisors. Individual volunteers will work under the supervision of the individual heading the team or crew to which they are assigned.
- H. The line of succession for the Public Works Officer is:
 - 1. Streets and Drainage Division Manager
 - 2. Capital Projects Division Manager
 - 3. Senior Design Engineer

- I. A major emergency or disaster may produce substantial property damage and debris requiring a lengthy recovery operation. Debris Contractor will work under the supervision of the Public Works Director. The Debris Contract will normally be initiated by either the EMC or Public Works Director.

VIII. READINESS LEVELS

A. Readiness Level IV - Normal Conditions

See the mitigation and preparedness activities in Section V.G.

B. Readiness Level III - Increased Readiness

1. Review plans and procedures.
2. Inform key public works and engineering personnel.
3. Monitor the situation.
4. Check equipment readiness and correct deficiencies.
5. Check emergency supply status and fill shortfalls.

C. Readiness Level II - High Readiness

1. Monitor the situation.
2. Activate applicable personnel and make preliminary assignments. Identify personnel to increase staffing as needed.
3. Implement plans to protect government facilities and equipment.
4. Ensure equipment is loaded and fueled; consider precautionary deployment of resources.
5. Review inter-local agreements and contracts for resource support and alert potential resource providers of possible emergency operations.
6. Identify and dispatch additional personnel to staff the ICP and EOC as applicable.

D. Readiness Level I - Maximum Readiness.

1. Mobilize any additional public works and engineering personnel.
2. Dispatch additional personnel to the ICP and EOC as necessary.
3. Advise resource suppliers of situation and mobilize any contractors as applicable.
4. Continue to monitor the situation.

IX. ADMINISTRATION & SUPPORT

A. Resource Support

1. A listing of local public works and engineering equipment is provided in Annex M, Resource Management.
2. Should our local resources prove to be inadequate during an emergency; requests will be made for assistance from other local jurisdictions, other agencies, and industry in accordance with existing mutual-aid agreements and contracts.

If the public works and engineering resources available locally, from other jurisdictions, and from businesses pursuant to contracts are insufficient to deal the emergency situation, assistance may be requested from the State. The Mayor should approve requests for state aid, which should be forwarded to the Disaster District Committee (DDC) Chair in Beaumont.

B. Communications

The public works and engineering communications network is depicted in Appendix 1.

C. Key Facilities

A listing of key local facilities, providing a general priority for damage assessment, debris clearance, and repair, is contained in Annex G, Law Enforcement. The EOC shall determine the specific priority for public works and engineering work on each of these facilities in the aftermath of an emergency.

D. Reporting

In addition to reports that may be required by their parent organization, public works and engineering departments and agencies participating in emergency operations should provide appropriate situation reports to the IC, or if an incident command operation has not been established, to the EMC. The IC will forward periodic reports to the EOC if one is established. Pertinent information will be incorporated into the Initial Emergency Report and periodic Situation Reports. The essential elements of information for the Initial Emergency Report and the Situation Report are outlined in Appendices 2 and 3 to Annex N (Direction and Control).

E. Records

Expenses incurred in carrying out emergency response and recovery operations for certain hazards may be recoverable from the responsible party, insurers, or as a basis for requesting reimbursement for certain allowable costs from the state and/or federal government. Additionally, FHWA and other federal programs or disaster aid by category may mean work projects need to be separated by specific location time and reason. Hence, all public works and engineering elements will maintain detailed records of labor, materials, equipment, contract services, and supplies consumed during large-scale emergency operations. NIMS compliant ICS forms will be utilized as provided by the Beaumont Emergency Management program.

F. Post Incident Review

For large-scale emergency operations, the EMC shall organize and conduct an after action critique of emergency operations in accordance with the guidance provided in Section IX.F of the Basic Plan. The After Action Report will serve as the basis for an Improvement Plan.

X. ANNEX DEVELOPMENT & MAINTENANCE

- A. The City of Beaumont Public Works Director is responsible for developing and maintaining this annex.
- B. This annex will be reviewed annually and updated in accordance with the schedule outlined in Section X of the Basic Plan.
- C. Departments and agencies assigned responsibilities in this annex will develop and maintain SOPs covering those responsibilities.

XI. REFERENCES

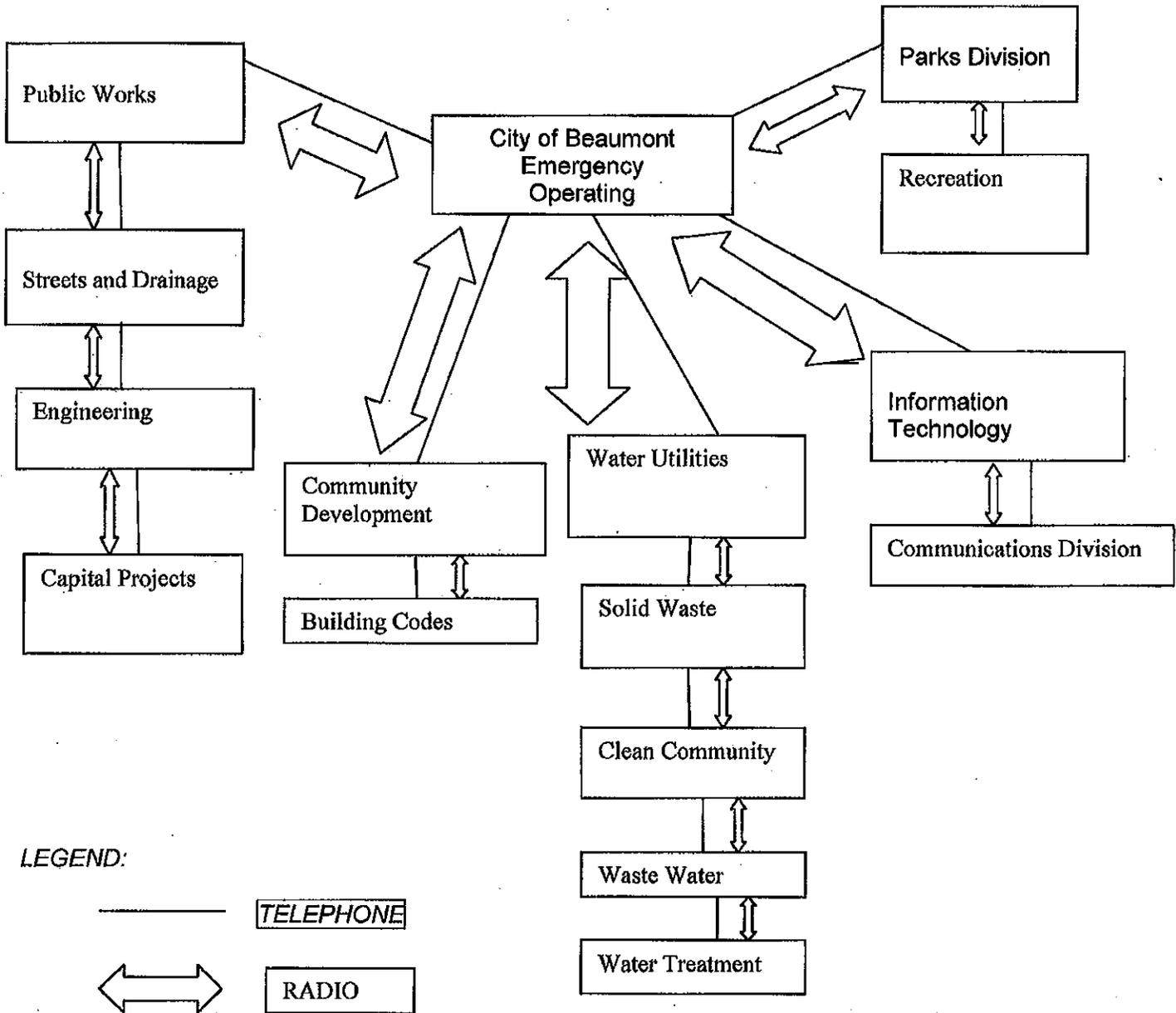
- A. DEM, Texas Disaster Recovery Manual.
- B. FEMA, Public Assistance Debris Management Guide (FEMA-325).
- C. FEMA, State and Local Guide for All-Hazard Emergency Operations Planning (SLG-101).
- D. FEMA, Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials (FEMA-116).
- E. Texas Department of Transportation, Emergency Relief Guidebook: Disaster Assistance for Local Federal-Aid Highway Facilities

APPENDICES:

Appendix 1 Public Works & Engineering Communications Network
Appendix 2 Debris Management
Appendix 3..... FHWA
Appendix 4..... Facility Assessment

ATTACHMENTS:

PUBLIC WORKS & ENGINEERING COMMUNICATIONS NETWORK



DEBRIS MANAGEMENT

1. Objectives

The objectives of debris management in the aftermath of an emergency are to:

- A. Reopen roads and provide access to facilities that provide essential government and population support services.
- B. Remove debris from public property.
- C. Assist citizens in removing debris from private property.
- D. Reduce the volume of debris going to disposal facilities to extend the life of those facilities and reduce costs.
- E. Ensure hazardous materials are segregated from other debris and properly disposed of.

2. Explanation of Terms

- A. Debris is the remains of things destroyed or damaged as a result of natural or technological disasters. Disaster debris may include yard waste, building materials, household items, personal property, hazardous household products, batteries, automobiles, boats, hazardous chemicals, spoiled food, dead animals, and other materials. Some types of debris pose a threat to health, safety, and the environment.
- B. Categorization of Debris. There are a variety of schemes for categorizing debris. In this appendix, the following categorization is used:
 - 1) Burnable Materials, which include:
 - a) Burnable Natural Debris – generally trees, shrubs, and vegetation
 - b) Burnable Construction and Demolition (C&D) Debris – wooden structural members and other wood products such as roof decking, siding, doors
 - 2) Non-burnable Debris – plastic, glass, metal, sheet rock, roofing shingles, carpet, tires, treated lumber, bricks, concrete, soil, and similar items. Household waste is a type of non-burnable debris.
 - 3) Hazardous Debris – industrial and household hazardous waste, paint, materials containing asbestos, batteries, petroleum products, agricultural chemicals, dead animals, and similar products.

3. Situation & Assumptions

A. Situation

- 1) The type and quantity of debris generated by an emergency situation is a function of the type of event, the location of impact, and the magnitude, intensity, and duration.
- 2) The quantity and type of debris generated, its location, and the size of the area over which it is spread affect the choice of removal and disposal methods, the costs incurred in doing so, and the time it will take to accomplish the task.

B. Assumptions

- 1) Emergency situations requiring debris removal may occur at any time.
- 2) Local government may have insufficient resources to remove debris created by a major emergency or disaster and accomplish other recovery tasks.
- 3) If local debris removal capabilities are insufficient, the chief elected official may issue a local disaster declaration and request State assistance in debris removal. If the local emergency situation is of such magnitude that the Governor requests a Presidential Disaster Declaration and such a declaration is approved, federal resources could become available.
- 4) For major emergencies or disasters, private contractors may be needed to collect, reduce the volume of, and dispose of debris.
- 5) Citizens should assist in removing debris from the immediate area of their homes and businesses, but will generally need government assistance in removing it for disposal.
- 6) Citizens are often willing to help their neighbors in removing debris. Proper public information can encourage such cooperative action, speeding up the process and reducing costs.
- 7) Community groups and VOADS are often willing to provide assistance in removing debris. Proper coordination can encourage participation and assistance and can speed the process and recover costs to citizens.

4. Concept of Operations

A. Phased Approach. Debris management shall be conducted in phases, including:

- 1) Phase 1 - Emergency Roadway Clearance
 - a) Following a disaster, the top priority is to clear major roads and routes providing access to key population support facilities such as hospitals, to allow for the movement of emergency vehicles, resumption of critical services, and damage assessment. Emergency roadway clearance also facilitates the deployment of external response elements and delivery of emergency equipment and supplies. In initial roadway debris clearance, debris is normally pushed to the side of the road with no attempt to remove or dispose of it.
 - b) Local government is responsible for clearing city streets, county roads, and their rights of way. The Texas Department of Transportation (TxDOT) is responsible for clearing state and federal highways and the rights of way for such highways along with debris disposal resulting from the clearing process.
 - c) In this phase, crews equipped with chain saws will generally be required to cut up downed trees and heavy equipment will be needed to move the remains. If possible, heavy equipment used for moving debris should be equipped with

protective caps and all personnel should wear protective equipment. Fire hydrants, driveway cutouts, and utility valves should be left unobstructed.

- d) Electrical systems are often damaged by the same hazards that create substantial debris, public works and engineering crews may need to coordinate their efforts to remove debris with utility crews.
- e) Documentation should include relation to FHWA Roadways.

2) Phase 2 – Debris Removal and Disposal

a) Debris Removal from Public Property.

(1) In the aftermath of a disaster, it may be necessary to remove debris from a variety of public property, including:

- (a) Roads and rights of way.
- (b) Government buildings, grounds, and parking lots.
- (c) Parks and recreation facilities.
- (d) Storm drainage systems and reservoirs.

(2) If the emergency situation resulted in a Presidential Disaster Declaration, the expense of debris removal from public property may be partially reimbursed by the federal government if the debris must be removed to:

- (a) Eliminate immediate threats to life, public health and safety.
- (b) Eliminate immediate threats of significant damage to improved public or private property.
- (c) Ensure economic recovery of the affected community.

Large-scale debris removal and disposal operations can be extremely costly. It is vital to determine if federal assistance will be provided and the rules that apply to such assistance before commencing debris removal operations. See the *DEM Texas Disaster Recovery Manual* for further information.

NOTE: FHWA may provide reimbursement for emergency clearing and 1st pass removal on applicable roadways.

(3) State law provides that state resources may not be used to clear or remove debris from local public property unless the local government presents the State an unconditional authorization for removal.

b) Debris Removal from Private Property.

(1) Debris removal from private property, including demolishing condemned structures, is generally the responsibility of the property owner, and the cost may be wholly or partly covered by insurance. If there has been a Presidential Disaster Declaration and debris on private property is so widespread that public health, safety, or the economic recovery is threatened, local government may be partially reimbursed for the cost of debris removal from private property. Local government normally has responsibility for picking up and disposing of debris from private property placed at the curb and bears the cost of that effort.

- (2) When the Governor has issued a disaster declaration for an emergency situation, § 418.023 of the Government Code law provides that state resources may be used to remove debris from private property. As a general rule, the property owner must authorize removal of debris, grant unrestricted access, and indemnify the state against any claim resulting from the removal. As the Executive Order of the Governor Relating to Emergency Management provides that county judges and mayors who have issued a local disaster declaration may exercise the emergency powers of the Governor on an appropriate local scale, local governments may remove debris from private property subject to the same conditions cited above. Attachment 1 to this appendix provides a sample Debris Removal Access Agreement that should be used to meet statutory requirements. (Right of Entry Form, "ROE")

B. Preparation for Debris Removal

Considerable time and labor can be saved in the debris removal process by sorting debris from public property and encouraging the public to sort debris from private property before it is picked up. A proactive public outreach program should advise the public of the actions they can take to facilitate pickup, including:

- 1) Sorting debris into categories – burnable natural debris, burnable construction and demolition debris, non-burnable debris, and potentially hazardous debris.
- 2) Placing sorted debris piles at curbside.
- 3) Keeping debris off roadways and away from fire hydrants and utility valves.
- 4) Disposing of household waste in normal refuse containers.

C. Estimating the Amount of Debris

In determining the means to be used to remove and dispose of debris, it is essential that local officials have a reasonable estimate of the amount of debris that must be removed and eventually disposed of. Attachment 3 to this appendix provides a methodology that may be used to estimate the amount of debris that must be removed.

D. Determining Debris Removal Strategy

- 1) After an estimate of the amount of debris that needs to be removed is made, options for removing the debris should be evaluated in terms of their cost and timeliness.
- 2) The general strategies for debris removal and processing are:
 - a) Removal and processing of debris by local government.
 - (1) Advantages:
 - Direct government control.
 - (2) Disadvantages:
 - Normally requires diversion of significant government resources from regular functions and makes them unavailable for other recovery tasks.
 - Speed of debris removal may be constrained by the government equipment and personnel available.

- Local government may lack specialized equipment and skills needed to carry out all aspects of debris removal.

b) Removal and processing of debris by contractors.

(1) Advantages:

- Speed of debris removal may be increased by contracting for additional resources.
- If local contractors are used, may provide local economic benefit.

(2) Disadvantages:

- Requires detailed contracts.
- Requires extensive oversight and inspection.
- May not be reimbursed.

c) Removal and processing of debris by a combination of local government and contractors.

- 3) If contractors are used, the disaster area should be divided into geographic sectors for control purposes and bids solicited based on the estimated quantity of debris in each sector. For the City of Beaumont, this will generally be represented by the Public Works Director. In defining sectors, it is desirable to group properties of like type, construction, and with similar vegetation together. This will also facilitate estimating the quantity of debris that needs to be removed.
- 4) Debris may be removed by one time collection of all debris at each property or using multiple passes to collect different types of material that have been pre-sorted by the property owner.

E. Establishing Temporary Debris Storage and Reduction (TDSR) Facilities.

- 1) The effective disposal of large quantities of disaster debris requires that suitable temporary storage and volume reduction facilities be established. Such facilities hold debris until it can be sorted, reduced in volume, and dispatched to an appropriate disposal facility. Sorting and volume reduction can significantly reduce the costs of disposing of debris and prevent potentially serious environmental problems.
- 2) Sorting. TDSR facilities sort debris and send it to the most appropriate facility for treatment or disposal. Sorting is needed to separate burnable from non-burnable materials and segregate hazardous products for disposal at authorized facilities and identify debris that can be burned, chipped or ground, recycled, or simply disposed of at a landfill without treatment.
- 3) The volume of debris can be greatly reduced by a variety of methods, including:
 - a) Incineration. This method includes open burning, use of air curtain pit incineration (trench burners), or use of portable air curtain incinerators. Incineration of burnable debris typically reduces its volume by 95 percent.

- b) Chipping and grinding. Chipping and grinding is appropriate for clean, woody debris and typically reduces its volume by 75 percent. However, chipping and grinding normally costs as much as incineration and unless the resulting mulch can be disposed of without cost or at a profit, local government may incur additional costs to have the residual material hauled to a landfill.
 - c) Recycling. Recycling debris may present an opportunity to reduce the overall cost of disposal. Metals, lumber, and soil are the most likely candidates for recycling. Before local government attempts to operate a recycling operation, it is essential to determine if there is, in fact, a market for the materials sorted out in the recycling process; otherwise the output may simply have to be hauled to a landfill. Specialized contractors may be willing to undertake recycling, particularly if it involves large amounts of well sorted debris.
- 4) Site Selection
- a) Criteria pertinent to selecting TDSR facilities are:
 - (1) Preferably government-owned.
 - (2) Large enough to accommodate a storage area, a sorting area, and volume reduction operations area(s).
 - (3) Reasonable proximity to disaster areas and debris disposal sites.
 - (4) Good road access.
 - (5) Not in a residential area or in the vicinity of schools, churches, or other facilities with concentrations of population.
 - (6) Not in an environmentally sensitive area, such as wetlands or a water well field.
 - b) Local landfills and possible local sites for TDSR facilities are described in Attachment 2 to this appendix. The selection of specific sites to be used for TDSR facilities will normally be made by a team of local, state, and, where appropriate, federal personnel, who are familiar with the local area and the specific environmental regulations governing such facilities. Attachment 3 to this appendix provides methods for determining space requirements for TDSR sites and estimating the quantity of debris that must be disposed of after processing.

F. Public Information and Instructions

- 1) In the aftermath of an emergency situation, the Public Information staff should provide the public detailed information on debris removal and disposal plans and procedures. Providing appropriate instructions to the public concerning debris removal can significantly reduce the time and costs involved. Public information on debris removal must start as soon as possible after the disaster – before people start moving and stacking large amounts of debris. (See Appendix 4 for Template PSA)
- 2) Public instructions should encourage citizens to:
 - a) Assist their neighbors, particularly the elderly or infirm, in removing debris.
 - b) Move debris to curbside for pickup.
 - c) Separate debris into the categories determined by local officials.
 - d) Keep debris piles away from fire hydrant and utility valves.

- 3) Public information should keep citizens advised of:
 - a) Debris pickup schedules and the system of pickup, if various types of debris will be picked up on different days.
 - b) Self-help disposal guidelines for citizens and businesses that wish to haul their own debris to a debris storage area or landfill.
- 4) The normal methods of public information dissemination through the media should be used to provide information to the public. If loss of electric power has occurred, extra effort must be made to reach those without power using door hangers, flyers, signs, and, if necessary, door-to-door outreach.
- 5) Provide a resource for information and answers through 311.

G. Regulatory Issues and Technical Assistance

- 1) The Texas Commission on Environmental Quality (TCEQ) regulates the disposal of waste, including hazardous waste. TCEQ also issues emergency permits for debris incineration. Hence, the advice and assistance of TCEQ should be obtained in developing and implementing plans for debris disposal. TCEQ should also be notified prior to removal of any animal carcasses.
- 2) The Texas Department of State Health Services (DSHS) is the state agency responsible for ensuring food safety. The assistance of DSHS should be sought when there are questions regarding the safety of foodstuffs in damaged retail stores, warehouses, and processing facilities. DSHS has the authority to condemn unsafe foodstuffs so that they can be disposed of.
- 3) The Texas Animal Health Commission (TAHC) can provide advice and assistance regarding the disposition of dead animals. TAHC may also help identify stray live animals so they can be returned to their owners.

5. Organization

A. Phase 1 - Emergency Roadway Clearance

During Phase 1, our normal emergency organization as outlined in the Section VI.A of the Basic Plan and this annex should coordinate debris clearance operations. Debris clearance will normally be managed from the EOC. However, if debris is localized, an incident command operation may be established at the incident site to manage debris clearance.

B. Phase 2 - Debris Removal and Disposal

- 1) For small-scale debris removal and disposal operations, our normal emergency organization as outlined in the Basic Plan and this annex may coordinate debris removal and disposal.
- 2) For major emergencies or disasters that result in large volumes of debris, removal and disposal may have to continue for an extended period. For these situations, a Debris Management Task Force, consisting of personnel from those departments

and agencies having the required expertise, shall be formed to manage debris removal and disposal operations. The Task Force should be comprised of personnel to perform the following functions:

- a) Operations: Plan debris removal and processing, manage the use of government resources, and monitor the use of contract resources committed to the task.
- b) Contracting & Procurement: Tertiary pre-disaster debris and equipment contracts are in place. If additional needs arise, develop contracts for services and/or equipment, obtain bids, and award contracts.
- c) Legal: Contract review, manage authorizations for debris removal, and prepare legal documents for building condemnation and land acquisition.
- d) Administration: Provide supply, administrative, and accounting support.
- e) Engineering: Damage assessment, develop scopes of work and specifications for contracts, and prepare cost estimates.
- f) Public Information: Provide information and instructions relating to debris removal to the public.

It may be desirable to organize the Debris Management Task Force as an ICS operation under an Incident Commander.

- 3) If the government uses its own resources to remove debris, the primary role of the operations staff is to plan and supervise debris removal. If contractors will be removing debris, then the primary role of the operations staff is to monitor contractor work and ensure contract provisions are followed.

6. Task Assignments

A. Phase 1 - Emergency Roadway Clearance

Task assignments shall be as stated in Section VI.B of this annex.

B. Phase 2 - Debris Removal and Disposal Phase

Task assignments shall be determined by the Debris Management Task Force leader. General tasks of the various components of the Task Force are described in the Chapter 3 of the *FEMA Debris Management Guide* (FEMA-325).

Attachment 1

Debris Removal Access Agreement

I/We _____, the owner(s) of the property

commonly identified as _____
(street address)

Beaumont, Jefferson County, State of Texas
(city/town) (county)

do hereby grant and give freely and without coercion, the right of access and entry to said property to the City of Beaumont, its agencies, contractors, and subcontractors thereof, for the purpose of removing and cleaning any or all storm-generated debris of whatever nature from the above described property.

It is fully understood that this agreement is not an obligation to perform debris clearance. The undersigned agrees and warrants to hold harmless the City of Beaumont, State of Texas, its agencies, contractors, and subcontractors, for damage of any type, whatsoever, either to the above described property or persons situated thereon and hereby release, discharge, and waiver any action, either legal or equitable that might arise out of any activities on the above described property. The property owner(s) will mark any storm damaged sewer lines, water lines, and other utility lines located on the described property.

I/We (have _____, have not _____)(will _____, will not _____) received any compensation for debris removal from any other source including Small Business Administration (SBA), National Resource Conservation Service (NRCS), private insurance, individual and family grant program or any other public assistance program. I will report for this property any insurance settlements to me or my family for debris removal that has been performed at government expense. For the considerations and purposes set forth herein, I set my hand this _____ day of _____ 20____.

Owner

Owner

Telephone No. Address

Witness

Attachment 2

Landfills & Potential Temporary Débris Storage and Reduction (TDSR) Sites

1. Landfills

a. Name: City of Beaumont Municipal Landfill

- 1) Address: 4986 Lafin, Beaumont, Tx 77705
- 2) Operated by: City of Beaumont
- 3) Estimated capacity remaining (cubic yards): 23,250.217
- 4) Estimated daily processing capacity: 1,240 tons
- 5) Normal operating schedule: Mon – Fri 7am – 5pm
- 6) Restrictions: Municipal Landfill
- 7) Fees: Compacted \$5.50 per cubic yard, Non-compacted \$6.40 per cubic yard
- 8) Other Factors: N/A

2. Possible TDSR Facilities

Name: DD6 Salvage Yard, located behind Wright's Scrap Metal, 5802 Washington Blvd

- 1) Owner: Jefferson County
- 2) Fenced: No
- 3) Road access: access off of Washington Blvd

Attachment 3

Debris Estimation

This attachment contains the following tabs:

1. Tab A – Estimating Debris Quantity.

This tab includes two worksheets (Worksheet 1 and Worksheet 2) which outline a methodology that can be used to estimate the quantity of debris produced by a disaster. The methodology allows the user to estimate the debris in various geographic areas (sectors) and then sum the amount of debris in each sector to determine the overall volume of debris that must be dealt with. The sectors developed in this process can be used in operational planning and contracting. To the extent possible, sectors should be drawn to encompass areas with buildings of similar construction and vegetative cover.

The methodology in this tab should not be used for hurricane debris; use the methodology in Tab B instead.

2. Tab B – Estimating Debris Removal Time. This tab includes two worksheets (Worksheet 3 and Worksheet 4). The worksheets provide a methodology that can be used to estimate the time in days that it will take to remove specific quantities of debris given a known set of hauling resources and a reasonable estimate of the cycle time for those resources (time spent in pickup, hauling, unloading, and, waiting on one trip).
3. Tab C – Estimating Debris Disposal Quantity. Worksheet 5 outlines a method to determine the volume of debris that will have to be disposed of after sorting and volume reduction, given information on the composition of debris that must be disposed of. To utilize this methodology, you must remove a sample of debris in each sector and sort it to determine the characteristics of the debris from that sector. If the sample of debris is not representative of debris in the sector, this method will be inaccurate.
4. Tab D – Estimating Requirements for Debris Processing. Worksheet 6 can be used to estimate how much space will be required for temporary debris storage and reduction facilities. This worksheet is based on a US Army Corps of Engineers methodology.
5. Tab E – Estimating Hurricane Debris Quantity. Worksheet 7 can be used to estimate the quantity of debris produced by a hurricane. This worksheet is based on US Army Corps of Engineers methodology.
6. Tab F – Hazardous Stump Extraction and Removal Eligibility. Used to establish criteria for reimbursement of removing eligible hazardous stumps from public or where authorized private property.

Tab A

ESTIMATING DEBRIS QUANTITY

Complete a separate Worksheet 1 for each Sector.
 Transfer results from each Worksheet 1 to Worksheet 2.
 CF = cubic feet & CY = cubic yards

Use Tab E for Estimating Hurricane Debris

WORKSHEET 1				
Sector:				
Description:		N = Number	M = Multiplier	CY = (NxM)
A. Homes (1800-2000 square feet)		100	300	30000
B. Mobile Homes		130	80	10400

C. Other Buildings	L = Length/ft	W = Width/ft	H = Height/ft	CF = (LxWxH)	CY = (CF/27) x.33
Apex Center	250	60	10	150000	1833
Anchor Fire Station	100	100	12	120000	1467
Teasdale School	125	100	10	125000	1527
Subtotal (sum the right column)					4827

D. Debris Piles	L = Length/ft	W = Width/ft	H = Height/ft	CF = (LxWxH)	CY (CF/27)
Crystal Creek @ Compton	150	8	4	4800	177
Hungry Hollow Bridge	80	20	8	12800	474
Willow Road @ Newton	100	16	5	8000	296
Subtotal [sum the right column]					947

WORKSHEET 2	Sector A	Sector B	Sector C	Sector D
<i>Debris Volume Estimate (cubic yards/CY)</i>				
A. Homes [from Worksheet 1]	30000	4200		
B. Mobile Homes [from Worksheet 1]	10400	2400		
C. Other Buildings [from Worksheet 1]	4827	1021		
SD = Structural debris (A + B + C)	45227	7621		
V = Vegetation Multiplier [see note]	1.3	1.1		
ST = Subtotal (SD x V)	58795	8383		
D. Debris Piles [from Worksheet 1]	947	1200		
E. SV = Sector Volume (ST + D)	59742	9583		
TOTAL [add entries in row E above]	69325			

Note:

V= Vegetative Multiplier:

Vegetative Cover

V =

None

1

Light

1.1

Medium

1.3

Heavy

1.5

Tab B
ESTIMATING DEBRIS REMOVAL TIME

Worksheets 3 and 4 may be used to estimate the time it will take to remove a quantity of debris given information on the quantity and capacity of the hauling resources available and estimates of the cycle time for those resources. Cycle time is the time it takes a cargo truck to complete a round trip. Cycle time is computed by adding the time it takes to load a truck, the round-trip travel time between the loading point and the off-load point, unloading time, and any unproductive waiting time. This methodology will be most accurate if you use times observed during actual operations, not theoretical numbers.

WORKSHEET 3	Sector A	Sector B	Sector C	Sector D
A. Debris to be Removed in cubic yards (CY) from Worksheet 2 or 7	59742	9583		
<i>Removal Cycle (all times in hours)</i>				
B. Estimated loading time	.2	.2		
C. Estimated travel time (roundtrip)	.4	.6		
D. Estimated unload time	.1	.1		
E. Estimated waiting time	.1	.1		
F. Cycle time (B+C+D+E)	.8	1.0		
G. Daily work period	7.5	7.5		
H. Cycles per day (G / F)	9	7		
<i>Removal Time</i>				
I. Capacity (CY) per cycle [Worksheet 4]	136	136		
J. Capacity (CY) per day [H x I]	1224	952		
K. Days to Clear Sector [A / J]	48.8	10.0		
L. Days to Clear All Sectors [add entries in Row K above]	58.8			

WORKSHEET 4	A. Truck Capacity (CY)	B. Units Available	C. Group Capacity (AxB)
<i>Equipment</i>			
Dump Truck, Light	6	4	24
Dump Truck, Medium	8	4	32
Dump Truck, Heavy	10	8	80
Capacity Per Cycle (CY) [sum the right column]			136

Note: In estimating units available, it is essential to consider that some equipment may not be operationally ready each day. Hence, an out-of-service factor based on local experience should be applied to obtain a realistic estimate of equipment available for use on a daily basis.

Tab C
ESTIMATING DEBRIS DISPOSAL QUANTITY

Worksheet 5 provides a method of estimating the volume of debris that will have to be disposed of after volume reduction. It requires taking a **sample of the debris in each sector** to determine the percent of burnable debris (B below), the percent of burnable C&D debris (C below), the percent of non-burnable debris (D below) broken down by recyclable materials (D-1) and other material (D-2), and the percent of hazardous debris. In taking a sample, it is desirable to include debris from at least 10 properties.

Worksheet 5	Sector 1	Sector 2	Sector 3	Sector 4
<i>Sample Debris Characteristics</i>				
A. Debris volume [from Worksheet 2]	59742	9583		
B. % Burnable Natural Debris	.30	.40		
C. % Burnable C&D Debris	.32	.28		
D. % Non-Burnable Debris	.35	.32		
D-1. Potentially Recyclable	.07	.10		
D-2. Landfill	.28	.20		
E. % Hazardous Debris	.03	.02		
<i>Disposal Volume (cubic yards)</i>				
F. Burnable Natural Debris (A x B)	17922	3833		
F-1. Amount to be chipped/ground ¹	200	0		
F-2. Amount to be burned	17722	3833		
G. Burnable C&D Debris (A x C)	19117	2683		
H. Total Burnable (F-2 + G)	36839	6516		
I. Volume for disposal after burning (H x .05)	1841	326		
J. Volume for disposal after chipping or shredding (F-1 x .25)	50	0		
K. Non-Burnable Debris (A x D)	20910	3067		
L. Less Non-Burnables to be Recycled ²	5400	767		
M. Volume of Non-Burnables for Disposal (K - L)	15510	2300		
N. Volume (Non-hazardous) for Landfill Disposal (I + J + M) ³	17401	5693		
N. Total for Landfill Disposal [add quantities in row N above]	23094			
O. Volume for Hazmat Disposal (A x E)	1792	191		
P. Total for Hazmat Disposal [add quantities in row O above]	1983			

Notes:

- Local officials need to decide how much debris to chip or grind instead of burning. The quantity should be based on a) the amount of chipped/ground wood that local government wants to retain for use as mulch and b) the amount that can be disposed of without cost or at some profit to landscape products firms. Since chipping and grinding costs approximately the same as burning and produces a higher volume of residue, there is little reason to chip and grind instead of burning if you also have to pay to have the resulting mulch hauled away.
- This number should be based on the proportion of recyclable materials for which you can determine there is a ready market. Recycling materials for which there is no market simply leaves you sorted debris to haul to the landfill.
- If mulch produced in the chipping and grinding operation is hauled away without cost, do not include it (Item J) in the equation because disposal of that material is no longer your problem.

Tab D
ESTIMATING REQUIREMENTS FOR DEBRIS STORAGE & PROCESSING SITES

This methodology may be used to determine the space required for debris storage and processing sites.

It assumes that:

1. Debris will be stacked 10 feet high.
2. 40 percent of a site will be used for storage; 60 percent will be used for sorting areas, separation between debris piles, roads, site buffers, and burn pits

WORKSHEET 6	
A. Debris Volume in cubic yards (CY) [From Worksheet 2 or 7]	69325
B. CY per acre assuming 10' stack height ¹	16117
C. Acres for debris storage only (A/B)	4.3
D. Multiplier for processing, roads, & buffers	1.66
E. Required facility area in acres ²	7.1

Notes:

1. If you plan to use a stack height other than the typical 10 feet, use the following formula to compute CY per acre:

$$CY = (\text{stack height in feet} / 3) \times 4840$$

2. Where the area requirement is large, the requirement is generally satisfied by establishing several sites that, taken collectively, provided the needed area.

Tab E
ESTIMATING HURRICANE DEBRIS QUANTITY

Worksheet 7 may be used to estimate the quantity of debris that must be removed. This worksheet uses the formula $Q = H \times C \times V \times B \times S$, where:

- Q = the quantity of debris in cubic yards (CF)
- H = the number of households
- C = the storm factor in CY:
- V = the vegetation characteristic multiplier:
- B = the business/commercial use multiplier
- S = the storm precipitation characteristic multiplier

WORKSHEET 7	Sector A	Sector B	Sector C	Sector D
<i>Debris Volume Estimate - Hurricane</i>				
1. H = households	5167	2100		
2. C = Storm category	26	8		
3. V = Vegetation multiplier	1.5	1.1		
4. B = Business/commercial multiplier	1.3	1.0		
5. S = Storm precipitation multiplier	1.3	1.3		
6. Q = H x C x V x B x S	340557	24024		
TOTAL (add columns in item 6 above)	364581			

Notes:

1. H = Households. If you do not know the number of households, estimate the number by dividing the population of the area by 3.

2. C = Hurricane Category	<u>Category</u>	<u>C =</u>
	1	2
	2	8
	3	26
	4	50
	5	80

3. V= Vegetative Multiplier	<u>Vegetative Cover</u>	<u>V =</u>
	None	1
	Light	1.1
	Medium	1.3
	Heavy	1.5

4. B = Business/Commercial Density Multiplier	<u>Density</u>	<u>B =</u>
	Light	1.0
	Medium	1.2
	Heavy	1.3

5. S = Storm Precipitation Multiplier	<u>Precipitation</u>	<u>S =</u>
	None to Light	1.0
	Medium to Heavy	1.3

Tab F

HAZARDOUS STUMP EXTRACTION AND REMOVAL

This Tab contains the following worksheets:

- Attachment 1: Hazardous Stump Worksheet
- Attachment 2: Stump Conversion Table

When a disaster event uproots a tree or stump (i.e., 50% or more of root ball is exposed) on a public right-of-way, improved public property or improved property owned by certain private nonprofit organizations, and the exposed root ball poses an immediate threat to life, public health and safety, FEMA may provide supplemental assistance to remove, transport, dispose, and provide fill for the root cavity of an eligible uprooted tree or stump. The Federal Emergency Management Agency (FEMA) will reimburse applicants reasonable costs for this type of work only when uprooted stumps are more than 24 inches in diameter (measured two feet from the ground), with the consensus of the Applicant and the State, and is approved in advance by FEMA, using the Hazardous Stump Worksheet.

1. If it is necessary to remove an uprooted stump before it can be inspected by FEMA because it poses a threat that must be dealt with immediately, the applicant must submit documentation, to FEMA including photographs, that establishes its location on public property, specifics on the threat, stump diameter measured two feet up from the trunk from the ground, quantity of material to fill the hole, and any special circumstances.
2. FEMA will reimburse applicants for extraction, transport and disposal of stumps with a diameter of 24 inches or smaller at the unit cost rate for regular vegetative debris, using the attached Stump Conversion Table; as such stumps do not require special equipment.
3. FEMA will reimburse applicants at the unit cost rate (usually cubic yards) for normal debris removal for all stumps, regardless of size, placed on the rights-of-way by others (i.e., contractors did not extract them from public property or property of eligible Private Non-Profit organization). In such instances, applicants do not incur additional cost to remove these stumps because the same equipment that is used to pick up "regular" debris can be used to pick up these stumps.
4. If an applicant incurs additional costs in picking up large stumps (over 24 inches in diameter) from right-of-way, it should complete the Hazardous Stump Worksheet and present documentation to FEMA in advance for consideration.
5. Stumps with less than 50% of their root ball exposed should be cut flush at ground level and the cut portion included with regular vegetative debris.
6. Straightening or bracing of trees is eligible for reimbursement if it is less costly than removal and disposal. Applicant must provide a cost analysis showing cost effectiveness.

Hazardous Stump Worksheet

Applicant: _____

Date: _____

Applicant Representative: _____

Signature: _____

FEMA Representative (if available) _____

Signature: _____

State Representative (if available): _____

Signature: _____

No.	Physical Location (i.e. Street address, road, cross street, etc.)	Description of Hazard (ROW, Park, etc.)	Hazard		GPS uncorrected error 00.000000		Tree Size (Diameter)	Eligible		Take for FEMA Samples	Comments (See attached sketch photo, etc.)
			Yes	No	Latitude (N)	Longitude (W)		Yes	No		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Tab F Attachment 1

Tab F Attachment 2

Stump Conversion Table

Diameter to Volume Capacity

The quantification of the cubic yards of debris for each size of stump in the following table was derived from FEMA field studies conducted throughout the State of Florida during the debris removal operations following Hurricanes Charley, Frances, Ivan and Jeanne. The following formula is used to derive cubic yards:

$$\frac{[(\text{Stump Diameter}^2 \times 0.7854) \times \text{Stump Length}] + [(\text{Root Ball Diameter}^2 \times 0.7854) \times \text{Root Ball Height}]}{46656}$$

0.7854 is one-fourth Pi and is a constant.

46656 is used to convert cubic inches to cubic yards and is a constant

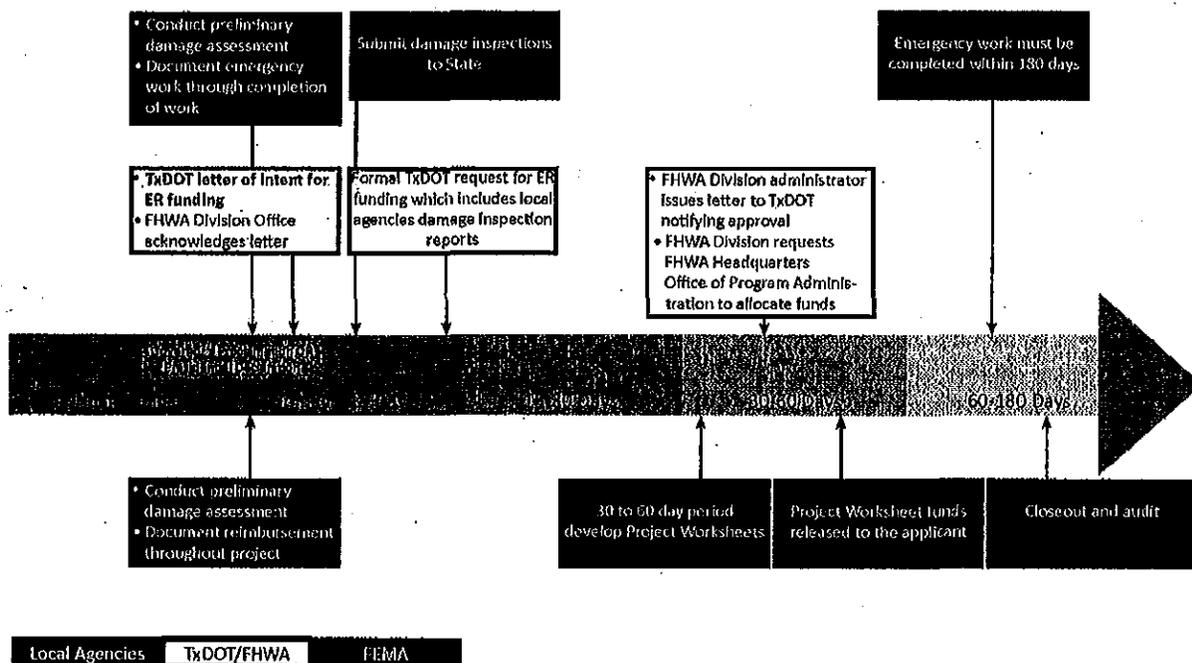
The formula used to calculate the cubic yardage used the following factors, based upon findings in the field:

- Stump diameter measured two feet up from ground
- Stump diameter to root ball diameter ratio of 1:3.6
- Root ball height of 31"

Stump Diameter (Inches)	Debris Volume (Cubic Yards)	Stump Diameter (Inches)	Debris Volume (Cubic Yards)
6	0.3	46	15.2
7	0.4	47	15.8
8	0.5	48	16.5
9	0.6	49	17.2
10	0.7	50	17.9
11	0.9	51	18.6
12	1	52	19.4
13	1.2	53	20.1
14	1.4	54	20.9
15	1.6	55	21.7
16	1.8	56	22.5
17	2.1	57	23.3
18	2.3	58	24.1
19	2.6	59	24.9
20	2.9	60	25.8
21	3.2	61	26.7
22	3.5	62	27.6
23	3.8	63	28.4
24	4.1	64	29.4
25	4.5	65	30.3
26	4.8	66	31.2
27	5.2	67	32.2
28	5.6	68	33.1
29	6	69	34.1
30	6.5	70	35.1
31	6.9	71	36.1
32	7.3	72	37.2
33	7.8	73	38.2
34	8.3	74	39.2
35	8.8	75	40.3
36	9.3	76	41.4
37	9.8	77	42.5
38	10.3	78	43.6
39	10.9	79	44.7
40	11.5	80	45.9
41	12	81	47
42	12.6	82	48.2
43	13.3	83	49.4
44	13.9	84	50.6
45	14.5		

Appendix 3 to Annex K

Following a declared disaster, there are two major federal funding processes available to local governments with disaster related costs on public roads: the Federal Highway Administration (FHWA) Emergency Relief (ER) program and the Federal Emergency Management Agency (FEMA) Public Assistance (PA) program. The City of Beaumont will be required to manage both funding sources and maintain proper documentation to receive maximum reimbursement.



Appendix 3 to Annex K

The FHWA ER and FEMA PA programs reimburse for disaster debris costs. The following guidelines must be used during debris operations:

- The applicant must separate quantities of debris eligible for FHWA ER from quantities eligible for FEMA PA on the respective grant applications.
- FEMA does not reimburse for items eligible under the FHWA ER program.
- FEMA pays for subsequent passes on federal aid roadways if not funded under the FHWA ER program.
- FHWA reimburses 100 percent for first pass on federal aid eligible roadways for work completed in the first 180 days.

Roadways and bridges on a federal-aid roadway that are damaged as a direct result of an approved natural disaster are eligible for reimbursement through the FHWA ER program. Eligible costs include:

- Local agency labor, both regular and overtime
- Local agency equipment, at in-house equipment rates, if available.
- Rented equipment, materials, supplies

To be eligible for reimbursement, detailed records of the direct costs incurred at a site must be maintained and submitted. The following section provides details on documentation for emergency repairs.

Force Account Documentation

- Emergency Relief Spreadsheet:** The ER spreadsheet lists the repair work that has been completed under FHWA guidelines and is being submitted for reimbursement.
- Program of Projects: Description of Emergency Repairs** should include the type and extent of damage as well as the estimated emergency repair costs.
- Emergency repair justification:** Details supporting that the work classifies as emergency work and is eligible for FHWA ER funding.
- Location:** The specific location and type of federal-aid roadway, including mileposts where available.
- Photos:** Photos to document the before and after emergency repairs.
- Labor, equipment, and materials:** Detailed records regarding labor hours, equipment, and materials must be recorded. Labor, equipment, and materials documented must be associated with emergency work performed on federal-aid roads. Labor hours must include name of employees, titles, hourly rates, and fringe benefits. Equipment hours must include description of equipment including manufacturer, model number, and capacity (volume, horsepower, etc.). Materials must include description and quantity.

Contracted Work Documentation

- Emergency Relief Spreadsheet:** The ER spreadsheet lists the repair work that has been completed under FHWA guidelines and is being submitted for reimbursement.
- Program of Projects: Description of Emergency Repairs** should include the type and extent of damage as well as the estimated emergency repair costs.
- Contracts:** Documentation supporting the contracted work used to perform emergency repairs.

Documentation must include contracts as well as documentation supporting that the contracts were competitively bid, solicited, or negotiated and meet FHWA ER funding contract requirements.

- Location: Document the specific location and type of federal-aid roadway, including mileposts where available.

- Photos: Photos to document the before and after emergency repairs.

- Documentation supporting payment: Documentation supporting that work performed by the contractor was on federal-aid roadways and was complete pursuant to the scope of work. Examples of supporting documentation include time and materials tickets that support contractor labor hours, equipment, and materials.

- Proof of payment: Contractor invoices and copies of checks to document payment to the contractor.

Debris Removal and Disposal Considerations:

- Must be able to segregate debris costs attributable to federal and nonfederal-aid roadways
- Permissible to pro-rate debris monitoring and site-related costs between federal and federal-aid roadways
- First pass completion documentation
- Environmental permitting of disposal sites is required

The following section provides details on documentation for permanent repairs.

- Damage Survey Summary Report (DSSR): The DSSR summarizes the damage assessment and provides information and documentation to support that the emergency repairs are eligible for funding under the FHWA ER program.

- Project approval: Documentation supporting approval of project for FHWA ER funding by FHWA division administrator.

- Environmental Review: Documentation supporting that the project underwent applicable environmental review (NEPA).

- Contracts: Documentation must include contracts as well as documentation supporting that the contracts were competitively bid, solicited, or negotiated and meet FHWA ER funding contract requirements.

- Location: The specific location and type of Federal-aid highway, including mileposts where available.

- Photos: Photos to document the before and after emergency repairs.

- Documentation Supporting Payment: Documentation supporting that work performed by the contractor was on Federal-aid roads and was complete pursuant to the scope of work. Examples of supporting documentation include time and materials tickets that support contractor labor hours, equipment, and materials.

- Proof of Payment: Contractor invoices and copies of checks to document payment to the contractor.

Following a disaster TxDOT will upload the most current FHWA roadway classification maps to an FTP directory. This directory can be found at <ftp://ftp.dot.state.tx.us/pub/txdot-info/tpp/functionalclass/>.

Appendix 4 to Annex K

Special Considerations Questionnaire

1. Worksheet 8 is used to document key considerations for each damaged facility.
2. Worksheet 9 provides an "all facility" reporting spreadsheet which can then be broken down by staff into individual project sheets.

Worksheet 8

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
SPECIAL CONSIDERATION QUESTIONS

O.M.B. NO. 1660-0017
Expires October 31, 2008

APPLICANT

PAID NO.

DATE

PROJECT NAME

PROJECT NO.

LOCATION

Form must be filledout - for each project.

1. Does the damaged facility or item of work have insurance and/or is it an insurable risk? (e.g., buildings, equipment, vehicles, etc.)

Yes No Unsure

Comments

2. Is the damaged facility located within a floodplain or coastal high hazard area/or does ti have an impact on a floodplain or wetland?

Yes No Unsure

Comments

3. Is the damaged facility or item of work located within or adjacent to a Coastal Barrier Resource System Unit or an Otherwise Protected rea?

Yes No Unsure

Comments

4. Will the proposed facility repairs/reconstruction change the pre-disaster condition? (e.g., footprint, material, location, capacity, use or function)

Yes No Unsure

Comments

5. Dose the applicant have a hazard mitigation proposal or would the applicant like technical assistance for a hazard mitigation proposal?

Yes No Unsure

Comments

6. Is the damaged facility on the National Register of Historic Places or the state historic listing? Is it older than 50 years? Are there other, silliar buildings near the site? Yes No Unsure

Comments

7. Are there any prislne or undisturbed areas on, or near, the project site? Are there large tracts of forestland?

Yes No Unsure

Comments

8. Are there any hazardous materials at or adjacnt to the damaged facility and/or item of work?

Yes No Unsure

Comments

9. Are there any other environmental or controversial issues associated with the damaged facility and/or item of work?

Yes No Unsure

Comments

Worksheet 9

Location Name	*Street Address	*Real Property Value (\$)	Damage observed/reported
AIRPORT SOUTH HANGER	455 KEITH ROAD	550,000	
AIRPORT TERMINAL	455 KEITH ROAD	675,000	
AIRPORT T-HANGER A	455 KEITH ROAD	600,000	
AIRPORT T-HANGER B NEW	455 KEITH ROAD	600,000	
AIRPORT T-HANGER C	455 KEITH ROAD	360,000	
ALICE KEITH PARK COMMUNITY CENTER	4084 REED (AKA 4050 REED)	350,000	
ALICE KEITH PARK POOL/FENCE/AREA LIGHTS	4070 REED	550,000	
ANIMAL SHELTER	1884 PINE	650,000	
ATHLETIC COMPLEX TENNIS PRO SHOP	8400 COLLEGE	200,000	
ATHLETIC COMPLEX #1 BLDG.	8400 COLLEGE	150,000	
ATHLETIC COMPLEX #1 FENCE	8400 COLLEGE	100,000	
ATHLETIC COMPLEX #1 FIELD LIGHTING	8400 COLLEGE	300,000	
ATHLETIC COMPLEX #2 BLDG.	8400 COLLEGE	160,000	
ATHLETIC COMPLEX #2 FENCE	8400 COLLEGE	100,000	
ATHLETIC COMPLEX #2 LIGHTING	8400 COLLEGE	300,000	
ATHLETIC COMPLEX #3 BLDG.	8400 COLLEGE	150,000	
ATHLETIC COMPLEX #3 FENCE	8400 COLLEGE	100,000	
ATHLETIC COMPLEX #3 LIGHTING	8400 COLLEGE	300,000	
ATHLETIC COMPLEX #4 BLDG	8400 COLLEGE	250,000	
ATHLETIC COMPLEX #4 FENCE	8400 COLLEGE	100,000	
ATHLETIC COMPLEX #4 LIGHTING	8400 COLLEGE	300,000	
ATHLETIC COMPLEX TENNIS COURT FENCE	8400 COLLEGE	43,700	
ATHLETIC COMPLEX TENNIS COURT FENCE	8400 COLLEGE	43,700	
ATHLETIC COMPLEX BASKETBALL COURT COVER	8400 COLLEGE	75,000	
BABE ZAHARIAS JET	1750 E. IH10	25,000	
BABE ZAHARIAS MUSEUM	1750 E. IH10	400,000	
BABE ZAHARIAS RESTROOMS & PAVILION	1750 E. IH10	225,000	
BEAUMONT YACHT CLUB	1500 PINE (AKA MARINA DRIVE)		
BPD OPERATIONS OFFICE	5250 WASHINGTON	800,000	
BUILDING SERVICES ADMIN OFFICE	1848 PINE ST.	500,000	
BUILDING SERVICES CARPENTER SHOP	1848 PINE ST.	500,000	
BUILDING SERVICES ELECTRICAL SHOP & WAREHOUSE	1848 PINE ST.	825,000	
BUILDING SERVICES ELECTRICAL STORAGE BLDG.	1848 PINE ST.	50,000	
BUILDING SERVICES PAINT SHOP & STORAGE BLDG.	1848 PINE ST.	250,000	
BUILDING SERVICES SPRAY BOOTH	1848 PINE ST.	75,000	
CENTRAL PARK TENNIS COURTS/LIGHTING/FENCING	2925 FANNIN	120,000	
CENTRAL PARK COMMUNITY BLDG	2925 FANNIN	800,000	
CITY HALL	801 MAIN	16,000,000	
CIVIC CENTER	701 MAIN	25,000,000	
COLLIERS FERRY RESTROOM	5390 PINE STREET	110,000	
COLLIERS FERRY SHORE PAVILION	5390 PINE STREET	60,000	
COLLIERS FERRY SHORE PAVILION	5390 PINE STREET	60,000	
COTTONWOOD PARK BASKETBALL COVER	200 COTTONWOOD	90,000	
CVB BUILDING	505 WILLOW	1,300,000	
EMS STATION #3	3199 AVE. A	265,000	
EMS STATION / ENV. HEALTH	2870 LAUREL	250,000	
FAIR PARK ANIMAL BARN	2800 GULF	400,344	
FAIR PARK ART LEAGUE OFFICE/DISPLAY	2833 GULF	208,300	
FAIR PARK ART LEAGUE CLASSROOM/DISPLAY	2833 GULF	242,000	

FAIR PARK HARVEST CLUB	FAIR PARK HARVEST CLUB	1,280,900
FAIR PARK HARVEST CLUB STORAGE BUILDING	2701 F GULF ST.	19,500
FAIR PARK OFFICE BLDG	2338 GULF ST.	450,000
FIRE ADMINISTRATION BUILDING	402A WALNUT	4,300,000
FIRE MAINTENANCE SHOP	1125 ARCHIE	1,600,000
FIRE STATION NO. 1	747 COLLEGE	2,500,000
FIRE STATION NO. 1 STORAGE BUILDING	747 COLLEGE	80,000
FIRE STATION NO. 10	3855 WASHINGTON	575,000
FIRE STATION NO. 11	2185 SABINE	378,200
FIRE STATION NO. 14	8250 OLD VOTH ROAD	624,000
FIRE STATION NO. 2	4495 RONTON	146,900
FIRE STATION NO. 3	805 WOODROW	622,600
FIRE STATION NO. 4	1305 W. LUCAS	647,000
FIRE STATION NO. 5	6375 WALDEN ROAD	622,600
FIRE STATION NO. 6	1880 S. MAJOR DR	582,200
FIRE STATION NO. 7	1710 MCFADDIN	388,800
FIRE STATION NO. 8	6297 HIGHWAY 105	600,000
FIRE STATION NO. 9	7010 GLADYS	600,000
FIRE TRAINING BFR DIVISION OFFICE BLDG	600 Marina Drive	165,000
FIRE TRAINING BFR DIVISION STORAGE BLDG	600 Marina Drive	10,200
FIRE TRAINING MAINTENANCE SHOP	600 Marina Drive	86,000
FIRE TRAINING BFR DIVISION OLD OFFICE/STORAGE	600 Marina Drive	80,000
FIRE TRAINING-PAVILION	600 Marina Drive	110,000
FIRE TRAINING-EQUIPMENT BUILDING	600 Marina Drive	97,000
FIRE TRAINING-RESCUE BUILDING	600 Marina Drive	160,000
FIRE TRAINING SMOKEHOUSE	600 Marina Drive	55,000
FIRE TRAINING-FIRE EXTINGUISHER BLDG.	600 Marina Drive	68,000
FIRE TRAINING STANDBY GENERATOR/CANOPY	600 Marina Drive	16,000
FIRE TRAINING-SPRINKLER SYSTEMS CLASSROOM	600 Marina Drive	126,000
FIRE TRAINING-STRUCTURE FIRE PROJECT BUILDING	600 Marina Drive	130,000
FIRE TRAINING-22 CLASSROOM	600 Marina Drive	60,000
FIRE TRAINING-ENGINE STALL	600 MARINA	45,000
FIRE TRAINING-PUMPER CLASSROOM	600 Marina Drive	91,000
FIRE TRAINING-EOC CLASSROOM	600 Marina Drive	160,000
FIRE TRAINING-DRILL TOWER	600 Marina Drive	507,000
FLEET MAINTENANCE COMPLEX	4955 LAFIN	2,100,000
FLEET MAINTENANCE #2 A-maint	4955 LAFIN RD.	690,000
FLEET MAINTENANCE #3 FUEL ISLAND/CANOPY	4955 LAFIN RD.	180,000
GILBERT BUILDING	330 BOWIE	1,447,500
HEALTH ADMIN & ANNEX BLDG	950 WASHINGTON BLVD.	2,000,000
HEALTH DEPT CLASSROOM BUILDING	2805 PARK	56,900
HEALTH DEPT HS1 CLINIC	950 WASHINGTON BLVD.	750,000
HEALTH DEPT HS2 CLINIC	950 WASHINGTON BLVD.	750,000
HENRY HOMBERG PRO SHOP	5940 Bebe Zaharias Drive	741,000
JEFFERSON THEATRE	345 Fannin	7,000,000
JULIE ROGERS THEATRE	725 PEARL	9,000,000
J.P. RICHARDSON COMMUNITY CENTER	1870 LOUISIANA	277,500
LAMB'S BUILDING	985 ORLEANS	350,500
LANDFILL OFFICE BLDG.	5896 Lafin Road	115,000
LANDFILL TICKET BOOTH	5896 Lafin Road	90,000

SOLID WASTE ADM. OFFICE BDLG	4955 LAFIN RD.	1,900,000
LIBRARY BEAUMONT PUBLIC LIBRARY	800 MAIN & COLLEGE	3,600,000
LIBRARY ELMO WILLARD LIBRARY	3580 E. LUCAS	1,291,500
LIBRARY KCS DEPOT	1205 FRANKLIN	107,800
LIBRARY R C MILLER MEMORIAL LIBRARY	1605 DOWLEN	1,629,100
LIBRARY THEODORE R JOHNS, SR. BRANCH	4255 Fannett	1,696,200
LIBRARY TYRRELL HISTORICAL LIBRARY	895 PEARL	2,800,000
MUNICIPAL COURT BUILDING/911 EMER. OPR. CTR	700 ORLEANS	6,900,000
PARK CHAISON COVERED BASKETBALL COURT	1305 Marriot	75,000
PARK JACOBS PARK WOOD SHELTER	2320 Jacobs	32,000
PARK JACOBS PARK COVERED BASKETBALL COURT	2320 Jacobs	75,000
PARK LIBERIA PARK COVERED BASKETBALL COURT	2342 OLLIE ST.	75,000
PARK LIBERIA PARK SHELTER	2342 OLLIE ST.	20,000
PARK LIBERIA PARK SHELTER	2342 OLLIE ST.	20,000
PARK LIBERIA PARK SHELTER	2342 OLLIE ST.	20,000
PARK LIBERIA PARK WOOD SHELTER (play area)	2342 OLLIE ST.	32,000
PARK MAGNOLIA BATHHOUSE, SWIMMING & WADING POOL	2855 Magnolia	196,700
PARK PIPKIN PARK BUILDING MEMORIAL TEMPLE	1350 Pennsylvania	88,800
PARKS OPERATION FACILITY/COVERED BAYS	1370 LANGHAM	750,000
PARKS OPERATIONS CHEMICAL STORAGE BUILDING	1370 LANGHAM	65,000
PARKS OPERATIONS EQUIPMENT WASH BLDG	1370 LANGHAM	5,000
POLICE STATION	255 COLLEGE	8,400,000
POLICE RANGE HOUSE	4900 LAFIN RD.	385,480
POLICE SHOOT (AKA FIRING) HOUSE	4900 LAFIN RD.	276,362
RADIO COMMUNICATIONS SHOP	620 Marina Drive	324,000
RADIO TOWER 400 FT	1844-1/2 PINE ST.	175,000
RADIO TRANSMITTER STATION/RADIO TOWER	REAR 1832 C PINE ST	225,000
RIVERFRONT PARK CONCESSIONS/RESTROOM	R-801 MAIN	220,000
RIVERFRONT PARK PAVILION	R-801 MAIN	75,000
ROBERTS PARK SHELTER & BASKETBALL COURT	2755 Avenue C	100,000
ROGERS PARK COMMUNITY CENTER	1445 Dowlen	65,700
ROGERS PARK SHELTER & BASKETBALL COURT	1445 Dowlen	36,000
SENIOR CITIZENS BEST YEARS CENTER	780 S. 4TH ST.	2,200,000
SOUTHEAST TX ART MUSEUM	580 MAIN	3,500,000
SPROTT PARK SHELTER & BASKETBALL COURT	2490 VIRGINIA	100,000
STERLING PRUITT ACTIVITY CENTER	2830 GULF STREET	2,800,000
SIGN SHOP/ GAS BARN	2620 E CONCORD RD	350,000
STREET DIVISION GARAGE AND WAREHOUSE	2610 CONCORD RD	800,000
STREET SIGN SHOP STORAGE	2610 CONCORD RD	195,000
STREET DIVISION TRUCK REPAIR	2610 CONCORD RD	216,000
STREET DIVISION TRUCK STORAGE	2610 C CONCORD RD.	140,000
STREETS AND DRAINAGE OFFICE	2610 CONCORD RD	750,000
STREETS AND DRAINAGE ASPHALT TRUCK STORAGE	2610 CONCORD RD	195,000
TEXAS ENERGY MUSEUM	600 MAIN ST.	2,700,000
BEAUMONT TRANSIT OFFICE	550 MILAM	400,000
BEAUMONT TRANSIT SHOP	550 MILAM	1,280,000
BEAUMONT TRANSIT BUS WASH	550 MILAM	180,000
TYRRELL PARK BASKETBALL COURT COVER	5305 TYRRELL PARK ROAD	75,000
TYRRELL PARK CARETAKER'S HOUSE	5305 TYRRELL PARK ROAD	180,000
TYRRELL PARK GARDEN CLUB CENTER	6305 Tyrrell Park Road	1,000,000
TYRRELL PARK GARDEN CENTER MAINT. BLDG	6305 TYRRELL PARK ROAD	125,000
TYRRELL PARK GAZEBO	6305 Tyrrell Park Road	25,000
TYRRELL PARK MOWING TRACTOR COVER	5305 TYRRELL PARK ROAD	15,000

TYRRELL PARK RESTROOMS (NEW)	5305 Tyrrell Park Road	123,800
TYRRELL PARK RESTROOMS (OLD)	6088 BABE ZAHARIAS DR.	80,000
TYRRELL PARK RIDING STABLES & OFFICE	5305 Tyrrell Park Road	153,400
TYRRELL PARK SHELTER HOUSE #1	5305 Tyrrell Park Road	29,883
TYRRELL PARK SHELTER HOUSE #3	5305 Tyrrell Park Road	29,883
TYRRELL PARK SHELTER HOUSE #4	5305 Tyrrell Park Road	29,883
TYRRELL PARK WOOD SHELTER (play area)	5305 TYRRELL PARK ROAD	32,000
TYRRELL PARK WARREN LOOSE CONSERVATORY	5305 Tyrrell Park Road	205,300
WATER DEPT LOEB 1200K 2300 VOLTS GENERATOR / BLDG	3142 Hwy 69 South	20,600
WATER DEPT LOEB CHLORINE STORAGE - LUMBERTON	3142 Hwy 69 South	300,000
WATER DEPT LOEB PUMPING STATION INSTUM HOUSE	3142 Hwy 69 South	604,000
WATER DEPT LOEB WELL PUMP STATION #2* - LUMBERTON	3142 Hwy 69 South	160,000
WATER DEPT LOEB WELL PUMP STATION #3 - LUMBERTON	HWY 421 LUMBERTON	160,000
WATER DEPT PRISONS INSTRUMENTATION CONTROL BLDG	6560 Pt Arthur Road	203,000
WATER DEPT PRISONS PUMP STATION	6560 Pt Arthur Road	65,000
WATER DEPT PRISONS WASTEWATER LIFT STATION	6560 Pt Arthur Road	249,000
WATER DEPT PROD 5 MG UNDERGROUND WATER STORAGE	1650 PINE	350,000
WATER DEPT PROD BACKWASH BUILDING	1550 PINE	260,000
WATER DEPT PROD BLOWER BUILDING	1550 PINE	200,000
WATER DEPT PROD CHEMICAL BUILDING	1550 PINE	125,000
WATER DEPT PROD ELECTRICAL PUMP CONTROL BLDG	1680 PINE	414,400
WATER DEPT PROD FILTER STRUCT (10) CONTRL BLDGS (5)	1650 PINE	2,280,300
WATER DEPT PROD GENERATOR BUILDING	1650 PINE	36,000
WATER DEPT PROD MAIN BUILDING	1550 PINE	850,000
WATER DEPT PROD MAINTENANCE BUILDING	1550 PINE	350,000
WATER DEPT PROD ORIGINAL FILTER BUILDING (STORAGE)	1650 PINE	125,000
WATER DEPT PROD PUMP ROOM BUILDING	1680 PINE	350,000
WATER DEPT PROD SECURITY FENCE	1550 PINE	300,000
WATER DEPT PROD SEDIMENTATION BASINS (5)	1550 PINE	500,000
WATER DEPT PUMPING HOUSE 3.5 miles north of Pine	5395 Pine Street	136,152
WATER DEPT PUMPING PLANT	FM 1131	33,892
WATER DEPT PUMPING PLANT GENERATOR BLDG	FM 1131	35,000
WATER DEPT RECL ABOVE GROUND SEWAGE LIFT STATION	8500 TRAM ROAD	32,000
WATER DEPT RECL ABOVE GROUND SEWAGE LIFT STATION	3480 ASTOR & MARTIN SCH	
WATER DEPT RECL BELT PRESS BUILDING	4900 LAFIN RD.	200,000
WATER DEPT RECL BLOWER BUILDING	4900 LAFIN RD.	225,000
WATER DEPT RECL BOAT SHED	4900 LAFIN RD.	32,000
WATER DEPT RECL CATTAIL MARSH CONTROL BLDG & PUMPS	4900 LAFIN RD.	650,000
WATER DEPT RECL CHLORINE BUILDING (CC2)	4900 LAFIN RD.	100,000
WATER DEPT RECL HEADWORKS BUILDING	4900 LAFIN RD.	185,000
WATER DEPT RECL MAINTENANCE SHOP	4900 LAFIN RD.	180,000
WATER DEPT RECL MULTI CONTROL CENTER #2	4900 LAFIN RD.	115,000
WATER DEPT RECL MULTI CONTROL CENTER #3	4900 LAFIN RD.	115,000
WATER DEPT RECL MULTI CONTROL CENTER #4	4900 LAFIN RD.	115,000
WATER DEPT RECL MULTI CONTROL CENTER #5	4900 LAFIN RD.	115,000
WATER DEPT RECL OFFICE BUILDING	4900 LAFIN RD.	300,000
WATER DEPT RECL SECONDARY RECIRCULATION BUILDING	4900 LAFIN RD.	
WATER DEPT RECL (2) PRIMARY, (2) 2ND TRICKLING FILTERS	4900 LAFIN RD.	932,000

WATER DEPT UNDER GROUND SEWAGE LIFT STATION	800 HARRIOT	60,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	297 BLANCHETTE & PEARL	80,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	860 SPINDLETOP	60,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	1592 WALL	53,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	5100 TYRRELL PARK RD	108,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	4903 ARTHUR LANE	53,000	
WATER DEPT UNDER GROUND SEWAGE LIFT STATION	6100 HOLIDAY	60,000	
WATER DEPT W/S ADMIN OFFICE	1350 LANGHAM ROAD #1	1,207,200	
WATER DEPT W/S MAINT	1350 LANGHAM ROAD #2	950,000	
WATER DEPT W/S MAINT EQUIP COVER BAYS SHELTER	1350 LANGHAM ROAD	120,000	
WATER DEPT. WAREHOUSE	1350 LANGHAM ROAD	430,000	
WATER SEWER PUMP STATION	1355 FLORIDA STREET		
WATER TANK ELEVATED 1 MG*	2910 LIBERTY	1,003,000	
WATER TANK ELEVATED 300rG	6550 Pl Arthur Road		
WATER TANK ELEVATED STORAGE 1 MG*	3235 KENNETH	1,003,000	
WATER TANK ELEVATED STORAGE 1 MG*	MUNICIPAL DRIVE	1,293,000	
WATER TANK ELEVATED STORAGE 1.5 MG*	3531 - C E. LUCAS	1,293,000	
WATER TANK GROUND STEEL/CONCRETE 2@ 5MG*	3142 Hwy 69 South	888,260	
WATER TANK GROUND STORAGE 2.6 MG	W. Pl Arthur Rd- PRISONS	520,800	
WETLANDS CONTROL BLDG.	4900 LAFIN ROAD	25,000	