

U. S. House of Representatives  
Committee on Transportation and Infrastructure  
Highway, Transit and Pipelines Subcommittee

Rebuilding Highway and Transit Infrastructure  
on the Gulf Coast following Hurricane Katrina – State and Local Officials

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## **Introduction**

Hurricane Katrina was the third major storm, along with Hurricanes Ivan and Dennis, to directly impact Alabama in less than twelve months. While the damage to Alabama's highway system was not as severe as in Mississippi or Louisiana, there were a number of infrastructure challenges that presented themselves. Even though ALDOT had previously experienced several large hurricanes over the years, having three major hurricanes in such a short period of time focused attention on those operational areas that worked well and those that did not.

## **Lessons Learned**

### **Benefit of Expedited Purchasing Procedures**

Sections 41-16-23 and 39-2-2(e) of the Code of Alabama permit state agencies to streamline the purchasing process by waiving the requirement for public advertisement for bids. Provided that the requirements of these two sections are satisfied, there is no need to delay emergency contracting actions until an Emergency Declaration has been issued. During Hurricane Katrina and prior storms, this provision has repeatedly proven to be a very valuable tool for obtaining materials, equipment and contract services in a very short amount of time.

### **Close Participation with FHWA Division Office**

During and immediately after Hurricane Katrina, key personnel from the FHWA Alabama Division office were present with ALDOT at each meeting in which major decisions were being made. Questions on eligibility for Emergency Relief (ER), project scopes and limits, methods of contract award and the like were quickly answered which helped to eliminate delays and move recovery efforts along. This level of participation and support was not unusual – it was representative of FHWA's response that ALDOT has come to expect during both disaster and non-disaster periods.

## **Susceptibility of I-10 to Disruption**

As outlined later in this document, there was a time during the storm when the Cochrane Bridge was out of commission, US-90 across Mobile Bay was closed due to flooding and I-10 tunnels were subject to being closed due to the imminent risk of flooding. Prior “worst-case” plans did not include the possibility that a single event could close the I-10 corridor and all of its existing detour routes. Given the volume of evacuation and relief traffic that used the I-10 corridor before and after the storm, loss of that route would have had a crippling regional effect.

## **Proclamations for Oversize and Overweight Vehicles**

At the request of Mr. Kenneth Burris of FEMA, Governor Riley issued a letter on September 3, 2005, that waived the enforcement of laws governing the movement of mobile and modular homes and all requirements for escort vehicles for ninety day period. A very limited number of routes were identified in that letter for which the waiver did not apply. The waiver facilitated the transport of mobile and modular homes through Alabama into areas of Louisiana and Mississippi where housing was desperately needed. If such waivers are required again, it is very important that state DOTs are able to safely route the movement of these vehicles (e.g., issuing no-cost permits) and to specify that certain route segments require escort vehicles.

Governor Riley also issued a proclamation on September 9, 2005, which expedited the movement of vehicles transporting emergency equipment, services and supplies, tree and debris removal equipment, damaged timber, storm-related debris, building and construction materials or temporary emergency buildings and their components. Depending on the total number and grouping of axles, these vehicles could weigh up to 95,000 lbs except on restricted routes as identified in an accompanying letter and set of maps from ALDOT. Governor Riley extended this proclamation by reissuing it for an additional thirty day period beginning October 7, 2005. Being able to issue a “routing map” with the proclamation was very helpful in keeping overweight vehicles off posted and deficient bridges around the state (see Exhibit 3).

## **Fuel Shortages**

The shortage of fuel after Hurricane Katrina caused a series of problems not experienced before. ALDOT had long supplied fuel to many of the other state agencies by providing access to fuel pumps at district and division offices around the state. When storm-related shortages drove up prices so quickly, fuel suppliers who had delivery contracts with ALDOT elected to break them. ALDOT could still buy fuel at market prices but only if suppliers could be found. A district whose tanks were approaching empty but had not yet scheduled a shipment of fuel found themselves unable to keep their own equipment running, much less provide fuel to agencies such as Corrections,

Public Safety, Environmental Management, etc. It became necessary for ALDOT to identify the few agencies that could be supported and notify the remaining agencies that they were now responsible for securing their own fuel sources. In addition, ALDOT was forced to restrict many of its routine operations in order to conserve existing fuel stockpiles.

As a result of this storm, ALDOT identified three major needs concerning fuel. The expansion of storage capacity at district and division fuel stations is imperative. Improving the distribution of fuel at the pump, especially the ability to specify the agencies and the individuals within those agencies who have access to fuel, is extremely important. Lastly, ALDOT's fuel contracts are being restructured such that suppliers do not have a financial incentive to break those contracts when fuel prices spike.

## **Communications**

ALDOT operates a two way radio network that has traditionally been used for all operational communication in the field. Over the last several years, the availability of cell phones and "push to talk" phone units have reduced the reliance on the traditional radio network to the extent that many ALDOT vehicles no longer possess two way units. Cellular based communications have a number of advantages over two way radios as long as the cellular network is functioning. ALDOT's experience during Hurricane Katrina illustrated that cellular network problems in a specific area could create significant communication problems in a much larger portion of the state. ALDOT has identified the development of a backup communication network as a high priority.

## **Debris Removal Policies**

Hurricanes generate large volumes of debris. The removal of that debris has increasingly become a matter of contention between state, county and municipal agencies. Programs such as Emergency Relief (administered by FHWA) and Public Assistance (administered by FEMA) have different rules regarding the type of debris removal that is eligible for reimbursement. ALDOT's infrastructure is almost entirely covered by ER. Debris removal on some county routes is covered by ER and by FEMA on others. Within municipal limits where state, county and city routes often coexist, determination of coverage (e.g., ER vs FEMA) is often problematic. At times the effort required to resolve coverage issues is significant enough to impact the ability of key personnel to manage ongoing recovery issues. ALDOT, FHWA and Alabama EMA have identified the need to cooperatively educate local governments and agencies regarding the appropriate roles of ER and FEMA public assistance programs. ALDOT and FHWA will jointly establish and publish policies that allow local agency representatives to more easily resolve coverage and eligibility issues.

## Summary of Damage

### **Roadways**

Routes that are within the range of tidal surges are susceptible to being damaged in a variety of ways. Layers of sand, up to three or four feet thick, are often deposited on roadways. Shoulders are often scoured or eroded during the storm or immediately afterwards when the water recedes to its source. When tidal surges are sufficiently large, roadways are often partially or completely breached. Sections of roadways near bridges and culverts are especially susceptible to these breaches. Some of these breached sections can be several miles long. Timely post-storm damage assessments and responses are made more difficult by these forms of damage.

During Hurricane Katrina, a number of coastal routes were damaged in the ways that were previously described. Among these routes are the following:

- SR-182 (Beach Road), Baldwin County.
- SR-180 (Fort Morgan Road), Baldwin County.
- SR-193 (Dauphin Island Parkway), Mobile County.

Traffic control devices are frequently damaged by high winds during storm events. In Hurricane Katrina, road signs and traffic signals were damaged over several counties in ALDOT's Eighth and Ninth Divisions, some of which were well inland (see Exhibit 1).

Downed trees along and across roadways represent the most widely spread form of storm damage. ALDOT's Second, Fifth, Eighth and Ninth divisions, covering fifteen counties, reported debris that was restricting traffic on the roadways or was limiting the availability of recovery zones.

Division personnel are dispatched to key areas to monitor conditions as the storm strength increases. When the winds become too strong, typically around 40 mph, for these personnel to operate safely, they are pre-positioned in safe locations until the storm has sufficiently subsided so they can begin damage assessments and report their findings to their supervisors who prioritize needs and dispatch crews and contractors as needed.

The majority of the emergency repair work was accomplished by a combination of state forces and contract forces paid on a force account basis. These work crews go from site to site reopening roadways and performing emergency repairs. This work includes clearing debris, filling in washouts, removing sand from the roadway and replacing essential signs and signals.

The contractors used for the emergency repairs are selected by the local county and state officials based upon needs and resource availability of the contractors.

## Bridges

Cochrane Bridge. The Cochrane Bridge is a cable-stayed bridge that carries US-90 (SR-16) over the Mobile River in Mobile County. An offshore platform was in drydock at a local shipyard, approximately one-half mile away. The platform broke free during the storm and was driven upriver by the wind. It hit the western end of the main span of the bridge and was held there for a number of hours until the water level fell sufficiently to allow the platform to move.

ALDOT positioned structural engineers on site within hours, even before the storm had completely abated, and an immediate inspection was performed on those portions of the bridge that could be accessed safely. The remainder of the bridge was inspected the next morning. The resulting damage was in the form of spalled and broken concrete (most significantly in the high stress area around two of the cable anchor blocks), broken and misaligned main bearings, damaged cable systems and damaged pier protection cells. It was determined that one lane in each direction could be reopened to traffic. However, permitted oversize and overweight loads were deemed unable to cross the bridge and were diverted onto a sixty-five mile detour.

A consultant was selected for the design of the repair work and for the construction inspection services. The design agreement both design and construction inspection services. The construction project was awarded as a low-bid contract for the amount of \$1,740,000. Repairs are expected to be completed by February 2006.

Mid Bay Crossing Ramp Bridge. The bridge carrying the ramp from eastbound US-90 to eastbound I-10 had five spans damaged by the storm. These spans were repeatedly lifted up and dropped by the combination of storm tidal surge and wave action. During the course of these lift/drop cycles, the girder ends were severely damaged and the girders were significantly overstressed at their mid-span point. These five spans were damaged to the point that they are not repairable and will be replaced.

The design of the replacement spans is being accomplished by state forces. The construction project will be awarded as a low-bid contract. The current estimate for the construction project is \$400,000.

Tensaw River Bridge. The bridge carrying US-90 over the Tensaw River was out of service for several days after the storm. Both end slabs were undermined and required grouting to be restored to their proper position. Approximately 700 ft of shoulder and one lane of the roadway was lost due to tidal surge.

Bayou La Batre Lift Span Bridge. This structure carries SR-188 over Bayou La Batre in Mobile County. The lower floor of the control room was flooded to a depth of five feet which submerged several transformers. The bridge was not operable until those transformers were replaced. The computer that the

bridge operator uses to raise and lower the bridge was damaged from electrical surges generated during the transformer failure.

## **Tunnels**

Bankhead Tunnel. Three of the pumps at the Bankhead tunnel failed during the storm. Due to the high head created by the storm surge in Mobile Bay, water infiltrated the tunnel at numerous locations which overwhelmed the pumps and caused their failure. Due to the low elevation of its entrance portal, the Bankhead Tunnel had already been closed to minimize the impact of the expected flooding from the tidal surge.

Wallace Tunnel. The Wallace Tunnel carries I-10 underneath the Mobile River. The discharge line on one of sump pumps at the west portal of the tunnel ruptured and acted as a drain line that allowed water from Mobile Bay to pour into the tunnel sump. When the sump overflowed, the pump motor room became inundated and all the pumps at that portal stopped operating. During the remainder of the storm, ALDOT personnel from the Ninth Division worked very hard to keep the tunnel open to traffic. With the Cochrane Bridge being out of service at that time, losing the Wallace tunnel would have meant that I-10 traffic could not pass through Mobile.

## **Miscellaneous**

Ft. Morgan Ferry. ALDOT operates the M/V Ft. Morgan as a ferry across Mobile Bay. Passengers are transported between Fort Morgan in Baldwin County and Dauphin Island in Mobile County. Prior to the arrival of Hurricane Katrina, the M/V Ft. Morgan was moved to a shipyard berth in Mobile. Nevertheless, the storm surge was high enough to cause the ferry to be deposited on land, damaging it in the process. The landing at Fort Morgan was also damaged due to storm-induced scour.

## **ITS system on I-10 bridges**

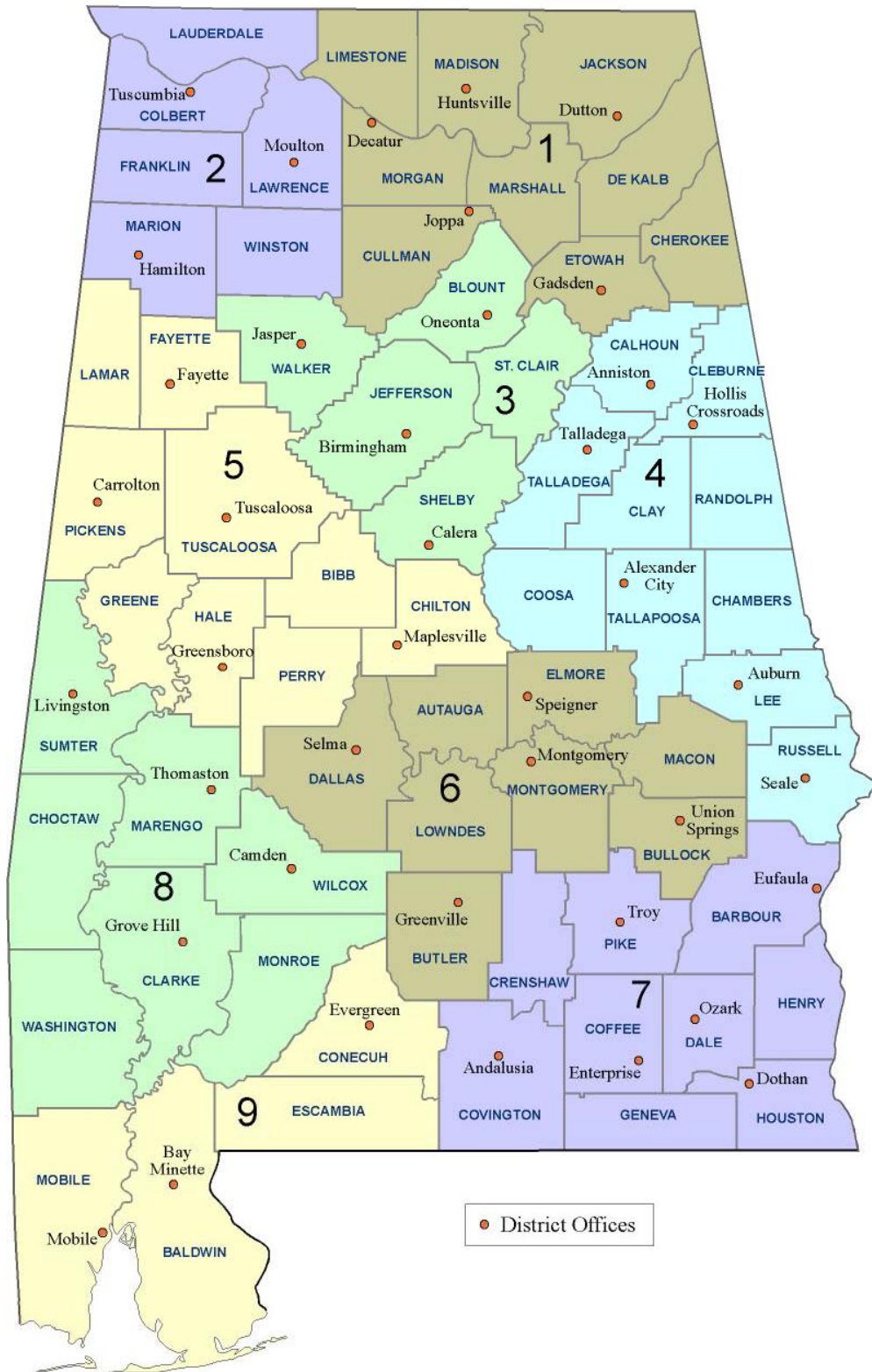
An ITS system was in place and operational on the I-10 Bayway bridge. During the storm, a number of variable message signs, cameras, fiber optic lines, weather stations and visibility sensors were severely damaged. Several permanent changeable message signs, cameras, and a significant length of fiber-optic cable was damaged and destroyed. The design work is being accomplished by a consultant. The construction project will be awarded as a low-bid contract. The current estimate for the construction project is \$6,100,000.

**Please also refer to Exhibit 2.**

**End of Statement**

Exhibit 1

# Department of Transportation Divisions



Produced by Cartographic Research Lab  
University of Alabama

## Exhibit 2

Div 2 Damage Summary for Emergency Relief - Hurricane Katrina						
Congr. District	County	Report	Location	Damage	Estimated Total	Totals
5	Colbert	1	County Federal-Aid Routes	Trees and Debris Down	\$11,395	
Colbert County Total						\$11,395
5	Lawrence	1	County Federal-Aid Routes	Trees and Debris Down	\$49,253	
Lawrence County Total						\$49,253
4	Franklin	1	County Federal-Aid Routes	Trees and Debris Down	\$9,743	
Franklin County Total						\$9,743
5 4 5 5 4 4	Div. 8	8-1	Federal-Aid Routes	Trees and Debris Down	\$97,000	
					Colbert \$5,500	
					Franklin \$20,000	
					Lauderdale \$5,500	
					Lawrence \$20,000	
					Marion \$23,000	
					Winston \$23,000	
2nd Division Total						\$167,391

Div 5 Damage Summary for Emergency Relief - Hurricane Katrina						
Congr. District	County	Report	Location	Damage	Estimated Total	Totals
7	Greene	1	County Federal-Aid Routes	Trees and Debris Down	\$22,050	
Greene County Total						\$22,050
4/6/7	Div. 5	5-1	Federal-Aid Routes	Trees and Debris Down	\$400,000	
5th Division Total						\$422,050

Div 8 Damage Summary for Emergency Relief - Hurricane Katrina						
Congr. District	County	Report	Location	Damage	Estimated Total	Totals
1/7	Clarke	1	County Federal-Aid Routes	Trees and Debris Down	\$36,000	
Clarke County Total						\$36,000
7	Choctaw	1	County Federal-Aid Routes	Trees and Debris Down	\$200,000	
Choctaw County Total						\$200,000
7	Marengo	1	County Federal-Aid Routes	Trees and Debris Down	\$57,600	
Marengo County Total						\$57,600
7	Sumter	1	County Federal-Aid Routes	Trees and Debris Down	\$200,000	
Sumter County Total						\$200,000
1	Washington	1	County Federal-Aid Routes	Trees and Debris Down	\$141,416	
Washington County Total						\$141,416
7 1/7 7 1 7 7 1	Div. 8	8-1	Federal-Aid Routes	Trees and Debris Down	\$271,325	
					Choctaw \$54,887	
					Clarke \$13,785	
					Marengo \$32,000	
					Monroe \$18,500	
					Sumter \$135,850	
					Wilcox \$6,500	
					Washington \$10,003	
1/7	Div. 8	8-2	Federal-Aid Routes	Signs and Signals Damaged	\$35,000	
8th Division Total						\$941,341



## Exhibit 2

Division 9 Damage Summary for Emergency Relief - Hurricane Katrina						
Congr. District	County	Report	Location	Damage	Estimated Total	Totals
1	Baldwin	1	SR-182 from MP 0.0 to MP 9.0 east of SR-59	3'-4' of Sand, Roadway & Bridge Approach Washout, Guardrail, Signals & Signs Damaged	\$1,264,141	
	Baldwin	2	SR-180 from MP 0.0 to MP 8.0 and at MP 23.0 to MP 25.0	Shoulder Washout, 3'-4' of Sand, Ferry Dock damaged	\$281,664	
	Baldwin	3	US-90 at Tensaw River Bridge, approx MP 37.3	Roadway Bridge Approach washed out on East end, Bridge End Slab Undermined on West end, Guardrail destroyed	\$350,060	
	Baldwin	4	I-10 at Middle Bay Crossing Eastbound On-Ramp at MP 30.22	Four Bridge Spans Displaced by Storm Surge	\$402,500	
	Baldwin	5	US-90 in Lillian at the State Line	Storm Surge Caused Erosion/Scour at Abutment #1	\$6,297	
	Baldwin	6	US-90 at MP 46.0	Washout at Box Culvert	\$14,231	
	Baldwin	7	I-10 at MP 58.5 WBR	Washout at Box Culvert	\$7,332	
	Baldwin	8	Federal-Aid Routes	Trees and Debris Down	\$15,000	
	Baldwin	9	County Federal-Aid Routes	Damage to Traffic Signs	\$34,500	
<b>Baldwin County Total</b>						<b>\$2,375,725</b>
1	Mobile	1	SR-193 from MP 4.0 to MP 6.0	Roadway and Shoulder Damage on both sides of Heron Bay Bridge	\$643,150	
	Mobile	2	Dauphin Island, Bienville Blvd approx 4.0 miles	3'-4' of Sand, Roadway Washout, Outfall Piping from Roadway Ditches Damaged	\$1,519,150	
	Mobile	3	SR-163 at the Bridge Over Dog River	Erosion and Scour Damage	\$22,836	
	Mobile	4	Tunnell Maintenance Building	Roof, Ceiling and Insulation Damage to Portion of Building	\$91,540	
	Mobile	5	I-10 Tunnell (Wallace)	Flood Damage to Pump Motors, Electrical Circuits and Devices, Emergency Pumping Services	\$107,720	
	Mobile	6	SR-188 Draw Bridge	Flood Damage to the Central room Transformer, Impact Damage by Large Boat	\$19,883	
	Mobile	7	US-90 Tunnell (Bankhead)	Flood Damage to Pump Motors, Electrical Circuits and Devices	\$11,857	
	Mobile	8	Interstate and State Routes	Trees and Debris Down	\$777,945	
	Mobile	9	County Federal-Aid Routes	Trees and Debris Down, Damage to Traffic Signals & Signs	\$1,829,595	
	Mobile	10	I-10 Byway & Wallace Tunnell	Repair Traffic Management System; Signs & Fiber optic Circuits	\$6,111,799	
	Mobile	11	Cochrane Bridge on US-90 over the Mobile River	Structural Damage from Impact when Oil Derrick Moored Nearby Broke Free	\$2,000,000	
<b>Mobile County Total</b>						<b>\$13,135,475</b>
1	Div. 9	9-1	Federal-Aid Routes (in Baldwin & Mobile Counties)	Signs, Signals & Lighting Damaged	\$1,128,910	
1	Div. 9	2-Sep	Federal-Aid Routes (in Baldwin & Mobile Counties)	Damage to Denied Access Fence and Guardrail	\$34,500	
<b>9th Division Total</b>						<b>\$16,674,610</b>

**Grand Total: \$18,205,392**

Exhibit 3

