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16. Abstract Project In this report, researchers assess the feasibility of implementing a three-digit (511) traveler information number within Texas. Researchers reviewed implementation efforts in other states, contacted key telephone company representatives and associations to identify major issues, and analyzed possible implementation approaches of a 511 number for TxDOT. Based on this research, the researchers recommended that TxDOT consider the following: <ul style="list-style-type: none"> • TxDOT should consider serving as the lead agency for adoption of the 511 traveler information number in Texas and convert its existing road-condition telephone number to utilize the 511 number. • TxDOT should establish and maintain close contact with the Texas Public Utilities Commission and the Texas Telephone Association to monitor the progress of telecommunication carriers as they work to resolve technical issues regarding 511 implementation. • TxDOT should become involved in the national working group that is developing guidelines regarding the content, consistency, and funding for a 511 system. • The individual TxDOT districts should serve as the facilitator and coordinator of future regional 511 systems in their respective major metropolitan areas. 					
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**FEASIBILITY OF IMPLEMENTING THE 511
NATIONAL TRAVELER INFORMATION NUMBER IN TEXAS**

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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation (TxDOT). This report is not intended to constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. The engineer in charge of the project was Dr. Gerald L. Ullman, P.E. #66876.

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1. INTRODUCTION

Abbreviated dialing codes (N11 phone numbers) allow callers to connect to a location in the phone network that otherwise would only be accessible utilizing a seven- or ten-digit phone number. There are only eight possible N11 codes; thus, they are among the scarcest of numbering resources. The most widely known N11 number is 911, which is used nationwide for emergency services. Other N11 numbers are 311 for non-emergency police and other governmental services, 411 for directory assistance, and 711 for access to Telecom Relay Services (TRS). These easy to remember numbers (compared to a seven- or ten-digit number) facilitate the caller's ability to gain information or receive help.

Currently, travel information such as roadway construction and accident locations is provided by multiple transportation agencies with each having a separate telephone number. In March 1999, the U.S. Department of Transportation (USDOT) filed a petition with the Federal Communications Commission (FCC) for assignment of a nationwide N11 code to be used by state and local governments to deliver travel-related information to the public. On July 21, 2000, the FCC assigned the 511 code to be used for access to traveler information services which includes traffic and transportation information.

NEED FOR RESEARCH

After the FCC assignment of 511, several state agencies throughout the nation, including the Texas Department of Transportation (TxDOT), became interested in the development of a 511 system. However TxDOT, as well as other public agencies within Texas, had a number of concerns about the issues surrounding the implementation of such a system.

Meanwhile, TxDOT research project 7-4951, "Improved ITS Information Network for Incident Management and Travelers," was entering its second year of activity. It was determined that the questions surrounding the national traveler information number were directly relevant to the ongoing activities of that research project. Thus, at the request of the TxDOT, the Texas Transportation Institute (TTI) began the task of assessing the feasibility of implementing 511 in Texas. Issues such as coordination with other agencies, the need for a lead agency in a region, the organizational requirements, the basic framework of a 511 system, costs, and funding were to be investigated.

REPORT ORGANIZATION AND SCOPE

The research conducted under this project is documented in two research reports: 4951-1 "Practices, Technologies, and Usage of Incident Management and Traveler Information Exchange and Sharing in Texas" and 4951-2 "Feasibility of Implementation of the 511 National Traveler Information Number in Texas." Research report 4951-1 presents a review of the practices and technologies being used in the Dallas, Fort Worth, Houston, and San Antonio TxDOT districts for incident management and traveler information exchange and sharing. Research report 4951-2 is contained herein.

The following is a brief description of this report:

- [Chapter 2](#) contains a review of the progress to date nationally in the development of 511 services. More specifically, the review examines the development of national standards for a 511 system and the implementation of 511 in other states.
- [Chapter 3](#) examines the key issues related to 511 implementation and the associated actions to date in Texas. The potential roles of TxDOT in the implementation of 511 are also discussed, as well as the existing phone-based transportation services in Texas.
- [Chapter 4](#) contains recommendations regarding the implementation of 511 in Texas and a discussion of several issues that will need to be considered throughout the implementation process.

2. NATIONAL 511 IMPLEMENTATION

At the request of the USDOT, on July 21, 2000, the FCC assigned the 511 abbreviated dialing code to be used for access to traveler information services. The following key points with respect to 511 were issued in the FCC Third Report and Order released on July 31, 2000 (1):

- Governmental entities must be the requester of 511 for both landline and wireless telephone companies.
- Parameters for cost recovery and other technical issues are not specified.
- Federal, state, and local government agencies must determine the deployment schedule and the type of transportation information to be provided.
- Transportation agencies are to work cooperatively to ensure that the information provided is appropriate to the national scope of N11 numbers.
- Callers should have access to information transcending municipal boundaries and that is easily retrievable in a single call.
- State public utilities commissions may continue to exercise jurisdiction over N11 codes to ensure telephone companies comply with transportation agencies' requests to deploy 511.
- Transportation agencies need to determine uniform standards for how services should be provided to the public.
- USDOT should facilitate the ubiquitous deployment of 511 across the nation.
- FCC will reassess the assignment of the 511 code in five years.

The FCC made it clear in the ruling that the 511 number will belong to public agencies, not the private sector. Thus, a private provider of traveler information cannot obtain direct use of the 511 number. However, this does not preclude a state or local government from using the private sector to provide the service. The public agencies are also responsible for determining the type of information to be provided and how the service will be financed. Since the use of 511 is not a mandated public service, the telecommunications carriers are entitled to recover their costs, and the public agency could charge on a per-call basis.

NATIONAL GUIDANCE

The FCC ruling leaves nearly all implementation issues to the discretion of the requesting governmental agencies and telecommunications carriers. While this ruling provides flexibility (which is desirable), it also presents a challenge, since there is a great deal of interest in using 511 throughout the nation. It is even expected that multiple requests for 511, within at least some parts of the U.S., will come from state departments of transportation (DOTs), transit agencies, as well as regional and local transportation agencies. Without thoughtful planning, 511 services could become an inconsistent set of services, varying in type, quality, and cost.

Mindful of the need for uniformity and guidance, the American Association of State Highway and Transportation Officials (AASHTO) in conjunction with the Intelligent Transportation Society of America (ITS America), the American Public Transit Association (APTA), the

USDOT, and others formed a 511 Deployment Coordination Program. The Policy and Working Committees within this coalition consist of representatives from state DOTs, metropolitan areas, transit, private-sector providers, and telecommunications carriers. These committees have identified three major issues that need to be addressed (2):

- Content – Should there be some minimum level and quality of content?
- Consistency – What should be the level of consistency among 511 services?
- Cost – Should 511 be free to the end user? If so, how should 511 be financed?

On March 29-30, 2001, the Policy and Working Committees met to establish high-level “foundation” policy directions in the following areas: institutional leadership, content, national consistency, and consumer pricing/service cost. Table 1 contains the draft policy for each area, while Table 2 contains the upcoming key dates and deliverables of the two committees.

Table 1. 511 Deployment Coordination Program Draft Policies.

Issues	Draft Policy
Institutional Leadership	<ul style="list-style-type: none"> • Public and private sector must work together • Include non-traditional partners in the coalition
Content	<ul style="list-style-type: none"> • Establish a set of minimum service guidelines • Can provide both basic and premium services • Can be tailored to meet local needs • Americans with Disabilities Act (ADA) compliant • Connect to other N11 numbers • Grow and evolve with the advent of new technologies
National Consistency	<ul style="list-style-type: none"> • Need same “look and feel” of basic services • Premium services may vary in appearance • Minimum level of quality • Marketing plan
Consumer Pricing/ Service Cost	<ul style="list-style-type: none"> • Business models will be investigated for appropriateness of their application to 511 • Basic service elements should cost the end user no more than the cost of a local landline or wireless call • Can have additional charges for premium services or additional local service options

In addition to the 511 Deployment Coordination Program developments, ITS America in cooperation with other organizations has held three 511 workshops and a 511 business roundtable over the past year. ITS America has also issued a request for proposal concerning original consumer research to better define the design and delivery of 511 basic services nationwide. It is envisioned that both telephone survey and focus group research will be utilized to gauge the general interest in 511 services and consumer opinions about content, quality, utility, service design, consistency, and reliability.

Table 2. 511 Deployment Coordination Program Timeline and Deliverables.

Date	Deliverable
June 15, 2001	Draft packages on content, consistency, business models, and communications plan
June 21, 2001	Working Committee reviews and finalizes four packages
July 30, 2001	Deliver one-page summaries of four packages to Policy Committee
August 7, 2001	Deliver completed position papers to Policy Committee
August 23, 2001	Hold Policy Committee meeting
September-November 2001	Present national guidelines at Associations Implement early adopters Achieve national consensus on guidelines
March 2002	Publish guidelines

CASE STUDIES

Immediately after the FCC assigned the 511 abbreviated dialing code for traveler information services, several entities utilizing existing traveler information phone-based systems began the process of converting to a 511 system. In the following sections, the implementation progress to date of 511 services in Arizona, Kentucky, Michigan, Minnesota, San Francisco, and Utah is discussed. In addition to these early adopters, Nebraska and Virginia have also expressed interest in pursuing 511 as a traveler information number.

Arizona

Currently, five government-sponsored phone-based traveler information systems have been identified in Arizona, of which the statewide toll-free system funded and operated by the Arizona Department of Transportation (ADOT) is the most relevant in terms of near-term 511 services. This number provides three main types of information: 1) roadway conditions on major state roads, 2) city-specific information in urban areas, and 3) weather information from the National Weather Service (3, 4).

The three primary components of the ADOT phone-based system are call routing, the telephone system, and the information system. All calls are routed from the toll-free number to a local Phoenix number that terminates at the Voice Remote Access System (VRAS) located in ADOT’s Traffic Operations Center. VRAS is an interactive voice response system (IVR) that incorporates a text-to-speech generator that enables system operation without requiring operators to record messages. Installation of this new system cost approximately \$75,000 in 1999. A maintenance contract, which includes updates to the most current version of the text-to-speech software, costs less than \$10,000 per year. At present, 24 incoming phone lines are connected to the IVR with the capability of handling an average of 720 calls per hour. Telecommunications charges cost ADOT roughly \$30,000 in a one-year period from July 1999 to June 2000 (3, 4).

The Roadway Closures and Restrictions System (RCRS) provides information to the VRAS by uploading a file to the VRAS every five minutes. The RCRS collects road information and provides a statewide central repository of traveler information for dissemination to the public. The RCRS receives information about construction locations, traffic-related maintenance activities, weather-related road closure, and traffic accident information from various authorized agencies. As of the end of 2000, 89 authorized agencies were allowed to enter RCRS information. In addition to providing the telephone system with information, the RCRS forwards information to the internet and kiosks (3, 4).

The following are the key elements of the Arizona 511 vision (3, 4):

- ADOT will continue to operate the VRAS as the gateway to traveler information.
- Switches will be reprogrammed to forward 511 calls to VRAS.
- System capacity will be expanded to meet anticipated demand.
- Call forwarding option to reach the appropriate transit agency and where available, dial-a-ride services will be included.
- Roadside signage to “advertise” 511 will be deployed.
- Service will remain a free call to users.

Kentucky

Ten phone-based traveler information systems have been identified in Kentucky, of which the Kentucky Road Report (toll-free phone number) and the Advanced Regional Traffic Interactive Management and Information System (ARTIMIS) Traffic Advisory Telephone Service (TATS) systems are the most relevant in terms of near-term 511 services. The Kentucky Road Report is a statewide system operated by the Kentucky Transportation Cabinet (KYTC). It provides daily updates (Monday-Friday) on construction, weather, and major event-related information on interstates and parkways. This information is input manually into a computer program by an individual in each KYTC district (there are currently 12 districts) and then forwarded to the KYTC Headquarters Division of Operations where the district input is compiled into a complete statewide report. This report is then disseminated via the telephone system, as well as the internet, fax, and rest area monitors. The Road Report is an IVR system that can support 22 incoming phone lines. In normal conditions, the IVR receives about 150 to 200 calls per day (5, 6).

ARTIMIS is a regional traffic management system provided by the KYTC, Ohio Department of Transportation (ODOT), Federal Highway Administration (FHWA), Ohio-Kentucky-Indiana (OKI) Regional Council of Governments, and City of Cincinnati. ARTIMIS serves the Cincinnati/Northern Kentucky metropolitan area. ARTIMIS TATS is operated by a contractor and provides real-time, route-specific multi-modal traveler information (5, 6).

The ARTIMIS TATS began with the phone number 333-3333; however, in 1995 the Kentucky Public Service Commission (KPSC) assigned the abbreviated dialing code 311 to the KYTC for the requested purpose of providing traffic information. In February 1997, the FCC reserved 311

for non-emergency local government use; thus, KPSC assigned 211 to the KYTC. In addition, the Public Utilities Commission of Ohio (PUCO) allocated 211 to ODOT in September 1997 (5).

A contract between Cincinnati Bell and KYTC was established whereby KYTC paid for all charges associated with a landline 311 call. This contract was later modified to include a \$20,000 annual administrative fee and \$0.10 per landline call with a minimum charge of \$5,000 per month. There are also monthly trunk switching fees. In 1999, ARTIMIS TATS received 558,229 landline 211/311 calls and paid Cincinnati Bell \$134,560 for telecommunications services, which is an average of \$0.24 per call. This cost is paid by the KYTC and ODOT so that the three-digit service is free to landline callers (5).

During the 28-month period that only 311 was used, there was a 74 percent increase in the call volume attributed exclusively to landline 311 access. After implementing the 211 code, an intercept survey in February and March 1999 found that 74 percent of callers dialed 211, 15 percent dialed 333-3333, and 10 percent dialed 311 (311 had yet to be re-programmed). Prior to the implementation of the 211/311 service, access to ARTIMIS TATS was about 50 percent landline and 50 percent wireless. Since the introduction of 311, the ratio of calls has changed to 60 percent landline and 40 percent cellular (a sharp contrast to similar systems in the nation that generally have less than 50 percent landline calls). Currently, ARTIMIS TATS has 96 incoming phone lines, with the capability of the existing equipment to accommodate 120 lines (5).

The Kentucky 511 vision includes the following (5, 6):

- reprogramming switches to direct 511 calls to ARTIMIS TATS in Northern Kentucky and the Road Report in the rest of the state;
- not providing initial connectivity between the two systems;
- eventually establishing four regional 511 services overlaid on a statewide system (services similar to those offered in Northern Kentucky would be available in Louisville, Lexington, and the Cumberland Gap region);
- eventually developing capabilities to use caller location information to determine which system they are routed to (Road Report would be the default system in all areas of the state that do not have regional service);
- eventually developing capabilities to offer connectivity between each regional system and the Road Report; and
- maintaining service as a free call to users.

Michigan

The Michigan Department of Transportation (MDOT) currently manages a clearinghouse for real-time freeway information for greater Detroit. In addition, MDOT operates a toll-free statewide phone system which provides construction information for the state highway system.

It is envisioned that Michigan's future statewide 511 system would be anchored by two regional service areas (Detroit/Southeast Council of Governments [SEMCOG] and Grand Rapids) overlaid by a statewide default system (possibly an enhanced version of the existing statewide

construction hotline) in all other areas. In the near term, MDOT has decided to complete a one-year 511 pilot program in the greater Detroit area (7).

Minnesota

In Minnesota, the Department of Transportation (MnDOT) has implemented a statewide toll-free and local Twin Cities number to access winter and summer road and weather conditions. Recently, the telephone equipment was upgraded to 47 incoming lines, and a system that converts text-to-speech through concatenation of prerecorded words and phrases was installed. This phone system receives information from the Minnesota Condition Acquisition and Reporting System (MnCARS) and the Road and Weather Information System (RWIS). MnCARS is an internet-based application used by MnDOT districts and the Minnesota State Patrol to input road conditions, restrictions, and incidents. RWIS is a statewide system of sensors that collect real-time road surface and weather conditions (8).

Minnesota will implement 511 in phases. In Phase 1, cellular infrastructure will be reprogrammed to forward 511 calls to the MnDOT's toll-free number and the local Twin Cities number. In addition, it is planned to create linkage between these two phone systems. Phase 1 should be complete in the spring of 2001. Phase 2 includes business model selection and implementation and inclusion of the nearly 100 land-based telephone systems in Minnesota. Phase 2 information should be available by mid-June 2001. A marketing plan is also being developed to quickly make the public aware of this new service (8).

San Francisco

In the San Francisco Bay area, the Metropolitan Transportation Commission (MTC) manages a comprehensive transportation system (TravInfo[®]) that collects, organizes, and disseminates transportation information. The historical focus of the data dissemination has been the Traveler Advisory Telephone System (TATS), which averages 65,000 calls per month. This phone-based system provides callers with real-time information concerning traffic and road conditions and static information on public transit and ridesharing, as well as bicycle programs and airport transportation services. TATS is a local seven-digit number, so the call is free to the user, except for any local toll charges that may apply (9).

The San Francisco 511 vision includes the following (9):

- making TATS available via 511 in the present nine-county area served by the local number at the earliest practical time;
- exploring methods for callers outside of the Bay area to access the same information (possibly through a toll-free number);
- working with the dominant landline carrier to determine the most cost-effective method to route calls;
- working closely with Caltrans and other agencies in California to facilitate an orderly, coordinated deployment of 511 throughout the state;
- identifying the most efficient IVR system architecture for the service area;

- upgrading data collection, data fusion, and information dissemination;
- allocating resources to market phone service; and
- maintaining service as a free call to users.

Utah

Currently, the most relevant phone-based system in terms of 511 service in Utah is the Utah Department of Transportation's (UDOT's) toll-free Winter Road Conditions Hotline. This system is updated by maintenance workers at least once a day. In addition, Utah is in the process of developing a new Traveler Advisory Telephone system that will integrate road weather conditions, crashes, congestion, and construction activities. This new system will also route calls to transit and other agencies that provide additional types of traveler information and provide traveler information related to the 2002 Winter Olympic Games in Salt Lake City. Utah is also developing an Event Tracking System that will provide information to the Traveler Advisory Telephone system. The Event Tracking System will allow state and city construction, maintenance, and permit workers to enter information about projects, as well as update the status of a project from the field using a keyed input from a telephone (10).

UDOT is currently seeking legislation to designate UDOT as the lead agency for 511 deployment in Utah. In addition, UDOT is developing relations with the largest landline carrier in the state and other potential stakeholders, including the Utah Transit Authority (10).

Summary of Early Adopters 511 Implementation

Table 3 highlights the implementation approaches being utilized by the early adopters. As seen in this table, the majority of the lead agencies are state departments of transportation. However, as noted, coordination with other potential stakeholders is very important to the development of a 511 system. In general, the 511 systems envisioned consist of both regional services and statewide services. In the case where only one service currently exists, 511 is initially being forwarded to a single phone number with the vision to expand based on the desires of the stakeholders. In contrast, if both types of services are available, 511 is initially being directed to multiple numbers. Usually, the location of the caller will determine which service (regional or statewide) the user receives. The early adopters anticipate these multiple services will be connected to facilitate a seamless 511 system. The need for public awareness (marketing) and for the call to be free to the user were also consistent themes with the early adopters.

Table 3. Summary of 511 Implementation Plans by Early Adopters.

State	Lead Agency	Approach	Cost to User
AZ	ADOT	<u>Short-term</u> <ul style="list-style-type: none"> • “Point” 511 calls to existing toll-free statewide number <u>Long-term</u> <ul style="list-style-type: none"> • Include call forwarding to other information • Expand system capacity • Deploy roadside signage to “advertise” 511 	Free
KY	KYTC	<u>Short-term</u> <ul style="list-style-type: none"> • “Point” 511 to local number in Northern Kentucky and toll-free statewide number in the rest of the state • No connectivity between the two systems <u>Long-term</u> <ul style="list-style-type: none"> • Four regional services overlaid on a statewide system • Connectivity between systems • Callers’ location will determine which system they are routed to 	Free
MI	MDOT	<u>Short-term</u> <ul style="list-style-type: none"> • One year pilot in greater Detroit area <u>Long-term</u> <ul style="list-style-type: none"> • Two regional services overlaid on a statewide system 	--
MN	MnDOT	<u>Short-term</u> <ul style="list-style-type: none"> • “Point” cellular 511 infrastructure to toll-free statewide number and local number • Connect two systems <u>Long-term</u> <ul style="list-style-type: none"> • Business model selection • Implementation of other existing land-based systems • Marketing 	--
CA	MTC	<u>Short-term</u> <ul style="list-style-type: none"> • “Point” 511 to local San Francisco Bay area number <u>Long-term</u> <ul style="list-style-type: none"> • Explore methods for callers outside the Bay area to access system • Develop relations with potential stakeholders and landline carriers • Upgrade system • Marketing 	Free
UT	UDOT	<u>Short-term</u> <ul style="list-style-type: none"> • Seek legislation to designate UDOT as lead agency • Develop relations with potential stakeholders and landline carriers <u>Long-term</u> <ul style="list-style-type: none"> • Develop new traveler advisory phone number and event tracking system 	--

-- Not yet determined

LESSONS LEARNED

Based on the experiences of the early adopters, the following items should be considered during the development of a 511 service (4, 6, 7, 8, 9, 10):

- Establish early contact with your state telephone association.
- Make early, informal contact with the public utilities or service commission.
- Ask for technical assistance from the regulatory commission when necessary.
- The lead implementing agency must coordinate with other public transportation providers.
- Task forces should be formed where appropriate to facilitate multi-agency coordination.
- With regional implementation, it is helpful to find a state agency to support the regional agency's intentions.
- Gain a commitment of resources by local telecommunications carriers and have them develop appropriate service offerings.
- Develop and initiate strong public awareness and marketing campaigns to accompany 511 implementation.
- Recognize that most of the cost is associated with gathering and formatting the information provided, not with the calls themselves.
- Evaluate the capabilities of the existing telephone system.
- Human factors should be considered when designing or redesigning the telephone system.
- If procuring an IVR system, recognize that additional costs may be incurred in the future when the system needs to be expanded (e.g., license costs associated with the number of incoming phone lines).

3. 511 IMPLEMENTATION IN TEXAS

Through the integration of experiences of the early adopter states, key issues related to the implementation of 511 were identified. Each of the following actions and issues will be discussed in this chapter with respect to 511 implementation in Texas:

- regional cooperation,
- designation of a lead agency,
- contact with state regulatory agency,
- contact with the telecommunication carriers,
- system design,
- cost,
- sources of funding, and
- ongoing national discussions.

REGIONAL COOPERATION

The FCC order, discussed in the previous [chapter](#), assumes phone-based traveler information numbers are multi-modal and thus provide various types of information, such as traffic conditions, construction locations, transit schedules and status, and weather conditions. With the assignment of 511, multiple transportation agencies in a region are envisioned to combine their existing services to make it easier for the traveling public to obtain information. Thus, it is essential that all agencies interested in using 511 cooperatively determine the exact implementation of the service.

[Table 4](#) contains the existing transportation-related phone-based systems located in Texas. In addition to these systems, there are multiple carpooling and motorist assistance programs that operate phone-based systems (e.g., the toll-free Department of Public Safety number on Texas driver's license). Other additional stakeholders in the development of 511 may include:

- metropolitan planning organizations,
- rural councils,
- local governments,
- rail,
- airports, and
- other N11 numbers (e.g., 911).

Table 4. Existing Transportation Phone Systems in Texas.

Managed By	Phone Number	Information Available	Area Covered
TxDOT	800-452-9292	Highway conditions, wildflowers, tourism	Texas
TxDOT	713-802-5074	Road construction	Houston
TxDOT	214-374-4100	Vehicle title and registration, road construction, wildflowers, driver’s license, LBJ project updates, courtesy patrol, precious cargo	Dallas/ Fort Worth
TxDOT	817-370-6899	Access to downtown Fort Worth, road construction, “Adopt a Highway”	Dallas/ Fort Worth
METRO	713-635-4000	Schedule, route, and trip planning	Houston
Corpus Christi RTA	361-289-2600	Route, fare, and schedule	Corpus Christi
Dallas Area Rapid Transit	214-929-1111	Route and schedule	Dallas
Fort Worth Transportation Authority	817-215-8600	Route and schedule	Fort Worth
Tyler Transit	903-533-8059	Route and schedule	Tyler
Citibus	806-762-0111	Route and schedule	Lubbock

DESIGNATION OF A LEAD AGENCY

With multiple entities potentially involved with the implementation of 511, there is a need to designate a specific point of contact or lead agency to guide the process. This lead agency would deal with the state regulatory agency and the telecommunications carriers. Based on the FCC ruling, the lead agency must be a governmental entity. However, as discussed in [Chapter 2](#), this does not preclude a state or local government from using the private sector to provide the service.

From TxDOT’s perspective there are both advantages and disadvantages to being the lead agency ([Table 5](#)). As discussed in [Chapter 2](#), the majority of the lead agencies in the early adopter states are the state departments of transportation. Thus, TxDOT being the lead agency would continue this trend, as well as support the USDOT vision for implementation. As described in the previous [section](#), TxDOT currently operates a statewide toll-free travel and roadway conditions telephone number. This phone-based system is the most probable of the other phone-based systems in Texas to be converted to 511. Most importantly, this conversion would promote a consistent 511 format throughout the state and allow TxDOT to facilitate and coordinate any future staged developments. As awareness of the 511 service increases and more states begin to implement 511, it is quite possible that the public will develop an expectation of 511 service in Texas and associate the availability (or lack thereof), as well as inconsistent or

unreliable information, with TxDOT, regardless of whether or not TxDOT is involved in the system.

Table 5. Advantages and Disadvantages of TxDOT Being the Lead Agency.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Supports USDOT vision for implementation • Consistent with other states • Ease of conversion of current phone system • Consistency in format statewide • Keeps TxDOT in control of future staged development • Eventually expected by the public • Opportunity to influence guidelines 	<ul style="list-style-type: none"> • Lack of guidance • Possible upgrade to current phone system • Personnel needed to facilitate implementation • Legal liabilities • Competition

Furthermore, as discussed in [Chapter 2](#), minimum guidelines for content, consistency, and cost are still being developed at the national level. Although these guidelines are not meant to hinder the development of 511, it does imply that deployments should occur in a staged fashion, with simple conversions of existing services (such as an existing toll-free information system) and a long-term vision of enhancements to the service as these guidelines become better defined and tested. Thus, the current lack of national guidance is a disadvantage with respect to expanding or developing new phone-based systems. However, it is the researchers’ belief that TxDOT should take advantage of the opportunity to influence the national guideline development by assigning key staff to participate in the 511 Deployment Coordination Program.

With respect to disadvantages, there is the potential for an increase in call volume that could eventually require the current TxDOT phone-based system to be upgraded. Also, since the lead agency will be responsible for coordinating the stakeholders (e.g., other transportation agencies, state regulatory agency, telecommunication carriers) and managing any future expansions of the system, TxDOT in a lead role would likely require some staff time to be devoted to the implementation of 511. Other issues of concern include the legal liability of the lead agency regarding issues such as ADA requirements, process patents, etc. and the potential for the 511 service to be viewed as competition to the private sector developments in the transportation arena. However, it should be noted that many of these issues will still be faced by TxDOT with its existing road information number and other traveler information dissemination initiatives throughout the state, regardless of whether or not the 511 number is implemented.

CONTACT WITH THE STATE REGULATORY AGENCY

In Texas, the state regulatory agency that exercises jurisdiction over abbreviated dialing codes is the Public Utilities Commission of Texas (PUCT). Following the actions of the FCC, on March 26, 2001, the PUCT assigned the 511 dialing code for traffic and transportation information via an amendment to the Texas Administrative Code Rule 26.127.

The following key points were addressed by the PUCT in the order adopting the amendment (11):

- Certified telecommunications carriers can recover costs for implementing 511.
- A carrier cannot receive compensation from another carrier for the transport and termination of 511 calls on a carrier's network facilities that originate on the network facilities of the other carrier.
- Competitive providers should be provided nondiscriminatory access to the information in the databases, consistent with any applicable privacy requirements.
- An implementation docket is to be scheduled to work with interested parties in developing technology-neutral standards or solutions.

Since the PUCT has already reserved the 511 dialing code in Texas for traveler information, the lead agency will not have to petition the PUCT for assignment. Instead, the lead agency can immediately begin discussions with the telecommunications carriers to determine the desired 511 network (e.g., routing). When a final decision is reached between the implementing agencies and the telecommunications carriers with respect to the setup of the 511 system, the telecommunications carrier would approach the PUCT (e.g., file tariffs, etc.). However, the lead agency would want to keep the PUCT informed throughout this process (see [Appendix](#) for PUCT contact information).

CONTACT WITH THE TELECOMMUNICATION CARRIERS

The incumbent local exchange carriers (ILECs) will ultimately be the implementers of the landline service. In Texas, there are 62 ILECs that provide telephone service to more than 13.3 million access lines in homes and businesses. The largest telephone company in Texas, Southwestern Bell, services approximately 77 percent of the state's incumbent telephone lines, while the second largest telephone company, Verizon, provides service to approximately 13 percent of the total incumbent telephone lines statewide. The remaining 60 ILECs combined service only 10 percent of the access lines, but serve more than 47 percent of the total area in Texas (12).

The Texas Telephone Association (TTA) represents the interests of the Texas ILECs (58 of the 62 companies). The TTA is involved with the PUCT implementation docket that will be developing 511 technology-neutral standards or solutions, and has formed a 511 Subcommittee to address these technical issues. Preliminary discussions with the TTA have been beneficial and will be discussed in the next [section](#) (see [Appendix](#) for TTA contact information). It should be noted that as the implementation of 511 progresses, wireless and coin-operated carriers will need to be contacted. (Currently, there is not a statewide wireless carrier association.)

SYSTEM DESIGN

System Issues

As discussed previously, the statewide, toll-free travel and information phone system funded and operated by TxDOT offers a simple alternative for near-term 511 service statewide. This can be accomplished relatively easily by forwarding 511 to this existing number. However, as shown in [Table 4](#) there are several existing regional numbers that may also be interested in utilizing 511. Thus, a framework for equitably representing all potential participants and a procedure for adding new participants to the system and expanding the service area in the future will need to be developed. It should be noted that even though the FCC ruling mandated that the lead agency be a governmental entity, this does not preclude a state or local government from establishing a public-private partnership to provide 511 service.

Another issue to consider is the possibility that the 511 number may actually be used by the public for purposes other than “typical” traveler assistance information (construction schedules, incident details, transit schedules and fares, etc.). In addition to obtaining road and traffic condition information, citizens often have a perceived need to contact a transportation agency (often not even the correct one) to ask questions or report some type of transportation-related information (e.g., traffic signal malfunctions, motorist assistance, etc.). Anecdotal evidence suggests that the public often uses whatever phone number they can easily remember in order to begin the search for the right person to speak with about a problem or concern. As an example, Houston TranStar receives nearly 200 telephone calls per day from the public onto the control room floor. In a one-week period, 63 percent of these were “information” calls not directly related to the motorist assistance program (MAP) operations or other TxDOT operator responsibilities (information provided by Carlton Allen, Freeway Operations Supervisor). TTI researchers anticipate that a significant number of these types of calls may be initiated in the future through the 511 number. Depending on how a 511 service is designed, a mechanism for improved direction of calls to appropriate personnel and agencies could actually improve the efficiency of other operations personnel.

Telecommunications Issues

Preliminary discussions with TTA representatives (landline carriers) indicate that “pointing” 511 to an existing toll-free number utilizing Local Access Transport Areas (LATAs) is a relatively low-cost process for the telecommunications carrier. The largest potential for cost (to the implementing agency) is at the terminating location and is dependent on whether there will be a need to increase the number of incoming lines. In addition, if the toll-free number is charged on a per-call basis (instead of a fixed fee), then an increase in call volume would increase the cost of the system. Based on the similar recent implementation of 711 in Texas, this type of setup takes approximately two to six months to implement (varies by telecommunication carrier).

As the vision of 511 expands, stakeholders in specific regions may want to develop regional 511 services so that localized information can be accessed more readily. This would be similar to Kentucky’s or Minnesota’s activities where several regional services are envisioned to be

overlaid on a statewide system. Based on the discussions with the TTA, several telecommunications approaches could be utilized to implement a coordinated network. However, it should be noted that the more complex the 511 network becomes, the larger the cost to the implementers.

Call forwarding is one possible approach to expanding the types of transportation information available via 511. This existing technology allows users to select, through a menu system, other phone numbers (transit, local regional number, etc.) that are simply forwarded utilizing the incoming toll-free number. If the toll-free system is based on a fixed fee, there would be a monthly charge for incoming and outgoing calls. This type of approach may also be used with a seven- or ten-digit number; however, local toll charges will most likely apply to the outgoing calls. Call forwarding may be feasible in the early stages of 511 development; however, as the number of services offered expands, the menu system utilized to forward the calls can become very elaborate. Thus, this approach would be unfeasible for more complex phone-based systems, as may be expected in future stages of 511.

The next level of a multi-service approach is based on LATAs. As discussed above, initially 511 could be directed to a toll-free statewide number in all LATAs. However, within each LATA 511 can be “pointed” to any one phone number (i.e., either the statewide number or a regional number). Thus, as regions express interest in developing local traveler information numbers, 511 could be forwarded to a localized number instead of the statewide number within the respective LATA. For example, if the Houston region desired a localized 511 service, they could direct 511 to a local system (possibly a combination of the existing Houston TxDOT and METRO numbers) in the Houston LATA. This would not affect the 511 service in the rest of the state (which still “points” to the toll-free statewide number). It should be noted that if the localized number is not toll-free, long distance charges may apply; thus, increasing the cost to the implementing agency (if the call is free to the end user). In addition, connectivity between the state and regional systems could be accomplished with call forwarding.

Another system that one may think is applicable to the implementation of the 511 service, but is not very feasible for Texas, is 911. Current regulations do not allow other N11 numbers to utilize 911’s infrastructure or databases. Thus, the development of a similar system would be very time consuming and costly.

COSTS AND FUNDING

Costs

The cost of a 511 system can be divided into two parts: 1) information gathering and packaging and 2) call routing and communication costs. The information gathering and packaging is usually the largest cost and includes data collection, data fusion, and data dissemination. The existing statewide roadway condition information infrastructure in Texas is already a part of TxDOT expenditures. Therefore, the adoption of implementation approaches other than the conversion of an existing phone-based system to 511 would require additional capital outlays and ongoing operations costs.

It is important to note that even if an existing telephone system is converted to 511, additional costs may eventually be incurred. For example, increased call volumes would increase the operating costs of the system and may eventually require system upgrades. The implementation of ITS within several major metropolitan areas in Texas does offer the potential to enhance the data quality and quantity in locations within the state. However, it would appear that the need for such enhancements and the funding of those enhancements would need to occur more at the local level so as to better capture local agency needs, interests, capabilities, and funding opportunities.

Funding

Other abbreviated dialing codes are funded in different ways. Based on previous experiences with establishing cost recovery mechanisms, the following can be concluded:

- *Funding 511 through surcharges on phone bills, as done for 911, is highly unlikely.* It is extremely doubtful that a surcharge for 511 would be approved by state regulators.
- *Carriers will not assume the cost burden of 511, as done with 711.* The FCC has mandated that carriers provide this service to be in compliance with the ADA. However, the FCC did not place a similar requirement on carriers with respect to 511.
- *Donations and grant monies cannot be expected to support 511 services, as done with 211.*

The FCC does not require that 511 be a public service. Thus, a public agency may choose to make 511 a free call to the public or to have the caller pay a charge per call. In general, a service that is free to callers will receive more usage than one in which a fee is charged. To date, all traveler information telephone systems sponsored or sanctioned by public agencies have been “free” to the traveler (in some cases local toll charges or long-distance charges apply). Possible cost-recovery mechanisms for a “free” system include advertising, sponsorship, and subsidy by other revenue-generating opportunities (e.g., value-added services). At present, no governmental-sponsored phone service contains advertising, nor is sponsorship a significant component. Instead, this type of telephone service is underwritten largely or exclusively by public sector investment. It is currently unclear how the potential increase in call volumes with the use of 511 will impact the market for revenue-generating opportunities. Even so, past experiences strongly indicate that the public sector agency will need to be prepared to provide some degree of financial support in the early stages of development in order to sustain a 511 system.

Traveler information systems are eligible for many federal aid transportation funding programs. For existing traveler information systems, the ITS program is providing grant money to help pay for the non-recurring conversion costs to change from a seven or ten-digit number to 511. This program was announced on August 9, 2000. Initially, the maximum amount of Federal funding provided for any individual application (e.g., a cooperative group of agencies) was \$50,000. However, at the end of April 2001, the grant program was revised. The major revisions to the program include an increase in the maximum amount awarded to one applicant and the

requirement that the applicant be a state department of transportation. (Contact information for the grant program is located in the [Appendix](#).) In addition, traveler information systems can receive funds for the National Highway System, the Surface Transportation Program, and the Congestion Mitigation and Air Quality (CMAQ) program.

ONGOING NATIONAL DISCUSSIONS

It is expected that as 511 is implemented throughout the nation, users will desire uniformity of service. For example, users may expect to hear similar greetings or list of menu options. In addition, they may desire the use of consistent terminology. When the FCC assigned the 511 dialing code, transportation agencies were charged with determining uniform standards for how services should be provided to the public. Mindful of the need for uniformity and guidance, AASHTO, ITS America, the USDOT, and various other organizations formed a 511 Deployment Coordination Program. This national effort is in the process of developing guidelines with respect to content, consistency, and cost. The guidelines that result from these discussions will significantly impact the evolution of a 511 system in Texas and elsewhere in the U.S. Regardless of how TxDOT chooses to approach future 511 implementation, it does appear to be in the state's best interest to become active in the national discussions in order to ensure that issues relating to implementation of 511 in a large geographic region, such as Texas, are heard and addressed.

4. RECOMMENDATIONS

The discussion in this report shows clearly that the path to full deployment of a 511 national traveler information number throughout the country is not yet well defined. This means that those agencies willing to step up and move towards deployment will have to shoulder some burden in the creation of new knowledge about the various implementation issues that must be faced. On the other hand, those early leaders will also have the benefit of influencing the evolution of guidelines, practices, and standards that adequately address their needs and concerns. This ability will be especially important to those agencies who have unique constraints or characteristics not currently represented in other 511 deployment initiatives. TTI researchers believe that TxDOT is such agency. The large geographic area encompassed by the state, the number of large metropolitan areas with highly developed but congested transportation networks that are separated by large rural expanses, and the philosophy of decentralized operation and control of TxDOT activities are all factors that affect how 511 can and should operate across the state. Consequently, TTI researchers recommend that TxDOT move forward with a 511 deployment strategy that builds upon current strengths and infrastructures, but that allows flexibility to address future developments as needed. Specifically, the following items are offered for consideration:

- *TxDOT should step up as the lead governmental agency for adoption of the 511 traveler information number in Texas and convert its existing road condition telephone number to utilize the 511 number.* This approach would allow near-term implementation and is consistent with the approach being taken by several other state agencies nationwide. It places TxDOT in a position to control its destiny with regard to possible future 511 enhancements and gives the department added credibility to voice concerns and opinions about national guideline developments.
- *TxDOT should maintain close contact with the Texas Public Utilities Commission and the Texas Telephone Association to monitor the progress of telecommunication carriers as they work to resolve technical issues regarding 511 implementation.* Technical groups within the telecommunications industry continue efforts to define and assess the implications of 511 implementation to their operations. These activities will directly affect development and operations costs that will ultimately impact the public agencies that support 511 implementation.
- *TxDOT should become involved in the national working group that is developing guidelines regarding the content, consistency, and funding for a 511 system.* It is possible that public expectancy for national implementation of 511 could develop over the next few years, which could pressure most states into eventual implementation of the service. By becoming involved in current guideline development, TxDOT has the opportunity to influence how the 511 service evolves over the next few years. In addition, involvement in national guideline development helps to ensure that the characteristics unique to large states, such as Texas, are adequately considered and addressed.

- *The individual TxDOT districts should serve as the facilitator and coordinator of future regional 511 systems in their respective major metropolitan areas. Development should occur as the data collection and fusion infrastructure in those regions develop AND as other public- and private-sector entities in the region express a willingness to assist in funding, developing, and maintaining a regional system. These regional 511 systems would then be overlaid on portions of the statewide system as appropriate.*

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APPENDIX: CONTACT INFORMATION

Table 6. Contact Information.

Name	Title	Employer	Phone Number	Email
Tim Wolfe	Assistant State Engineer	ADOT	602-255-6622	twolfe@dot.state.az.us
Leon Walden	ITS Team	KYTC	502-564-4556	l-walden@mail.kytc.state.ky.us
Kunwar Rajendra	Engineer of ITS	MDOT	517-335-2893	rajendrak@state.mi.us
Jim Wright	ITS Engineer, Chair of Deployment Coalition	MnDOT/AASHTO	651-582-1349	Jim.wright@dot.state.mn.us
Emily Van Wagner	TravInfo Co-Project Manager	MTC	510-817-3282	evanwagner@mtc.ca.gov
Michael Berman	TravInfo Co-Project Manager	MTC	510-817-3281	mberman@mtc.ca.gov
Bryan Chamberlain	ATIS Project Manager	UDOT	801-956-4222	bchamber@dot.state.ut.us
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William Jones	Technical Director	FHWA	202-366-2128	William.s.jones@fhwa.dot.gov
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Claudia Morgan	Director of Regulatory Affairs	TTA	512-472-1183	Claudiam@tta.org
Mark Washington	Chair of 511 Subcommittee	TTA	806-272-7032	Markwa@fivearea.com

