511DFW TRAVELER INFORMATION SYSTEM – INDEPENDENT EVALUATION

PREPARED FOR

North Central Texas Council of Governments

North Central Texas
Council of Governments

PREPARED BY

IN ASSOCIATION WITH

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OTHON

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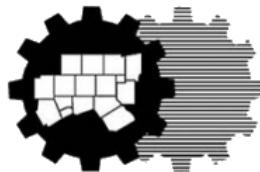Colby Walton
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DISCLAIMER

Prepared in cooperation with the Regional Transportation Council, NCTCOG, and the Texas Department of Transportation.

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the views or policies of the Regional Transportation Council, NCTCOG, and the Texas Department of Transportation.

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ACRONYMS, ABBREVIATIONS AND SYMBOLS

ASP	Active Server Page
CASA	Collaborative Adaptive Sensing of the Atmosphere
CBD	Central Business District
CCTV	Closed Circuit Television
CMAQ	Congestion Mitigation and Air Quality
COG	Council of Governments
DART	Dallas Area Rapid Transit
DFW	Dallas-Fort Worth
DMS	Dynamic Message Sign
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Authority
GIS	Geographic Information Science
ICM	Integrated Corridor Management
IT	Information Technology
ITS	Intelligent Transportation System
IVR	Interactive Voice Recognition
LEP	Limited English Proficiency
MPO	Metropolitan Planning Organization
NCTCOG	North Central Texas Council of Governments
NTE	North Tarrant Express
NTTA	North Texas Tollway Authority
OS	Operating System
RFP	Request for Proposals
RTC	Regional Transportation Council
SAT	System Acceptance Test

STP	Surface Transportation Program
TV	Television
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
V2I	Vehicle-to-Infrastructure
V2V	Vehicle-to-Vehicle
XML	Extensible Markup Language

EXECUTIVE SUMMARY

As of 2015, forty-five 511 services have been deployed in 39 states in the nation by following the United States Department of Transportation (USDOT) vision of using a cobranded website and phone system (511) to disseminate real-time traffic, transit, and weather information to the traveling public. The 511DFW system was developed by a consultant in 2013 for Dallas Area Rapid Transit (DART), in collaboration with the Texas Department of Transportation (TxDOT), the North Central Texas Council of Governments (NCTCOG), which covers over 200 member government agencies, and the Cities of Dallas, Richardson and Plano as part of the US 75 Integrated Corridor Management (ICM) effort.

The 511DFW system serves as the single source for real-time, comprehensive regional traveler information that includes planned and unplanned incident information and status; modal availability; travel times; speeds, conditions, and congestion information for roadways; transit routes, schedules and vehicle tracking; weather; and parking management. Interest from the traveling public and even from government agencies has increased over the years, and several other agencies want to actively participate in the program. This study investigates how a significantly large number of agencies can effectively participate in the 511DFW service. The current research also answers the following basic planning questions:

- what would be the best business model to adopt;
- what should be the organizational structure for efficient coordination;
- who should take the lead to make the coordination effective;
- which way to go: statewide or regional 511 system;
- what would be the right marketing tools to promote the service;
- how is the existing system performing and what is the potential for further improvements;

- what is the anticipated cost for providing a basic system and recommended improvements; and

- is there any possible opportunity for revenue generation from the system?

The comprehensive research identifies that the current system follows a hybrid business model that consists of assistance from an outsourced contractor in development, operation and maintenance, and significant efforts from partnering agencies in data entry and other coordination. This model provides the system with flexibility in fund usage and is currently working well for the 511DFW system. It has been estimated that providing continued training to all of the new agency personnel of all new partnering agencies for their data entry support will have a total cost of about $40,000 – $50,000.

The current system is led by DART. The determination of an optimal lead agency involves a variety of considerations and factors. This study developed a matrix with criteria that include: previous experience and familiarity, institutional capacities, funding sources, administrative hierarchy i.e. agency responsible for administrating larger jurisdictional area, and comparison to other similar regional systems. Though DART has been the lead in development, operation and maintenance of the 511DFW system since 2013, there are some advantages to the regional system if NCTCOG, as an agency that is responsible for administrating a larger jurisdictional area, is willing to take over the management of the system.

In addition to the existing partners, other agencies that include the Cities of Fort Worth, Arlington, Grand Prairie, Irving, McKinney, and Flower Mound, and two transit agencies – Fort Worth Transportation Authority (The T) and Denton County Transportation Authority (DCTA) – have expressed an interest in more active participation in a regional 511 system. It would be a challenge to coordinate with both actively and non-actively involved entities (over 200 local government members of NCTCOG) in a single meeting, and to share thoughts and plan effectively. Therefore, a two-level coordination concept with an executive committee (led by

NCTCOG) and several operational sub-committees (led by each actively involved entity) has been recommended in the new organizational structure. It has been estimated that each executive-level entity will require about 450 hours annually and each operational sub-committee entity will require about 370 hours per year for this coordination efforts. It has also been estimated that the system would require about $1,100,000 dollars annually for the continuing operation and maintenance of the 511DFW system. This cost covers hardware and communication maintenance, third party traffic data acquisitions, parking data acquisitions, quarterly data update, periodic and as required operations and maintenance, and overall project management. Research revealed that an average of 400,000 dollars is required for annual operations and maintenance for other 511 systems which disseminates traffic information from freeways only and the lead agency owns the software and also purchases the third party data separately or uses its own detector data.

The existing 511DFW system complies with the national standards and requirements established by the 511 coalition committee. When compared with 511 best practices in the nation, the DFW region's 511, which is a fairly new system, has all the necessary components to disseminate real-time travel information to the public. The 511DFW service has four components: website, interactive voice recognition (IVR), My511 personalization system, and a mobile app to cover a variety of users. Current limitations, user friendliness, ease of use, and data coverage have been investigated for each of these components, and a number of features have also been recommended to further advance them. It is estimated that $250,000 – $400,000 would be required to implement the recommendations that have been developed as part of this study.

Additionally, since 39 percent of Texas' population is Hispanic, a Spanish-language version of the 511DFW system which consists of website, IVR, My511, and mobile app is recommended. The associated cost has been estimated to be about $50,000 - $60,000 for implementing this effort while some of the developers think it may cost as much as $250,000.

Effective marketing plays a vital role in increasing the number of users, and a list of potential marketing and campaigning efforts has also been developed. Coordination with airport authorities, TxDOT, North Tarrant Express, North Texas Tollway Authority, and LBJ Express to use their existing infrastructure for campaigning is also recommended and will not require extra funding beyond effective collaborations. Other strategies for marketing and campaigning have been developed, and the cost for the associated efforts has been estimated to be $700,000 – $1,500,000, depending on the extent of the campaign program. The following table shows the cost components that are required for the continuous operation of the current system as well as to deploy the develop recommendations.

Items	Costs (in USD)
Operational cost	$1,100,000 (annual)
Agency personnel training on data entry software EcoTrafiX	$40,000-$50,000 (one time training for each agency)
Enhancements of 511DFW (Website, IVR, My511, and mobile app	$250,000-$400,000 (one time improvement cost)
Bilingual System (Spanish version in addition to current English)	$50,000-$60,000, it could be as much as $250,000 (one time deployment cost)
Marketing and Campaigning	$700,000-$1,500,000 (one time cost)

Potential opportunities for public-private partnerships for 511 services and some successful practices in the nation have also been investigated. The findings suggest increasing the number of users significantly through effective marketing and campaigning first, and then using the annual usage statistics as a tool for revenue generation. After a considerable increase in users, an attempt to generate revenue is recommended. This effort will cost the lead agency about 260 hours for preparing request for proposals and selection of contractor, and 100 hours for continuous coordination and monitoring. It is also anticipated that the revenue generated from this system would be able to reduce the burden from the partnering agencies by providing financial support towards annual operating costs.

ACKNOWLEDGMENTS

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CHAPTER 1: INTRODUCTION

The United States Department of Transportation (USDOT), in 2000, envisioned using an abbreviated N11 (where N is a digit from 0 - 9) dialing code to provide a simple, easy-to-remember-and-use telephone number to disseminate multimodal travel information to the traveling public. This need arose because it was clear to those in the travel information sector of the transportation industry that there were too many potential sources of information for travelers, each having its own different ten-digit telephone number, which are rarely known by the traveling public (511 Deployment Coalition, 2005). The N11 solution was viewed as a way to cut through the "number" clutter, and enable a widely known source of information on a multi-jurisdictional or regional basis. This 511 service is an advanced concept of communicating and disseminating information in real time from the stakeholders on the roadway systems to the traveling public, and the use of real-time travel information systems improves flow and reduces congestion (GAO, 2009). This sophisticated component of an intelligent transportation system provides a popular, user-friendly, direct service to taxpayers in their daily lives. As of 2015, there are 511 services deployed by 45 leading agencies in 39 different states in the nation.

To ensure the highest-quality customer service, 511 services provide roadway condition, construction, traffic and incident management, public transportation, parking and weather information all together at a single access point. This system provides travelers advanced, reliable, and accurate real-time information that increases mobility and safety, decreases congestion (to a certain extent), and ultimately provides travelers with improved overall travel satisfaction. Following the USDOT's vision of providing real-time, multimodal transportation system information to the traveling public, DART, TxDOT and the North Central Texas Council of Governments (NCTCOG), which is a voluntary association of, by, and for local governments, have implemented the 511DFW Traveler Information System for the Dallas and Fort Worth areas as part of the US 75 integrated corridor management (ICM) project. The current 511DFW

system, which is the first and only 511 system in the State of Texas, became operational in 2013.

The system followed the standard specifications developed by the national 511 Deployment Coalition Committee, and implemented the 511 system for 10 counties in the Dallas-Fort Worth area. The 511DFW service is anticipated to be the single source for providing regional traveler information including: planned and unplanned incident information and status; modal availability; travel times; speeds, conditions, and congestion information for roadways; transit routes, schedules and vehicle tracking; weather; and parking management. It was also anticipated that the service would provide timely, useful, high-quality, comprehensive, readily available and easily accessible information for multiple modes of transportation to the traveling public in the Dallas-Fort Worth region.

Increasing interest in the 511 system from other agencies led to this project, which was undertaken to evaluate the current system, compare it with national guidelines and other best practices, and recommend potential improvements along with guidance for future management, organizational and operational structures, and innovative revenue generation opportunities to continue operating the 511DFW service in the region and better disseminate real-time travel information to the public.

In order to provide the traveling public a "one-stop shopping" place to get details necessary to reach their destinations on time, choose the most effective transportation mode, plan ahead for construction- or weather-related delays, and learn more about traffic-related incidents while on route, the goal of this study is to independently evaluate the current 511DFW service, suggest new necessary features, and identify ways to optimize the operational cost. Thus, the research addresses the following four primary objectives:

- Conduct comprehensive literature review and identify guidelines for the efficient, popular and recommended best practices of 511 traveler information systems.

- Investigate and assess the existing 511DFW system, and identify potential for future improvements.

- Compare the best practices with existing systems and prioritize a list of needs, features and services to be added for the enhancement of the 511DFW system, which may include effective methodologies, management strategies, organizational restructuring, technological application and coverage of data.

- Develop an implementation plan and schedule for the enhancement without interrupting the existing service, in order to provide the most advanced service to the traveling public with the latest accurate and reliable travel information.

To fulfill the research objectives, a four-step work flow has been established in this study: literature review and identification of standards and best practices; evaluation of existing 511DFW system; development of recommendations for the enhancement of the existing system; and development of an implementation plan of the recommendations and necessary cost estimation. This report is organized in the order of this work flow. The organization and structure of the report is as follows:

Chapter 1: Describes the vision of 511 traveler information systems, history of 511DFW service, and needs of the current 511DFW system in NCTCOG area. It also describes the challenges that the current system is facing and the objectives of this research project.

Chapter 2: Identifies the standard guidelines and requirements of USDOT and the national 511 coalition committee. It also identifies best practices of 511 systems in the nation and compares these with the existing 511DFW system to identify opportunities for further improvements.

Chapter 3: Develops a prioritized list of needs for the enhancement of the existing 511DFW system including its management and organizational structure, marketing and

campaigning plan, future funding sources, new features in 511 service components, and a real-time performance monitoring system.

Chapter 4: Develops an implementation plan and schedule for the recommended features, and estimates applicable costs.

CHAPTER 2: EVALUATION OF THE 511DFW SERVICE

Since 2001, there have been forty-five 511 systems deployed and operated in the USA, and 37 of them are statewide, and 8 of them are regional (FTA, 2009). The goal of 511 is to provide reliable and accurate, real-time traffic, transit and weather information to the traveling public for their efficient and safe travel. An effective way to consolidate these islands of information into one multimodal, comprehensive resource for the traveling public is through a 511 system, where active participation by different agencies and an understanding of the available resources are vital to the success of the system (FHWA, 2014).

The national guidelines set standards about the data content and coverage for the 511 service. Typical roadway-related content includes information on construction, incidents, special events, and congestion on both freeways and local major streets. Transit content is typically schedule and fare information and service disruptions, along with call transfers and website links to transit agencies. Weather information can include current conditions that are affecting travel (flooding, high winds, etc.), as well as forecasts (511 Deployment Coalition, 2005).

In addition to a wider coverage of traveler information, a well-defined management and organizational structure with commitment of the participating agencies is also critical for the success of any 511 service. Also, in order to assure the required high level of reliability, a comprehensive and cohesive operating structure must be in place for the service's day-to-day operations (MORPC, 2009).

This independent study reviewed national standards and requirements developed by the 511 coalition committee, and other best practices of 511 services around the nation. The team also evaluated the existing 511DFW system and its business model, management, organizational structure, and operational collaboration. The team also conducted research on innovative funding sources, including opportunities for public-private partnerships. The current features of

the existing 511DFW system have also been evaluated in comparison with the national standards and other best practices.

BUSINESS MODEL

The national 511 Deployment Coalition Committee has identified three general business arrangements: operated in-house; fee-for-service contract; or a hybrid model that is a blend of the two – with some features and services performed in-house, and some contracted out. This last model is followed for the majority of 511 services across the country (511 Deployment Coalition, 2005). Representing a blend of efforts from the agency's in-house staff and an outsourced contractor, the hybrid model provides more flexibility and makes the system more efficient. A fourth option could be a completely outsourced product and management, with a single agency handling oversight of the entire system from a very high level. This option would be expensive unless a significant amount of revenue is received from any available public-private partnerships.

The current 511 DFW system is a blend of agency in-house staff leading the effort, while also incorporating a private contractor's assistance. DART is the lead agency that coordinates with the partnering agencies and obtains assistance from a private contractor for implementing any changes in the system. Other partnering agencies, including TxDOT, provide real-time data input support to the system developed by the contractor. An investigation of the current business model of the 511DFW service, which is a hybrid in-house and outsourced contractor model, reveals that it generally works well.

511DFW AND COLLABORATIONS

511DFW is a regional traveler information system for transportation systems and services throughout the North Texas area covering 10 counties including Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise.

The system followed the national guidelines in its organizational structure by incorporating the state and local agencies. The current system is led by DART, and the organization/ coordinating committee consists of members from TxDOT, NCTCOG, DART, and Cities of Dallas, Richardson and Plano. The system was developed by an outsourced contractor, and the contractor is also assisting in the day-to-day system operation and maintenance. The role of each current partnering agency in the current organizational structure is described below.

Texas Department of Transportation (TxDOT)

As the state transportation agency, TxDOT has been actively involved with the current 511DFW system deployment and continuous operation. TxDOT is also an active member of the regional 511DFW coordination committee. The DalTrans Transportation Management Center (TMC) is managed and operated by TxDOT. DalTrans TOC staff enters the freeway incident, events, and construction information into the "Lonestar Freeway Management System" which has a web connection to the 511DFW service. The TxDOT feeds from cameras, DMSs, and speed detectors are also linked to EcoTrafiX and the data fusion engine which feeds the data to the 511 DFW system. Moreover, DalTrans and DART have an inter-local agreement which allows DART to physically house the 511DFW servers and other system equipment at DalTrans, and TxDOT shares 10 percent of the cost of the 511DFW operational and maintenance contract managed by DART.

North Central Texas Council of Governments (NCTCOG)

As the regional planning agency, NCTCOG has been actively involved with the current 511 DFW deployment and continuous operation. NCTCOG is responsible for evaluating the 511DFW website, IVR, and other features. NCTCOG also assisted DART in developing the specifications that were used for the current operation and maintenance contract for the 511DFW system. Moreover, NCTCOG is an active member of the regional 511DFW coordinating committee and funds 80 percent of the regular operational and maintenance costs for the fiscal year 2016. Prior to 2016 the operating cost share was equal (1/3 of the total cost by each agency) for all agencies i.e. TxDOT, NCTCOG and DART.

Dallas Area Rapid Transit (DART)

DART is the lead agency of the current 511DFW system. DART is the project manager for the 511DFW system integration, operations, and contracts, as well as the chair of the regional 511DFW committee. DART also provides the spokesman for the current system. DART has 13 member cities including Dallas, Plano, Richardson, Irving, Glenn Heights, Rowlett, Garland, Farmers Branch, Carrollton, University Park, Highland Park, Cockrell Hill, and Addison. DART provides transit incidents, events, and construction feeds to the system and supports the trip planner, GTFS data feeds, real-time location of Bus, and rail, rail passenger counts and parking locations and availability, and social media feeds that are not automatic. DART staff also enter real-time transit construction, incident and event information into EcoTrafiX which feeds the 511DFW system. DART also provides floodgate messages as needed. Moreover, DART participated greatly in the development of the system and is committed to long-term funding of the system and is currently sharing 10 percent of operating costs of the current system for fiscal year 2016. Prior to 2016, DART shared one third of the total cost to operate and maintain the 511DFW system.

City of Dallas, Texas

As a local government entity, the city manages Dallas' incident response plans that feed into 511DFW. It has also been a long-term member of the regional 511DFW coordinating committee. The City Operations Control Center staff enter all of the Dallas events, construction, and incidents into EcoTrafiX, which feeds the 511DFW.

City of Richardson, Texas

As a local government entity, the city manages Richardson's response plans that feed into 511DFW on the US 75 Corridor only. It has also been a long-term member of the regional 511DFW committee. The City Traffic Operations Center operators enter Richardson events, construction and incidents into EcoTrafix, which feeds the 511DFW system.

City of Plano, Texas

As a local government entity, the city manages Plano's response plans that feed into 511DFW. It has also been a long-term member of the regional 511DFW coordinating committee. The City Operations Control Center controls and enters Plano events, construction, and incidents into EcoTrafix, which feeds into 511DFW.

Additionally, North Texas Tollway Authority (NTTA) and HERE (previously Navteq) were also involved with the 511DFW system from its early deployment.

Private Outsourced Contractor

As mentioned in the business model discussion, the current 511DFW system is a combined effort of government agencies with assistance from an outsourced contractor. The contractor has developed the 511DFW system, which includes the website, phone system, My511 personalization system, and the mobile app. The contractor also developed and maintains the EcoTrafix software, which links all control centers to share regional traffic conditions, incidents, and events with the public through 511DFW. The contractor developed and is now maintaining

the Data Fusion Engine that fuses the data and brings traffic speeds, weather, transit location, parking and load data, and incident information together in the system. The contractor also provides 24/7 system support. Moreover, the contractor also provides training staff at the Regional Control Centers as needed.

Potential for Collaboration

Besides the current government agencies, there are other agencies that have expressed an interest in more direct, active participation in the 511DFW system, including the Cities of Fort Worth, Arlington, Grand Prairie, Irving, McKinney, Frisco, and Flower Mound. Two transit agencies: Fort Worth Transportation Authority (The T) and Denton County Transportation Authority (DCTA) have also expressed an interest in more active participation. The plan is to expand the coverage and include the interested jurisdictions in the 511DFW system. This will require additional coordination among agencies and formation of a comprehensive plan with specific operational strategies. Personnel from these agencies have been trained to use EcoTrafiX.

The 511DFW service covers more than 200 government agencies in the NCTCOG area. It would be unrealistic for the lead agency to coordinate with all agencies effectively, hosting meetings, and discussing issues at the same time for 511DFW planning with such a big group of people. The coordination would be more efficient with different levels of meetings among the respective agencies by distinguishing the agencies based on their level of partnership.

The new 511DFW coordination committee should have committees at two levels: one higher-up committee with all actively involved agencies, which may consist of six current partners and eight newly interested agencies. This committee may be called the 511DFW Executive Committee. Figure 1 shows a proposed Executive Committee, and Table 1 shows the contacts of the representatives for the 511DFW system.

Figure 1 – Higher Level 511DFW Executive Committee

At the second level, there should be a number of committees that would include representatives from all local agencies covered by the 511DFW service. This level of committees may be called 511DFW operations sub-committees, and each committee would be run by each executive member agency, who would also be responsible for coordinating with the non-participating agencies. The Executive Committee members will bridge the gap between the 511DFW system and the non-participating agencies by coordinating with them, conveying messages on guidelines and policies from the 511DFW Executive Committee to the non-participating agencies. Table 2 shows the list of sub-committee member agencies with respective lead executive agencies for each sub-committee.

Without having a cohesive structure and active participation of the partnering agencies, a successful operation of any 511 system would be unrealistic. As mentioned, it is envisioned that the two-level committee structure will make the overall operation more efficient and effective.

For ensuring ongoing coordination, regularly scheduled coordination meetings may take place. Three Executive Committee meetings and six operations sub-committee meetings annually would be a good start at this point. Table 2 shows a proposed list of sub-committee members of each sub-committee. It would also be convenient for the agencies to keep a specific day fixed for the coordination meetings such as the first Wednesday of the month. Since most holidays are either on Mondays, Thursdays, or Fridays, Wednesdays should work for the meetings without missing any meeting dates for holidays. Table 3 shows a list of proposed coordination meetings at both levels for a typical year. Figure 12 in the Appendix shows an example schedule of coordination meetings (both Executive Committee meetings and operations sub-committee meetings) for 2016.

It would be also beneficial to have the meeting minutes of Executive Committee meetings and operations sub-committee meetings uploaded on a common place on the website. A new tab on the 511DFW website could be added and called "511DFW Coalition." The lead agency should have authority to upload/delete/modify any documents at the site. The effort will enable all committees to keep track of their own as well as others' activities and would also encourage them to be proactive.

Since the current business model for the 511DFW deployment and operation is a blend of agency in-house staff leading the effort, while also incorporating a private contractor's assistance. The 511DFW committee should outsource the technical operation and maintenance responsivities to private constructor. The committee should also contract out request for proposals for implementation of any enhancements to the system. The lad agency must assign a full time 511DFW Project Manager (PM) who will have overall responsibility for administering all aspects of the 511DFW system. This individual will lead the executive committee consisting of the system support technicians, agency coordinators, and outsourced contractor-provided system technical maintenance, operations and enhancement implementation personnel. The Project Manager will chair the 511DFW Executive Committee

and also be the main point of contact for all the operation sub-committees. The operations and maintenance of the 511DFW system will be overseen by the 511DFW PM as well. The 511DFW PM would lead the efforts for periodic reviews of the system, including necessary software, to identify necessary software updates, license renewals and interface upgrades with an estimate of funds required to implement. The outsourced contractor PM should directly report to the 511DFW PM. The current operational plan should be followed for all coordination and responsibility allocation.

Table 1 – 511DFW Executive Committee Representatives

Executive Member Agency		Contacts		
Agency Type	Agency Name	Name	Email	Phone
Department of Transportation	TxDOT Dallas District	To Be Determined	To Be Determined	To Be Determined
	TxDOT Fort Worth District	To Be Determined	To Be Determined	To Be Determined
	TxDOT Austin Office	To Be Determined	To Be Determined	To Be Determined
Tollway Authority	North Texas Tollway Authority	To Be Determined	To Be Determined	To Be Determined
Council of Governments	NCTCOG	To Be Determined	To Be Determined	To Be Determined
Transit Agency	DART	To Be Determined	To Be Determined	To Be Determined
	DCTA	To Be Determined	To Be Determined	To Be Determined
	The T	To Be Determined	To Be Determined	To Be Determined
Local Cities	City of Dallas	To Be Determined	To Be Determined	To Be Determined
	City of Richardson	To Be Determined	To Be Determined	To Be Determined
	City of Plano	To Be Determined	To Be Determined	To Be Determined
	City of Arlington	To Be Determined	To Be Determined	To Be Determined
	City of Fort Worth	To Be Determined	To Be Determined	To Be Determined
	City of Grand Prairie	To Be Determined	To Be Determined	To Be Determined
	City of Irving	To Be Determined	To Be Determined	To Be Determined
	City of McKinney	To Be Determined	To Be Determined	To Be Determined
	Town of Flower Mound	To Be Determined	To Be Determined	To Be Determined

Table 2 - List of Sub-committee Members of 511DFW System

Executive Member	Sub-committee Members
NCTCOG	To Be Determined
DART	To Be Determined
DCTA	To Be Determined
The T	To Be Determined
City of Dallas	To Be Determined
City of Richardson	To Be Determined
City of Plano	To Be Determined
City of Arlington	To Be Determined
City of Fort Worth	To Be Determined
City of Grand Prairie	To Be Determined
City of Irving	To Be Determined
City of McKinney	To Be Determined
Town of Flower Mound	To Be Determined

Table 3 – List of Proposed Coordination Meetings (at both Executive and Operational Levels)

Month	Date	Meeting Type
January	-	-
February	1st Wednesday	Operations Sub-Committee
March	1st Wednesday	Executive Committee
April	1st Wednesday	Operations Sub-Committee
May	-	-
June	1st Wednesday	Operations Sub-Committee
July	1st Wednesday	Executive Committee
August	1st Wednesday	Operations Sub-Committee
September	-	-
October	1st Wednesday	Operations Sub-Committee
November	1st Wednesday	Executive Committee
December	1st Wednesday	Operations Sub-Committee

REGIONAL 511DFW OR TEXAS STATEWIDE SYSTEM
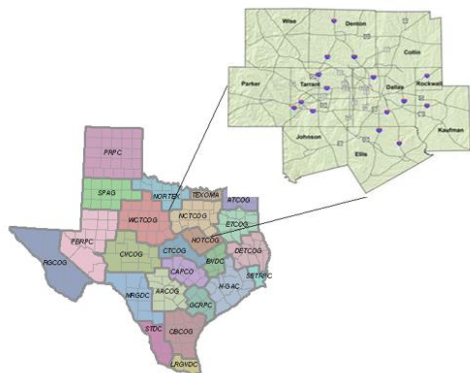
As mentioned earlier, there are eight regional 511 systems in the United States, versus 37 operated as statewide systems. In regional systems, coordination among the partnering agencies would typically be more efficient compared to a huge statewide system supporting multiple regional systems, especially for larger states like Texas.

There are several advantages of having a statewide system instead of having a regional system. As different regions of a state may have different time zones, the peak hour could be distributed, which saves resources, especially fewer numbers of phone channels for the IVR system. A single statewide system can eliminate data and system inconsistencies, and lessen users' confusion. On the other hand, states have had issues when having regional 511 systems. For example, Florida DOT integrated all the regional 511 systems into one traveler information resource in 2009. They reported that multiple systems "worked differently causing confusion among travelers." Though following standard specifications can eliminate data and system inconsistency, Florida was ultimately unable to operate multiple systems.

TxDOT has two other websites that disseminate real-time traffic information: http://drivetexas.org and http://its.txdot.gov. The regional 511DFW system already exists, so it could save TxDOT both time and money in developing the statewide 511 system. Coordination with TxDOT on the possibility of using the 511DFW system as the groundwork for the statewide 511 system, or integrating it into a future TxDOT system, could be beneficial. It may be efficient to consolidate both software and hardware of the existing TxDOT and 511DFW system and launch a statewide system for the entire state of Texas.

Interviews with TxDOT staff revealed that TxDOT currently does not have any plans for a statewide 511 system. Therefore, it would be wise to keep the regional 511DFW system operational, and begin investigating opportunities for a statewide system with integration of the current system into it.

LEAD AGENCY: TxDOT VS NCTCOG VS DART
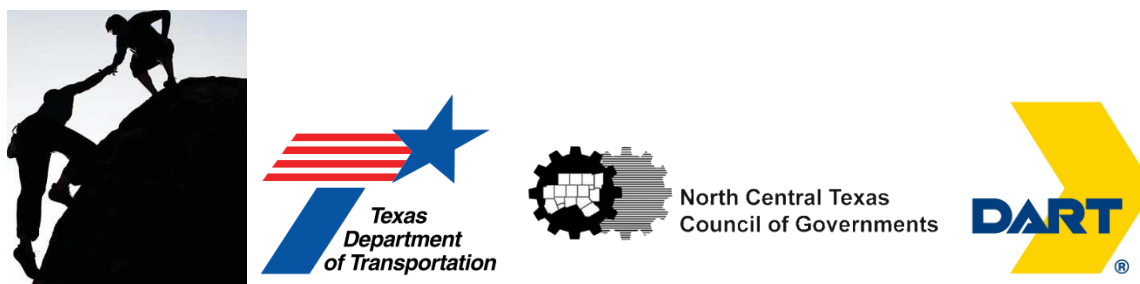
There are no straightforward guidelines developed to determine who should be the leading agency to run a 511 system. The state DOT, MPO, or any transit agencies are potential candidates and can take the lead depending on the circumstances. Determination of the leading agency, to a great extent, depends on if the system is to remain a regional system, or if it is expected to transition into a statewide system, as well as other factors. The matrix of the determining criteria/ factors that have been developed as part of this study consists of previous experience and familiarities; institutional capabilities; administrative hierarchy; funding sources; and other similar systems. Each of the factors is discussed pertaining to 511DFW in the following sections to determine the best candidate to lead this effort.

- **Previous Experience and Familiarity** – DART has taken the lead in the development and operation of the 511DFW system and is the agency most familiar with it. DART became the project manager and primary advocate for 511 to encourage multi-modal, multi-facility information. DART's mission is to improve mobility within the region including its 13 member cities. DART has invested substantial DART funds in

the development of the traveler information program and DART has been willing to consistently provide program leadership, project management and funding since the program's inception. DART's enabling legislation permits it to provide contract services including transit, traveler information, ITS services, bike and pedestrian programs, and street improvements and ITS. Therefore, DART would be suitable to continue leading the system. This, however, is not the typical practice for other 511 systems in the United States. This also depends on the business model that the current system has adopted. If the business model requires significant amount of outsourced efforts, then the lead agency's experience may not carry much weight in this regard. Regardless of who is leading the system, the partnering agencies will continue entering the real-time data into the system, and the rest of the tasks would be operated and maintained by the outsourced contractor.

- **Institutional Capacities** - The statewide 511 programs (or the regional 511 programs) that are currently in operation have been deployed by state DOTs (or the MPOs, and a transit agency as in the case of 511DFW - DART) alone or in partnership with other local agencies. Both of these are options, as would be a 511 system for which a transit agency is the lead agency. In all cases, the deploying agency needs to work with internal control boards or Information Technology (IT) departments to develop and launch a 511 phone system or webpage. Again, if an outsourced contractor plays a significant role in day-to-day operation and maintenance, institutional capabilities does not carry much weight to determine the lead agency.

- **Administrative Hierarchy** – Being under the same umbrella, an agency which is responsible for a largest jurisdiction would be more efficient in running a 511 system. In this particular case, the hierarchical ranking is, in order of highest to lowest, TxDOT, NCTCOG, and DART. Since the current plan is to keep operating the regional 511DFW system, and since TxDOT does not have any plans or significant

funding for the 511 system, NCTCOG would be the next organization in the jurisdictional hierarchy to take the lead. NCTCOG is the planning agency for the entire region and works with all local cities and the transit agencies, and it would better be able to effectively coordinate with partnering agencies and run the system more efficiently. In that case, TxDOT, DART and other partnering agencies would provide support to NCTCOG.

DART has been in the lead from its early stage, and is familiar with the system and the current plan is to expand the 511DFW agency involvement, include two other transit agencies, and bring in other local government entities or agencies that are outside of the DART service area. Based on the Texas Transportation Code 452, DART is authorized to provide regional service beyond its service area subject to an appropriate funding agreement.

- **Funding Sources** – The source of funding also plays a vital role in the determination of the leading agency. Current funding sources for the 511DFW system for fiscal year 2016 are:

  - NCTCOG – 80%
  - DART – 10%
  - TxDOT – 10%

NCTCOG has contributed 80% of the funding and has the capability of providing multiple leaders in different areas as needed to ensure effective coordination, as well as make the system efficient. The funding source going forward depends on the business policy, and the current plan is to generate some revenue from the private sector to help offset the operating cost (partially or fully). In the near future, with expected positive contributions from public-private partnerships, the funding sources may change, and using this criteria may not be as valid a way to determine the leading agency.

- **Other Similar Regional Systems** - Other similar regional systems are found to be operated either independently or jointly by State DOTs, County DOTs, Councils of Governments and/or freeway emergency service agencies. Regional 511 systems such as the Sacramento 511 (Sacramento 511, 2015), San Diego 511 (San Diego 511, 2015), Los Angeles 511 (Southern California 511), and San Luis Obispo 511 (San Luis Obispo 511, 2015) are typically managed by MPOs such as SACOG, SANDAG, Angeles County Service Authority for Freeway Emergencies (LA SAFE), and San Luis Obispo Council of Governments respectively, but get information support from other agencies as well as other regional 511 systems. The partnering agencies of these systems are Los Angeles County Service Authority for Freeway Emergencies, Los Angeles County Metropolitan Transportation Authority, Orange County Transportation Authority, the Ventura County Transportation Commission, the California Highway Patrol, and the California Department of Transportation.

  The Honolulu 511 system is deployed and operated by the Hawaii State Department of Transportation, and the City and County of Honolulu Department of Transportation Services (Goakamai 511, 2015). The Inland Empire 511 system is a joint project of the Riverside County Transportation Commission and San Bernardino Associated Governments (Inland Empire 511, 2015). San Francisco 511 is managed by a partnership of public agencies led by the Metropolitan Transportation Commission, the California Highway Patrol, and the California Department of Transportation (San Francisco 511, 2015). Taken together, these examples also suggest a strong preference for having a larger jurisdiction agency such as the MPO to lead the service, and also having a partnership with other local agencies to support the system by providing data.

Based on the examples of other similar regional 511 systems, the 511DFW current business model (hybrid model), and the advantages offered by NCTCOG in terms of geographic hierarchy and its role in programming federal funding, NCTCOG may be the best candidate to lead the

next phase of the 511DFW program. In the event, NCTCOG is not in agreement with this recommendation, DART has the experience and ability to continue operating the program.

FUNDING, REVENUE & PUBLIC-PRIVATE PARTNERSHIP

In addition to the leadership and strong commitment from the partners, financial commitment for any 511 system is critical to its continued and successful operation. There should a reliable funding source(s) for the 511 service defined by the partnering agencies. There are no specific, USDOT-recommended funding sources for establishing or operating a 511 system. But an evaluation of different 511 systems finds a wide assortment of funding, ranging from ITS earmarks, Congestion Mitigation and Air Quality (CMAQ), and Surface Transportation Program (STP) funds, to other state or local funds (511 Deployment Coalition, 2005).

Recently, public-private partnership as a funding source has drawn significant attention. One very important element of this collaboration is that each side of a public-private partnership needs to understand the principles and ideals that govern the other. There is a need for team member consensus regarding the development approach and the technical tools to be used for making it successful (USDOT, 1998). Among several options that are being considered by different 511 agencies are advertising and sponsorships, and fee-generating premium services.

The decision to incorporate advertising or private sponsorships into a 511 service is an implementation decision, and there appears to be no restrictions on this from USDOT as long as the user experience is not harmed and the content is consistent with the public nature of the service. But the agencies should not rely solely on the private sponsorship in development and/or operation of 511 service, as those business models have had only limited success in the

past. The following paragraphs describe different public-private partnership stories of varying 511 services in the country.

Arizona DOT (ADOT) issued a request for proposal for a fee-generating service and got over 250 proposals. Only two proposals substantially met the requirements, but they did not fully qualify, and ADOT ended up funding the entire project (ADOT, 2005).

Colorado DOT attempted to implement ads, but they had very little success with this. Callers to the IVR system had to listen to advertisements first to hear the traffic report, which resulted in numerous complaints, and the state scrapping the plan (Mead, 2015).

Some states have been considering a few ideas for future revenue generation. New Mexico DOT (Remkes, 2015), and two 511 systems in California (the San Diego 511 and Los Angeles 511 systems) (Deeter, 2009) are planning to share features with private partners to generate revenues.

Some state constitutions, such as Tennessee's, do not allow the agencies to link with private sponsors or revenue generation opportunities due to liability concerns (Hall, 2015), while some states' governing bodies, such as Nevada's, have adjusted legislation so that the state can pursue sponsorship of the system (Remkes, 2015).

Some states use a third-party traffic information system. For example, Missouri DOT (MoDOT) has partnered with a private-sector company (Traffic.com) to provide traveler information services. Under this arrangement, Traffic.com operates the 511 phone system as well as a traveler information website branded as the Gateway Guide website used by MoDOT. Traffic.com operates this service without any operating costs to MoDOT. Unfortunately the partnership did not continue and the state DOT shut down their 511 service.

Georgia DOT has had great success in its public-private partnership business model with State Farm's provision of $700,000 annually to operate the 511GA system (Demidovich, 2015). State Farm provides an advertisement at the start of the phone call for about 5 seconds, as well as a tab on the 511GA website. The state decided to try the revenue model after someone they were approached and indicated it would be at no cost to the state to blanket roadside signs with ad such as "Brought-to-you-by," model. This system was used for several years. The state had plaques on roadside signs and sponsorships on its phone system. One big sponsor was used on phones, while whoever wanted signage sponsorship could do so on roads. There was significant interest in this. However, after some time, revenue streams from signs and telephones were not enough to keep the program afloat. These streams only covered 50 percent of the system's total cost. The state stepped in and supplied the remaining half. Georgia also tried Requests for Proposal (RFPs), but there was not enough interest. Pepsi, State Farm, Racetrack all expressed interest and then backed out.

Georgia does have a separate sponsor agreement with the "HERO" roadside assistance program. State Farm became a sponsor and advertised their name on the sides of trucks, uniforms, and signage. The state rolled the popular "HERO" sponsorship (roadside assistance trucks) and 511 sponsorship into one package, generating between $3-4 million each year. The 511 Program sponsorship is used to cover 50 percent of its expenses.

Virginia DOT has also been successful in public-private partnership, and their system is run by a contractor at no cost to the agency (511 Deployment Coalition, 2005). The Massachusetts 511 system has also been successfully partnered with Safety Insurance. Safety Insurance is sponsoring the 511 service, in exchange for having a short promotional audio in the IVR along with website banners and messaging advertisements.

Based on the current practices, it is clear that there are opportunities for businesses to have customizable advertising in the 511 system. The website can incorporate the sponsors' links

without any issues since it would depend on the viewer to visit the sponsors' website. The potential candidates to attract for sponsorship would be insurance companies, hotels, restaurants, tourism venues, taxicabs or car services, gas services, TV channels, etc. The IVR system can also be used for providing advertisements at the greeting, in cases where users might be switching through the steps of information, or when there is a delay in response. However, based on feedback from the public, it appears that pursuing this approach could be met with negative response from users who do not want to be subjected to ads while they wait for the information they seek. Therefore, a balance between the length and content of advertisements, and speedy delivery of the roadway information should be considered. The content of the message must be consistent with the public service nature of 511 and the government agency image. Just like websites, the mobile apps could also be another source to provide sponsors' information or links to their business websites. Another option would be providing acknowledgements for the sponsors on DMS signs. The message will not show any directions to any specific businesses, but would acknowledge their contribution by delivering a "brought-to-you-by" message.

There should be a clear strategy for sponsorship and revenue generation developed for the system. The following steps could be followed to develop such strategy when it would be time for the region to pursue the public-private partnership (which currently is not feasible),

- media opportunities needs to be identified that mesh with the overall mission of 511;
- need to analyze the current traffic volatility, and use of the telephone, web site, personalization system and mobile app;
- need to develop a model for advertising opportunities and revenue sharing;
- design a marketing package to be used to present advertising opportunities;
- need to create a database of potential advertisers (e.g. insurers, hotels, restaurants, tourism venues, taxicabs or car services, news channels, and other services);

- need to develop and execute a sales program (keeping a person in charge of this); and

- produce advertisements, and monitor and report progress of the implemented strategies.

MARKETING AND CAMPAIGNING

The 511 service implementer must enter into a continuing marketing campaign for the 511 service (511 Deployment Coalition, 2002). Making 511 a mission-critical way to communicate with customers and the promotion of 511 a priority at the lead agencies are the first steps to effectively marketing the service. Continuous efforts with significant promotions at the early stage are necessary, too. The marketing and campaigning efforts can be in many forms including radio, television, static signs, transit vehicles, airports, business establishments, as well as online advertisements. The national 511 coalition committee has established standards for 511 marketing and sample scripts, audio, and video files for the convenience of the deployment agencies (511 Deployment Coalition, 2002). Others might be available through a request made to the 511 Working Group or 511 listserv at http://groups.yahoo.com/group/511_ coalition. These can be followed as samples in this effort.

Following the standards, 511DFW has established a well-defined strategy for marketing and campaigning. The effort targets different age groups, different occupations, as well as people using different modes of transportation. The current plan is to use radio, television, online advertisements, major business companies, other out-of-home media (kiosks at malls, and shopping centers), stationary highway signage, dynamic message signs, highway radio advisories, as well as major cities' assets and visible arteries.

The focus geographic areas at the early stage of 511DFW deployment for marketing was the ICM corridors with primary focus on the five cities of Dallas, Richardson, Plano, University Park and Highland Park. The target of current marketing is to increase the usage of the 511DFW system by greater than 85 percent. With the marketing and campaigning efforts, the statistics on 511DFW usage in 2014 are as follows:

- o IVR calls – 138,345 (Table 9 in Appendix)
- o IVR calls for Transit information – 3,159 (Table 13 in Appendix)
- o IVR calls for Airport information – 1,246 (Table 14 in Appendix)
- o Number of website visitors – 12,513 (Table 10 in Appendix)
- o Number of My511 users – 2,545 (till December 2014, Table 11 in Appendix)
- o Social media users – 3 followers, 6,347 Twitter posts (Table 12 in Appendix)

The future campaigns should focus on the entire NCTCOG area. Also, 24/7 usage of the TxDOT DMS signs for 511 marketing would be another idea to consider. Since this effort needs to be approved by TxDOT headquarters, TxDOT local districts should be involved in pursuing this. A study shows that posting a marketing message on the DMS signs at times when there are no other priorities to display increases the usage of 511 services by 83% (ADOT, 2005). In the NCTCOG area, there are over 200 DMSs operated by TxDOT, and about 50 DMSs operated by North Texas Tollway Authority (NTTA), North Tarrant Express (NTE) and LBJ Express, all of which could be used to display the campaign message. This effort could be on a pilot basis for about six months, and the effort could be continued upon satisfactory response.

Also coordinating with the potential candidates that are being considered for revenue generation would be good options for marketing opportunities. In addition to the transit stops, expanding the marketing efforts to the airports (especially at the baggage claim areas) would be something to consider as well. Kiosks located at the airports and transit centers can also be considered for placement of campaign messages. Parking lots at different facilities such as

airports, transit stations, rental car agencies, garages at CBD areas, and stadiums could also be considered for campaigning.

Incorporating the local agencies into the 511DFW system, either actively or passively, is another strategy that can be considered. The policy at the Regional Transportation Council (RTC) would be such that any RTC partnering agency getting funds for their transportation improvements, would need to put the 511DFW logo on their website and officials should be encouraged to mention the 511DFW service (briefly) at every meeting. The agencies that are requesting and/or being awarded funds for their Intelligent Transportation System (ITS) projects should provide data to the 511DFW system. Before RTC implementation of these ideas as policies, coordination with local agencies is recommended, to better know about their capabilities and opinions on this strategy.

BILINGUAL SYSTEM

English

Español

Access to 511 services for Limited English Proficiency (LEP) callers should be considered when planning a system (511 Deployment Coalition, 2005). Guidance to Recipients on Special Language Service to LEP Beneficiaries issued by USDOT on January 22, 2001 determines its applicability. Though it is not mandatory to have both English and Spanish options in 511 systems in current guidelines, having the option for the Spanish-speaking population will benefit them.

As of 2015, there are forty-five 511 systems in 39 states in the United States, and several states and/or regions have a significant Spanish-speaking population. Yet only a limited number of 511 systems currently provide information in both languages. Arizona has a 30 percent Hispanic population (Census, 2015), and the Arizona 511 website provides information in both English and Spanish. However, the phone system does not have options for Spanish. In 2009, Florida DOT launched their new, integrated 511 system, which provides traveler information in both English and Spanish. Based on Census data, Nevada, Los Angeles, and New Mexico have 28, 45 and 39 percent Hispanic populations respectively, but do not provide the 511 service in Spanish. In contrast to that, in the Sacramento, California, and San Luis Obispo areas, the Hispanic population is 22 percent of the total population, and both of the systems have options for English and Spanish. In Texas, 39 percent of the population is Hispanic. Both the 511DFW website and IVR system should provide service in both English and Spanish. All of the options are recommended to be available in both languages (English and Spanish).

Having a live operator upon request would be another item to consider as statistics show that 15 percent of callers ask for a live operator. Studies show that the people asking for a live operator request information similar to what is available in the IVR options under some menus. In comparison to the additional information, the operating cost of a live operator is significantly high and a big commitment for any single agency. At this point it is not recommended to have a live operator upon request. Instead it is recommended that the IVR system adds phone numbers of the customer service centers of the partnering agencies, to which users can easily be connected automatically if they desire more personalized assistance. Just in case the 511DFW committees decide to host a live operator in future, the operator should speak in both English and Spanish, or there should be options to direct the call to an operator fluent in both languages.

DATA CONTENT, 511 FEATURES AND COVERAGE

The data content of the 511 system covers a broader range of components of the multimodal transportation system, as well as weather information. Typical roadway-related content includes information on construction/maintenance, road closure/limited access/incidents, special events, congestion/delays, as well as weather and road surface conditions affecting travel. The basic roadway-related content that is provided to the public should have a regional overview or summaries of current conditions. The content should also be route- and/or corridor-based in rural areas and segment-based in urban areas. The content should be provided with exact location, direction of travel, and time of the latest update. A checklist of the content that is needed for each highway content type, as provided by the 511 Implementation and Operational Guidelines, is as follows:

Table 4 – Detail Needed for Each Highway Content Type (511 Deployment Coalition, 2005)

Content Type	Non-urban	Urban	Location	Direction of travel	General description and Impact	Days / Hours and / or duration	Travel time or delay **	Detours / Restrictions / Routing advice	Forecasted weather and road surface conditions	Current observed weather and road surface conditions
Construction / Maintenance	✓	✓	✓	✓	✓	✓	✓	✓		
Road Closures / Major Delays	✓	✓	✓	✓	✓	✓	✓	✓		✓
Major Special Events	✓	✓	✓			✓	✓	✓		
Weather and Road Conditions	✓	✓	✓		✓				✓	✓
Incidents / Accidents (Minor)*		✓	✓	✓	✓					
Congestion Information*		✓	✓	✓	✓		✓			

* Major congestion information and incident / accidents are considered part of the "Road Closures/Major Delays" content type

** Desirable if the deployer has the capabilities to include this information as part of the service

Transit-related content typically includes schedule and fare information and service disruptions, along with call transfers and website links to transit agencies. The basic transit-related content that is provided to the public should cover all transit agencies in the area, with the service working in conjunction with the customer service centers and with each agency being responsible for its own information. The information should be sub-area-, jurisdiction-, or corridor-based. The content should be provided with exact location, direction of travel, and time stamp of the last update.

Weather information can include current conditions that are affecting travel (flooding, high winds, etc.), as well as forecasts. The basic weather information should include weather conditions as well as the related impact on traffic. Other or enhanced content should include special events, parking, CCTV, incident reporting, motorist aid, and tourism information. The system's providers should focus on data quality, as well. They need to make sure that the information is accurate and relevant, and being delivered in a timely and consistent manner. The system also needs to be reliable, and should be operated with real-time information 24 hours a day, 7 days a week.

The standard 511 traveler information system should consist of both a website and a phone system. All regions that have deployed 511 utilize co-branded websites. Through this "cobranding," 511 became the "brand" that travelers recognize for transportation information (511 Deployment Coalition, 2005). Investigation of the 511 systems in the United States shows that out of the forty-five 511 systems in 39 states, all forty-five systems have both websites and phone systems. At this time, only 28 systems have an additional mobile app to disseminate the traveler information more effectively (FHWA, 2015).

The 511DFW system that was deployed in 2013 has all three components: website (including a My511 personalization system, as well), telephone system, and mobile app. The website, telephone system, and My511 personalization system were deployed simultaneously in 2013,

while the mobile app was developed and is scheduled to release in 2016. The information provided via all of these media is consistent and follows national standards. This study (refer to Table 8) found that the fairly new 511DFW system is providing great information compared to other systems in the nation. The following sections describe the current features in greater detail and recommend new features that would provide additional, positive value to the system.

Website (www.511dfw.org)

The 511 Deployment Coalition committee has established a set of standards and guidelines for 511 systems. The 511DFW website consists of most of the features recommended in the standard guidelines. The website content, at a glance, is as follows:

- Roadway – Construction/maintenance, road closures, congestion, etc.
- Transit - Public transportation schedule, location, departure times, etc.
- Weather - Advisory warnings, road surface conditions, weather impacts, etc.
- Other/Enhanced – Special events, parking, CCTV, incident reporting, motorist aid, etc.

The 511DFW website is shown in Figure 2. The website has been evaluated from two different aspects:

- Data availability (data extent, percent coverage, accuracy, up-to-date, etc.)
- Ease of use

The website has information in five major categories: Select Region, Transit Planner, My511 (is discussed in My511 Personalization System), Traffic and Transit Conditions, and Travel Links. The website provides for flexibility of viewing information on a specific region (Figure 3). The regions are limited to two categories: DAL and FTW. Adding more flexibility to allow for finer-level detail such as each county and the respective cities under each county may attract more attention from travelers. It would also reflect that the 511DFW is designed to serve each city

under its coverage area, which will make the partnering agencies feel important and would encourage them in active participation.

The website does not utilize full-pixel resolution or full-screen extent to display the information. It uses about 50 percent of the screen on modern HD displays, which is basically developed for a 3:4 monitor not for 16:9, and this should be converted to responsive design technology to be compatible with any resolutions of the viewer's monitor.

Figure 2 – 511DFW Website

Figure 3 – Selection of Region

The availability of real-time transit information enables existing and potential riders to make better pre-trip and en-route decisions (Raman, Schweiger, Shammout, & Williams, 2003). Following this guidance, the 511DFW website developer added a transit planner, which is an interactive map with bus stations and rail lines, transit stops, parking locations, and departure schedules. The transit trip planner provides transit travel time, path, and location (Figure 4). A specific origin-destination request provides several options with different start times. The GIS-based interactive map provides flexibility to the users. Adding an option to zoom in on any specific jurisdiction would attract more transit users.
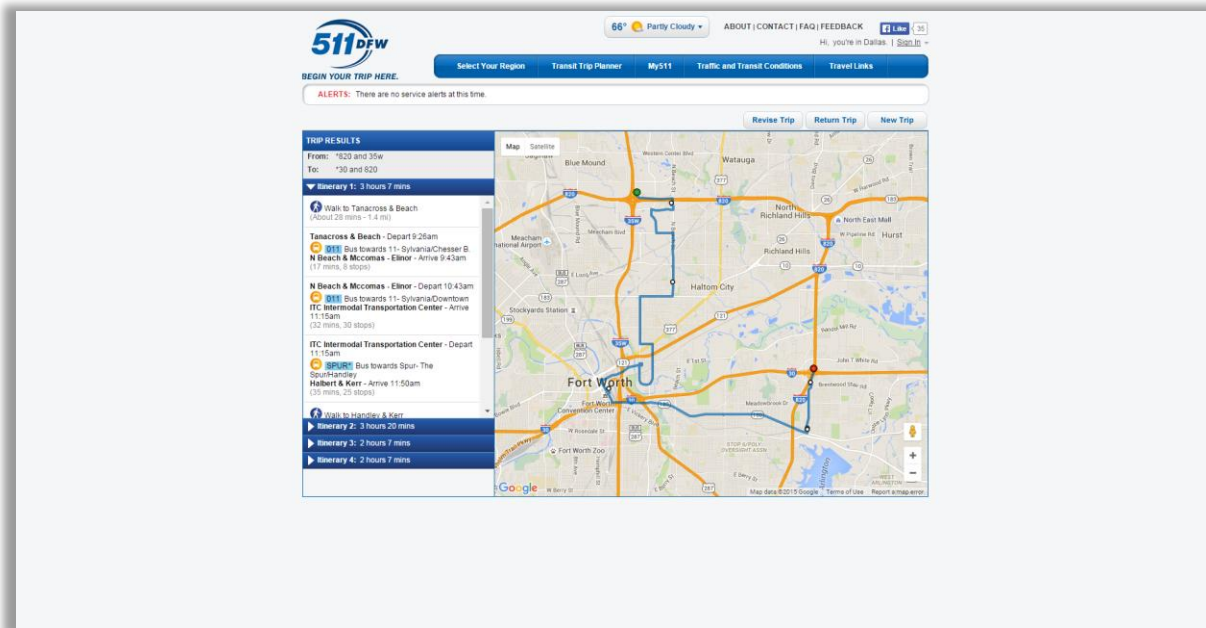
Figure 4 – Transit Planner

The Traffic and Transit Conditions section has two options: a map shows the incidents or information, and a list of events (Figure 5). The map option consists of information on the following items with the location of the events:

- Traffic incidents

- Traffic construction

- Traffic speed

- HOV speed

- Transit incidents

- Transit construction

- Special events

- Weather alerts

- Weather forecasts

- Radar overlay

- Rail

- Bus stops

- Message signs

- Traffic cameras

- Parking information

The interactive map also should show the detour or alternate routes when an incident occurs on the roadways. The information is very important to make decisions when travelers are on the roads stuck in the queue (Virginia DOT, 2004). The list does not show information on incidents or construction on arterials. Since adding incident and construction information on arterials for the entire region would be very cost-intensive with the current setup, it would be a good start to disseminate this information on the routes of significance. Figure 9 in the Appendix shows the routes of significance for the NCTCOG area. The traffic cameras are only freeway cameras, and no arterial cameras are available. The map also does not show the travel time for different modes. The map allows many overlays at the same time; however, when the 'Special Event' is selected, it removes most of the overlays and does not allow the user to re-select the other options until the 'Special Event' is de-selected. This issue needs to be fixed.

The website also does not show any information on the bridges, low underpass routes/ locations, and truck routes. The weather information shows basic weather information. We would recommend adding road surface conditions: dry, icy, wet, and flooded. Construction and/or closure notices do not provide detour and exit information. Partnering with TV stations would reduce the cost of providing detailed road surface conditions. Another opportunity is to collaborate with Collaborative Adaptive Sensing of the Atmosphere (CASA) to get detailed, weather-related road information for free.
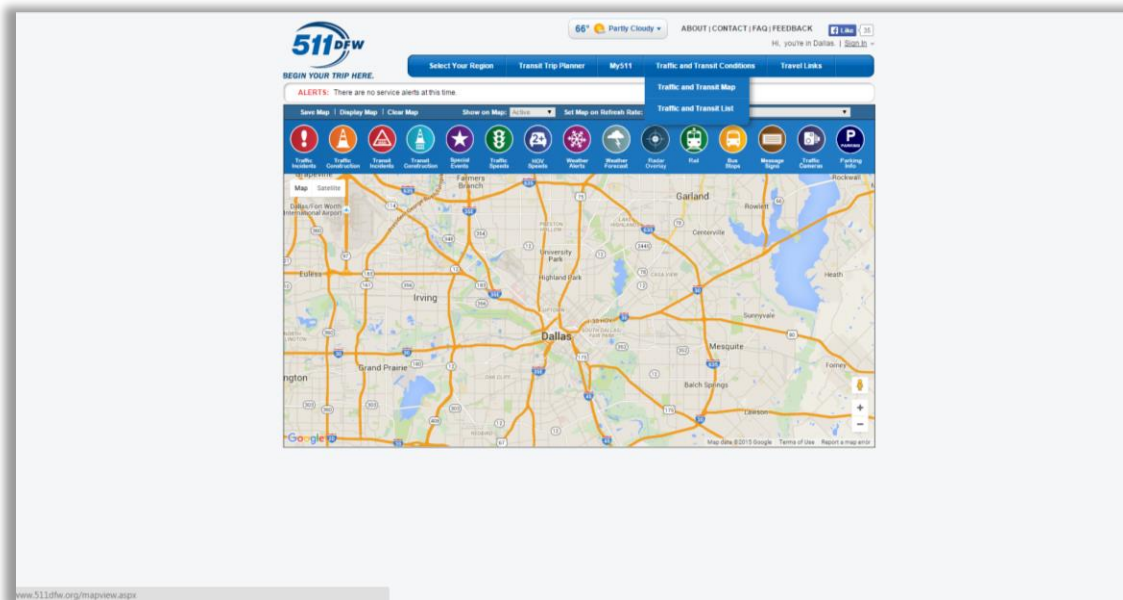
Figure 5 – Traffic and Transit Conditions

The website incorporates links to the options for Rideshares, Paratransit, and the Developed Resources. The site does not show links to bike and pedestrian trails. The traveler information system can also benefit the commercial and freight companies (Raine, Withill, & Eddy, 2014). But the list here in 511DFW system does not provide contact links to seek permits for oversize loads and overweight loads, or for information about hazmat routes. The website does not show links to the airport authorities and the neighboring 511 systems (New Mexico, Colorado, Kansas, and Louisiana) either. Adding the links to the neighboring 511 systems would provide the user full control on the information that they need for their trips. The website can also link documents on accessibility routes for pedestrians and bikes. One issue with the travel Links tab is that when clicking on the tab itself (not on the drop-down menu), the user is taken to the Home page, which needs to be fixed.

Figure 6 – The Traveler Link

Because many of the benefits of traveler information systems such as 511 are qualitative, it is important to be able to capture users' experiences as a way of evaluating the system's performance (ADOT, 2005). Capturing valuable information about the ways that users interacted with the system is important, and this information not only reveals how callers are using the system but also where improvements are needed to make the service easier to use and provide better travel information. The system currently provides an option to provide user feedback in the form of an email.

The website home page does not show the back door number of the 511DFW phone service. Adding the number (877-511-3255) on the home page will allow a user to get info even if they are physically outside of the area. The website also does not have the option to get real-time performance indicators. Adding the performance indicator would provide users with more insight about traffic conditions. The following indicators based on the real-time traffic data could be displayed in graphical format on the website:

- Congestion duration

- Extent of congestion

- Travel time reliability

- Average freeway travel time

- Average arterial travel time

- Average transit time

- Volume-to-capacity ratio

- Incident duration

The website does not contain a dedicated page for summary information on Amber alerts only which needs to be included. Guidelines for Amber alerts and relevant messaging can be found at the Amber, emergency, and travel time messaging guidance for transportation agencies (FHWA, 2004).

After reviewing a number of 511 websites in the United States, overall, the 511DFW site seemed to be difficult to navigate compared to other systems, and also difficult to understand where to get started. Many other city and state sites have clearly defined callouts and buttons to download apps. The live traffic map is not easily found compared to many other cities and states that have their maps on the home page, which is where the Metroplex map should be. Besides the 511DFW website, TxDOT has at least two other websites that disseminate real-time traffic information: http://drivetexas.org and http://its.txdot.gov. Navigation in these two sites is more intuitive than the 511DFW website. The Twitter feed appears to be an accurate and helpful feature. Twitter should be promoted more as an efficient means of broadcasting and receiving the info.

Overall, the idea and concept for this system is good. However, from a user's perspective, the implementation and use of the tools is too complicated. The site needs to be much simpler to use and navigate. There is also a lot of redundancy on the home page with the main images and

the drop-down pages. Deleting some of these links and pages could alleviate some of the users' confusion on where to go for helpful information.

Interactive Voice Response (IVR)

The key telecommunication elements of a 511 service should allow the system to accept calls, interact with users, process queries and commands, and provide useful information back to callers (511 Deployment Coalition, 2005). 511 telephone service can be evaluated through the following four major criteria:

- Accepting calls

- User interface

- Processing commands

- Output – providing information

The IVR for the 511DFW service has been evaluated from three different aspects:

- Data availability (data extent, percent coverage, accuracy, current date, etc.)

- Voice recognition

- Ease of use

Calling different state 511 phone call systems revealed that most systems follow the standard organization and comply with the Implementation and Operational Guidelines for 511 Services. The IVR 511DFW system is capable of accepting calls from both cell phones and landlines. The User Interface system has voice recognition and touch-tone system as a back-up option, as is standard. The top menu structure is more or less consistent with the standard: Traffic, Public Transportation, and Transit. The system also offers more choices – Weather, Airports, My511, and DART. The menu levels are consistent with the standard: no more than three entries/menus to get information; and no more than six options listed at any level. The system does allow users to "go back" and to the main menu by saying "Main Menu." The system also allows user to "barge in" and cut the system short, as well as stop and move on to another

topic. But the system does not offer any shortcuts in menus. The system processes answers within 1-3 seconds unless responding incorrectly.

There are several options to present information in the IVR system. Text-to-speech and concatenated systems are commonly used by different 511 systems. A text-to-speech algorithm uses software to convert typed text into audible words, whereas concatenated is a method of parsing previously recorded words or phrases, pieced together to produce sentences. Text-to-speech is comparatively less expensive than the concatenated system, but the concatenated system provides higher-quality sound. Currently, the 511DFW IVR is using the concatenated system, and the output of any call/request provides straightforward information with a volume that is of high quality. Though the option is expensive, it is recommended to keep using the currently adopted concatenated option.

The 511DFW system contents offer similar information to what is provided in the website. The system provides roadway-related information: driving times only for destinations in Dallas/Ft Worth and traffic slowdowns on major highways. The system does not report the reason of slowdown (incident, construction, road closure, etc.) and also does not provide information on alternate routes. The system also provides information on transit and weather. On transit, the system provides transit schedules and departure times and has an option to speak to an operator. But the system does not consider that people may or may not know the location of nearest transit stop. In weather, the system provides current information and basic forecasts on weather and temperature, but does not provide any information on road surface conditions, or advisory warnings. The menu has options to transfer to the airports: Love Field Airport or DFW Airport.

However, there is a several second delay when dialing "just" 511. Also, the system does not consistently recognize/understand some of the city names offered, including Watauga.

There is no option for getting a live operator at this time. Statistics of other 511 call systems that provide live operators show that 15 percent of the calling travelers ask for a live operator for some sort of information including traffic, transit, and airport. As mentioned early in the report that the information requested by the caller to a live operators is also available in the IVR menu and is not any new information. Therefore, considering the huge cost of hosting a live operator and the limited additional information that can be provided by doing so, it is not recommended to have the option at this stage.

The call system is not integrated with the My511 system, which is an utmost need to implement. This would ensure that the traveling public can get information on their preferred routes just by calling the 511 number. The system also does not have any options for selecting a Spanish language option, which needs to be added.

The system also does not offer to connect to the neighboring 511 systems, which needs to be implemented as well. Currently, the neighboring states 511 systems are: New Mexico, Colorado, Kansas, and Louisiana 511 systems. When new neighboring 511 services are available, then they need to be added to the list as well. For example, if the Houston region launches a 511 service, that region's system or back-door number should be added into the menu for possible call transfers.

Another important part of the IVR is a floodgate message. Floodgate or broadcast messages are played at the beginning of the call (or upon reaching certain menus in the 511 system) before any other information or instructions are given. They should be used for information that is critical for travelers to know in a defined area or for a certain transportation agency. The information on the following types of events can be disseminated as a floodgate message:

- Major incidents
- Road closures
- Detours

- Traffic delays more than a certain limit (e.g. 30 minutes)
- Major adverse weather
- Security-related alerts
- Amber alerts

The events that affect the traveling public or span across multiple agencies could be added in this category. The floodgate messages should be kept short, as the information may not apply to all users of the system. Floodgate messages can be placed at the statewide, county, or roadway level. It is also possible to place floodgate messages for entities such as airports, buses, etc. Floodgate messages can be implemented in various ways, but the two basic types are uninterruptible and interruptible – the latter meaning a caller can override or skip the message. Before placing a system-wide floodgate message, a managerial person from the traffic control room must authorize and review the message for approval as well as take the responsibility for this action. During the evaluation period for the 511DFW system, no messages have been found to be added in the floodgate message option, however, the current system has an option to post floodgate message through a software manager.

Overall, the IVR is a good system considering the user-friendliness and content of other 511 call numbers in other states. 511DFW is intuitive and provides helpful information regarding traffic conditions throughout Dallas-Fort Worth.

My511 Personalization System

The My511 Personalization system provides users the ability to create their preferred routes and get notifications in their account on the routes automatically when any events take place. There are 45 total 511 systems in the USA, and not all of them have a personalization system. Some of the personalization systems are very user-friendly, and some of them are not. Also some of the systems are not informative and poorly designed. Some states provide Spanish options in their personalization system and some do not. The My511 Personalization system

shown in Figure 6 has been evaluated from the following aspects: options, ease of use, and technological compatibility.
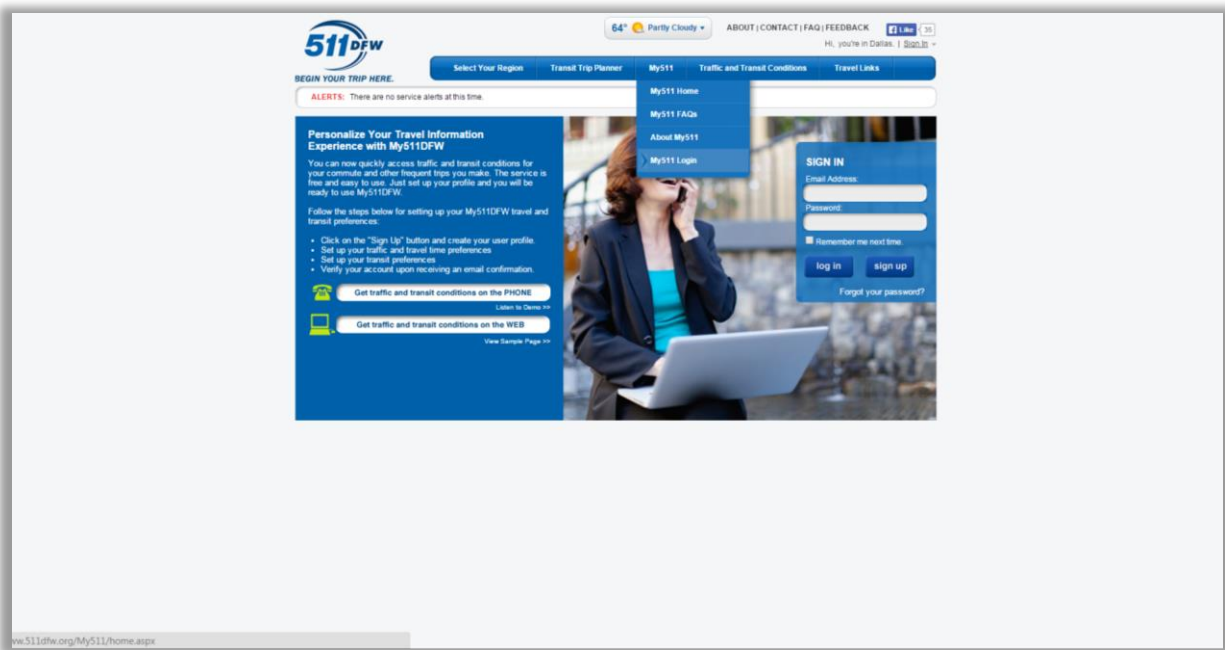
Figure 7 – My511 Personalization System

The system offers a clean look, and gives specific latitude and longitude coordinates to go with mile markers. There is also easy navigation of icon choices. However, the login and sign up tabs could be larger to make it easier for the user to access.

After setting up a My511 account, and choosing my available route "Home to Work", there are only a few available route options to select, with limited departure and arrival points. Compared to other commonly used navigational tools such as Google Maps or Waze, this system is extremely limiting when selecting user routes. Under "Sports to Home," two of the largest stadiums in the area – AT&T Stadium and Globe Life Park – are listed only by their previous names (Cowboys Stadium and Rangers Ballpark). The system needs to be updated as well when any name change takes place due to change of the sponsorship. The nearest attraction/landmark to these venues is Six Flags and is not very accurate. The option of adding

cameras is a nice feature to have. The only drawback is not having these views in real-time video. The technology appears to lag a bit when adding and deleting trip information, which may depend on the internet connection and the device being used for browsing.

The phone number entry block seems not to accept specific numbers. For example, it has been found that, by default, the system changes 972-580-0662 to 725-006-2000. Also if the user puts a wrong phone number and tries to correct it using backspace that does not work here. During the study period the contractor resolved the issue of phone number acceptance.

Overall, this system is very cumbersome and not easy to use compared to other navigational options currently used by a large portion of the public. To simplify the process, multiple steps (pages) can be deleted from the site so users do not have to drill down to get what they need.

Another feature that could add some value to the system and also can attract more users is automatic text or notifications. Adding an option to send an automatic text to the user if any events take place on the pre-selected routes would definitely draw the attention of users and add value to the system.

In the Dallas/Fort worth Metroplex, there are multiple sources for live, up-to-minute traffic information, all of which are popular with users. All of these sources are free, which creates a competitive disadvantage for the My511 system. These resources include:

- KDFW – Channel 4 – website's data source is Bing
- KXAS – Channel 5 – website's data source is Google
- WFAA – Channel 8 – website's data source is Here.com
- KTVT – Channel 11 – website's data source is sigalert.com
- KRLD 1080 AM, WBAP 820 AM and various other radio stations
- Google Maps
- Waze app

- Apple Maps

- MapQuest app

- Here.com

- MapQuest

- Sigalert.com

511DFW Mobile Applications

As mentioned before, the 511DFW service also provides users with a user-friendly mobile application (also known as mobile app). A study by the Pew Research Center shows that 90 percent of American adults have cell phones and 64 percent use smart phones, which indicates that having a mobile app will attract a significant number of users (Pew Research Center 2015). A concern is technology compatibility, which may not be a major issue now. A study showed that the smart phone market share of the different operating systems (OSs) are: Android 78.0%, Blackberry 0.3%, iPhone 18.3%, Windows 2.7%, others 0.7% (IDC.com 2015). Therefore, development of apps for the three leading operating systems (Android, iPhone and Windows) will cover a wide portion of the users. The current app is compatible with two major OSs: Android, and iOS, which allows more than 96 percent of the smartphone owners to use the app and get real-time traveler information.

The current app is overall synchronized with the website, IVR and My511 Personalization system. Figure 8 shows the Home page and the Disclaimer page of the app. Without accepting the mobile app, the user cannot use any of its functions. The app has three major options with features of: transit (top left icon enables a drop-down menu), traffic (top right icon enables a list of different features), and an option for displaying the current location of the user.
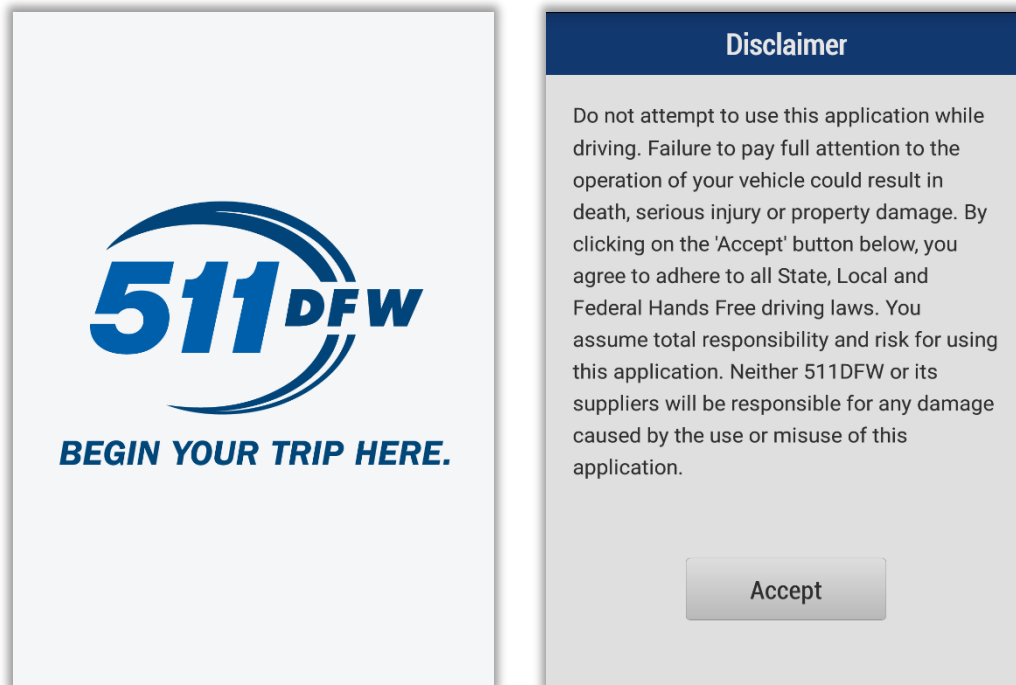
Figure 8 – Mobile App Home Page (left) and Disclaimer Page (right)

The icon for transit information (Figure 9) provides the following list of features to the user.

- Transit planner

- Hands free (Talk to me)

- Transit tracker

- Transit near me

- My511

- My favorite

- Departure time alerts

- More information

    o Call My511

    o Rideshare

    o Paratransit

    o Feedback (useful addition)

o   About

o   FAQ
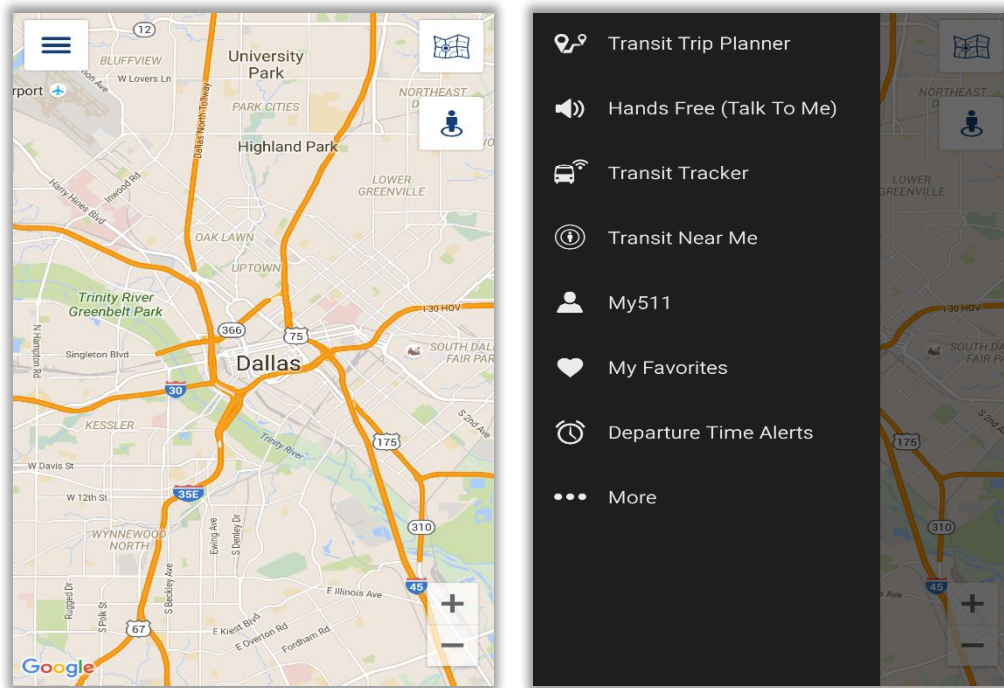
Figure 9 – Mobile App Transit Information

The icon for traffic information provides the following features to the user, and each option can be enabled or disabled just by clicking on the respective legend.

- Traffic incidents

- Traffic construction

- Transit incidents

- Transit construction

- Special events

- Traffic speeds

- HOV speeds

- Weather alerts

- Weather forecast

- Radar overlay

- Rail stops

- Bus stops

- Message signs

- Traffic cameras

- Parking info
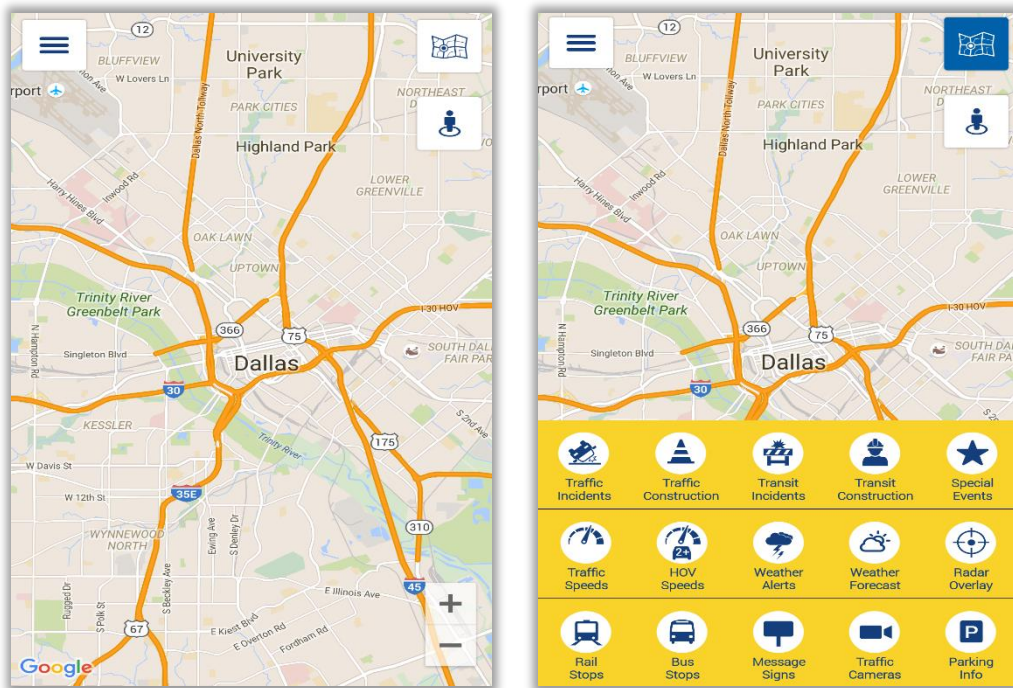
Figure 10 – Mobile App Traffic Information

The icon just below the traffic information, shown in Figure 11, enables displaying the current GPS location of the user.
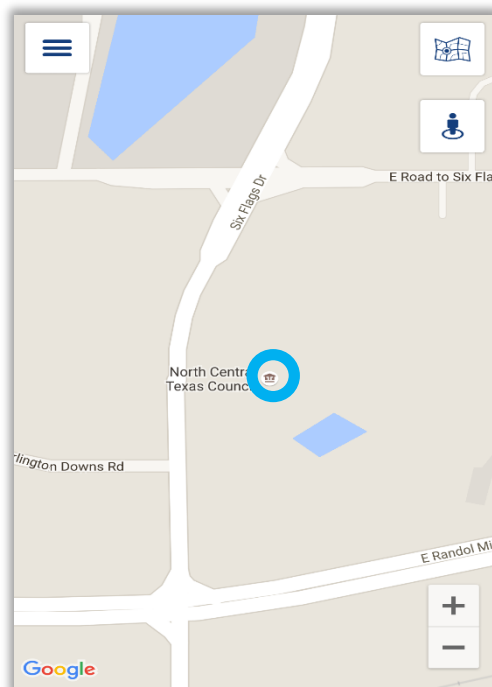
Figure 11 – Mobile App Current Location of the User

Overall the mobile app (scheduled release date is in 2016) looks good. It is believed that adding an option for building a trip just like Google provides will attract more users. Adding a summary of all alerts including transit, traffic, and Amber alerts is also recommended. The section called More Information can have links to Twitter and Facebook, as well. Also, the app should be available in both the iPhone store and Google Play for free download. Also the website should have information about the 511DFW mobile app to let the public know about the existence of the app for their use.

CHAPTER 3: RECOMMENDATIONS FOR 511DFW ENHANCEMENT

A list of higher-priority recommendations is provided in the following sections. The recommendations have been categorized into seven categories, and the recommendations in each category are ranked based on their relative priority.

LIST OF PRIORITIZED NEEDS

Item 1: Recommendations on Management, Organization and Collaboration

Efficient and cohesive organizational structures and effective collaboration are the pre-requisites for a successful 511 service. The lead agency should ensure that the coordination is taking place, data sharing is running smoothly, and any issues that may take place get resolved. It is also the lead agency's responsibility to investigate the institutional capabilities of any partnering agencies and provide support, as needed, to enable them to actively contribute to the 511DFW operation. The following list shows the prioritized needs for the 511DFW system.

1.1 Coordinate and/or partner with cities and other agencies to provide as much accurate information as possible. Form a 511DFW coalition with two levels of committees to cover all agencies under the 511DFW coverage. The two level committees are 511DFW Executive Committee (led by the NCTCOG) and 511DFW Operations sub-committees. The Executive Committee is formed by the partnering agencies, whereas the operations sub-committees are formed by the non-participating agencies which are under 511DFW coverage. The 511DFW PM will be the chair for the Executive Committee. The executive member will be representing the non-participating agencies in the higher-level committee. The coordination effort should take place periodically for efficient coordination and system operations as described in Table 3.

1.2 Coordinate and/or partner with cities and other agencies to provide as much accurate information as possible. The executive member agency of each sub-committee should be responsible for coordinating with all cities in the group and also address any issues or concerns that cities might have. The 511DFW PM will serve as the main point of contact.

1.3 Each city should have designated personnel to enter data into the system. The cities would be selected by their proximity to the routes of significance. Training should be provided to use EcoTrafiX to the personnel by the vendor. The contractors could provide the training sessions, and this would be a moderately expensive effort, but the coordination and assignments of the city personnel would take a significant amount of personnel hours at the early stage. This effort will take fewer hours as time goes by and as the personnel become more familiar with the system.

Item 2: Recommendations on Partnership and Data Integration

Partnership with the private sector can reduce data costs significantly. CASA showed an interest in sharing weather data with the 511DFW system, and also partnering with private data vendors like Waze will provide more data coverage to the 511DFW system. It is also recommended to keep the option open for integrating connected vehicle data into the system.

2.1 Partner with CASA to get updates and integrate this information to the 511DFW features that includes website, IVR, My511 Personalization System, and 511DFW mobile app.

2.2 Partner with websites/apps such as Waze, etc. that are used by motorists to report incidents, slowdowns, and traffic. This could serve as a means of receiving and sending information back and forth between the 511 system and partnering websites/apps. The website DriveTexas.org provides a lot of traffic-related information in a user-friendly interactive map.

2.3 Plan for the integration of future technologies such as in-vehicle Wi-Fi and Vehicle-to-Vehicle (V2V)/Vehicle-to-Infrastructure (V2I) communication.

2.4 If TxDOT decides to implement a statewide 511 system eventually, then integrate the 511DFW system (including hardware and software) into the statewide system to save cost.

Item 3: Recommendations on Marketing and Campaigning

Marketing the 511DFW system should be one of the top future priorities. A lot of people are not aware that such a system exists, and rely on other websites/apps for traffic information. Promoting the system through a marketing and advertising campaign of some sort should help more users to be aware of its existence and benefits.

3.1 The marketing area should extend to the entire 511DFW coverage agencies from the original plan (original focus area was the US 75 ICM corridor). Medium to high expensive item.

3.2 In addition to the current marketing and campaigning efforts by DART (implemented on some train and bus advertising within the limits of the space DART has for its services), existing DMS signs operated by TxDOT, NTTA, NTE, and LBJ Express, along with social media and e-mail lists, are a few potential options to spread the word regarding the 511 system.

3.3 Coordinate with airport authorities and put marketing advertisements at the baggage claim areas – including both audio and poster.

3.4 Also coordinate with the parking authorities at airports, transit stations, rental car facilities, garages at the CBD area, and sport stadiums for marketing and campaigning efforts.

3.5 Provide advertisements along the freeways on billboards or static signs to promote the 511 service.

3.6 Establish RTC policy to promote the 511DFW marketing and campaign, and to foster data collection collaboration, by teaming up with the RTC partnering agencies.

Item 4: Recommendations on Public-Private Partnership

Public-private partnerships provide the agencies with the opportunity to generate revenue from the 511 system. The revenue can be used to reduce the operational cost of the system. Since the current usage of the 511DFW system is not significantly high, it is recommended to focus on the marketing and campaigning now to increase the number of users. Also, increasing the popularity of the 511DFW system so it is being used by a significantly high number of travelers will draw more attention from potential sponsors. Therefore, it is recommended that the 511DFW Executive Committee keep the option open for future revenue generation opportunities.

4.1 Create a project to develop and coordinate with potentially interested candidates to generate revenue through the process of public-private partnerships.

Item 5: Recommendations on 511DFW Features

Considering that the 511DFW system has been deployed in 2013, it provides a wealth of information on traffic, transit, parking, and weather. It also meets the national standards and requirements. The recommendation is to keep operating the developed 511 system with few recommendations to add new features that will increase the value of the overall system. The recommendations for adding new features to the 511DFW website, IVR, My511 Personalization system, and the mobile app are summarized in the following sections.

Sub-item 5.1 – Website (www.511dfw.org)

5.1.1 Switch to the responsive design to make the website compatible to modern HD quality 16:9 resolution in addition to the 4:3 resolution screens and any other resolutions to display the information.

5.1.2   Add option to select a specific county and city on the map.

5.1.3   Provide the back door number (877-511-3255) to the 511DFW system.

5.1.4   Add incident and construction information for routes of significance.

5.1.5   Provide a summary of all Amber alerts.

5.1.6   Add the option to show travel time (both directions) just by clicking on the routes (established corridors by TxDOT for freeways and routes of significance by agencies).

5.1.7   Add city cameras to the website.

5.1.8   Show locations of bridges, low underpass locations, truck routes, and hazmat routes with specific information.

5.1.9   Coordinate with CASA and add specific weather information (e.g. icy, wet or flooded roadway).

5.1.10   Provide links to pedestrian and bike routes.

5.1.11   Provide links to the permit authorities for oversize, overweight, and hazmat carriers.

5.1.12   Add a new link with access to the coordination documents, meetings, etc. for the partnering agencies only. The vendor shall generate a username and password for each agency.

5.1.13   Fix the link to the social media sites such as Twitter and Facebook.

5.1.14   Add information about the existence of 511DFW Mobile App and the sources where the users can download it.

5.1.15   Add links to go to the partnering agencies' websites and customer service centers.

5.1.16   Add links to the neighboring 511 systems run by neighboring states (New Mexico, Colorado, Kansas, and Louisiana).

5.1.17   Add detour information for any incidents taking place.

5.1.18   For construction, add information on detour exit.

5.1.19   Add performance measure dashboard to the website.

5.1.20   Make the overall system more user-friendly. Making the Traffic and Transit Conditions page as the home page, deleting redundant links and information, and switch to responsive design would provide a clean cut look to the site.

Sub-item 5.2 – Interactive Voice Response (IVR)

5.2.1   Add roadway conditions in addition to the general weather information.

5.2.2   Add option for broadcasting floodgate messages.

5.2.3   Add construction and incident information on the routes of significance.

5.2.4   Add option to get traveler information on the preferred routes only, as set up in My511 Personalization account.

5.2.5   Add options to connect to the neighboring 511 systems (New Mexico, Colorado, Kansas, and Louisiana).

5.2.6   Add shortcuts in menus.

5.2.7   Add reasons for congestion or slowdowns.

5.2.8   Fix some issues with recognizing city names, such as Watauga.

5.2.9   Add options to connect to a customer service representative of the partnering agency.

5.2.10 Add directions for detouring or alternate routes for any closures.

Sub-item 5.3 – My511 Personalization System

5.3.1   Add options for automatic text or email alerts in a case when any events take place on the favorite routes.

5.3.2   Integrate with the IVR to get information on the preferred routes.

5.3.3   Add Spanish option.

5.3.4   Add more major tourist and trip attraction locations in the menu.

5.3.5   Update the names of the major trip attractors when the names get changed for the change of ownerships or sponsorships.

5.3.6   Make the login and sign-in tabs larger.

5.3.7   Keep track of annual usage of the My511 personalization system.

Sub-item 5.4 – 511DFW Mobile app

5.4.1   Make the mobile app available for free download and installation both at iPhone store and Google Play.

5.4.2   Add an icon to get a summary of all events by category that includes incidents, construction, and Amber alerts, for both traffic and transit.

5.4.3   Add links to get connected with Twitter and Facebook.

5.4.4   Add phone numbers and website links of the neighboring 511 services (New Mexico, Colorado, Kansas, and Louisiana) with the appropriate options to go to the website or call the respective numbers.

Item 6. Bilingual System

Considering that Texas has a 39 percent Hispanic population, it is recommended that the 511DFW system provide the traveler information both in the English and Spanish languages via all four dissemination systems: website, IVR, My511 personalization system, and mobile app.

6.1.1   Add website features in Spanish (add two buttons: English and Spanish at the top right corner of the website, which will change the language with just a click). My511 also needs a Spanish version.

6.1.2   Add Spanish version for the IVR. Add a sentence just after the welcome sentence and before providing the list of choices to the caller. The Spanish version should use concatenate system informing the sentences. If sufficient fund is available while deploying, it is recommended that the 511DFW committee delays the implementation until the fund is available for use.

6.1.3   Add option to use Spanish version of the mobile app to all mobile app users.

Item 7. Overall 511 DFW System's Performance Monitoring

Recommendations for the performance indicator to measure the operational performance of the 511DFW system in real time have also been developed and are provided in the following sections. The entire effort is envisioned to be a ***low cost item*** based on the information needed, system's functionality, and the effort needed to store the data. The following recommended list is very comprehensive, and thus it is also recommended that the contractor select a short, justifiable list of indicators, make sure that the indicators are monitored regularly, and ensure that the monitoring system covers all the features and components of the 511DFW system.

7.1 Keep track of percent uptime of the website, IVR, My511 Personalization system, and 511 mobile app.

7.2 Ensure that messages (construction, incidents, weather, travel time, etc.) being provided by the 511 system contain the latest, accurate information, by having software monitors maintained in locations of data flow including:

- o Data acquisition, data fusion, and message generation
- o Message data transfer to the 511 systems
- o Mean duration of entry in system to availability on 511
- o Message delivery to the customer

System Performance Reporting should be monitored on a basis determined by the 511 deployer, at least monthly, and could include:

- o Number of data (incident, road condition, construction, etc.) transfer requests
- o Number of successful data transfers from database to 511 system – these could be from the deployer to the ASP, from the ASP to the 511 Database, and from the database to the 511 system IVR

- o Number of batch data transfers – there could be several different batch data transfers, depending on the system design
- o Transfer of information (from database) to IVR for dissemination
- o Average age of incident messages (from generation to clearance)
- o Average age of non-incident messages – such as floodgate messages
- o Average age of the message set transferred to the 511 system – this may vary with various data sets, etc.
- o Comparison to source data – quality control to ensure that data is not corrupted and messages are developed properly
- o System CPU usage / capacity – monitor the data to check system availability and performance
- o System data storage – monitor this also for overall system performance
- o Peak number of simultaneous users – to gauge appropriate system sizing
- o Unscheduled system downtime – when the system went down, when it came back online, the reason for the failure, and how it was fixed, to gauge system operations according to contract terms
- o Maintenance downtime – when the system went down and when it came back online, to gauge system operations according to contract terms

Systems maintenance should be monitored:

- o IVR System:
    - ✓ XML data feed – is information current and correct?
    - ✓ Voice recognition software – is tuning required to enable customer access to information?
    - ✓ Data transfers / regional interoperability – is information exchange from neighboring 511 services available?
    - ✓ Call transfers – are calls being routed to the proper agency and service numbers?

- ✓ Touchtone access – available as a backup, or primary in some cases, method of accessing information?
- ✓ Multilingual message coordination – are translations proper and conveying appropriate information?
- ✓ Call in reporting function – are floodgates and other messages available on the service?
- o Website system, My511 personalization, and Mobile app:
  - ✓ XML data feed – is information current and correct?
  - ✓ Website hyperlinks – are Internet users being routed to the proper agency and service websites?
  - ✓ "Static" databases – is this information still available and accurate?

CHAPTER 4: IMPLEMENTATION PLAN, COST AND SCHEDULE

The prioritized list of needs (developed and presented in Chapter 3) has been categorized into five major areas for implementation: management and organizational collaboration; enhancement of 511DFW system; marketing and campaigning; bilingual service; and revenue generation effort. Each item with its respective set of efforts has been discussed in this section. Tentative budget levels have also been developed that will help the NCTCOG to secure funds for the implementations. Based on the priority of the recommendations, an implementation plan has also been developed and is shown in Figure 12. The items are packaged in the forms of different requests for proposals (RFPs) with the necessary budget. Some items do not require any external expenditures but require a significant amount of agency personnel time. As part of the budget, the time from agency personnel that is required to implement the recommendations has also been estimated and presented in the respective sections.

IMPLEMENTATION PLAN AND COST ESTIMATION

Item 1: Management and Organizational Collaboration

This item has a recommendation that would be implemented in two phases. In the first phase, the lead agency, NCTCOG, coordinates with the authorities who have some sort of information dissemination medium that could be used without any extra charge for marketing purposes, and also develop internal policies. Phase two would be an on-going effort that requires inter-agency and intra-agency coordination and new partners' staff trained up to perform the regular data entry tasks.

In this section, the only task that requires funding is to provide training to the staffs. There is no need for any RFPs for this task. It is envisioned that the contractor who will be in charge of regular operations and maintenance would provide the training to the staffs. This needs to be incorporated in the specifications while hiring contractors for annual operations and

maintenance. The on-going coordination requires two levels of meetings. It has been estimated that each executive level agency requires 450 hours annually and each operation sub-committee member agency requires 370 hours annually for the 511DFW coordination (refer to Table 5 for detailed information).

Phase 1 – DMSs, Airports, RTC Policy

- Using existing DMS signs operated by TxDOT, NTTA, NTE, and LBJ Express, as well as social media and e-mail lists, as a few potential options to spread the word regarding the 511 system.
- Coordinate with airport authorities and put marketing advertisements at the baggage claim areas as audio announcements.
- Establish RTC policy to promote 511DFW marketing and campaign, and facilitate data collection collaboration by teaming up with the RTC partnering agencies.

Phase 2 – 511DFW Operational Coordination

- Form a 511DFW coalition led by NCTCOG with two levels of committees: Executive Committee and operations sub-committees to cover all agencies under the 511DFW coverage. The coordination effort should take place periodically for efficient coordination and system operations as described in Table 3. Table 5 shows a breakdown of the time that is required for each agency. The number of hours are estimated based on the time that would be required for coordination among partner agencies, meeting preparation and participation, educational training and daily data entry.
- Coordinate and/or partner with cities and other agencies to provide as much accurate information as possible.
- Also provide training to the data entry personnel of each agency on how to use EcoTrafix and enter the data accurately, timely, and efficiently. Estimated cost for providing training to all agency members is about $40,000 – $50,000.

Table 5 – Agency Coordination and Data Entry Efforts

Level of Participation	Agency Personnel	Executive Committee Meeting	Coordination Meeting	Training/ Education	Data Entry and Operational Coordination	Total Annual Efforts
Executive Committee Member	Manager/Planner/ Engineer	2 persons @ 20 hours per meeting (2X20X3) = 120 hours per year	2 persons @ 10 hours per meeting (2X10X6) = 120 hour per year	2 persons @ 20 hours (2X20) = 40 hour per year	2 persons @ 2 hours per week (2X2X52) = 208 hours per year	448 hours
511DFW Operations Sub-committee Member	Data Entry Manager/ Event Coordinator	-	2 persons @ 10 hours per meeting (2X10X6) = 120 hour per year	2 persons @ 20 hours (2X20) = 40 hour per year	2 persons @ 2 hours per week (2X2X52) = 208 hours per year	368 hours

Item 2: Enhancement of 511DFW System (RFP1)

This item has features to be implemented in three different phases. In the first phase, coordination between 511DFW committee and private data providers should take place. As the private data vendors agree to collaborate, the 511DFW will have their data integrated into the system. It has been assumed that this effort would not require any extra funds and the data would be free of cost. In the second and third phases, the recommended features need to be added in the 511DFW components that include website, IVR, and the mobile app. The effort also includes establishment of a real-time system performance monitoring system. Phase 2 and 3 would require hiring an external contractor to implement the recommendations. It is envisioned that a single RFP will cover both phases of implementation, and the budget for this effort has been estimated to be $250,000 – $400,000.

Phase 1 - Partnership and Data Integration

- Partner with CASA to get weather information and push the information to the 511 components.
- Partner with websites/apps such as Waze, etc. that are used by motorists to report incidents, slowdowns, and traffic.

Phase 2 – Enhancement of 511 Web, IVR & Mobile App

Website (www.511dfw.org)

- Make the website compatible with both modern HD quality 16:9 and traditional 4:3 resolutions.
- Add option to select a specific county and city on the map.
- Provide layers to pedestrian and bike routes on the map.
- Provide a back door number (877-511-3255) to the 511DFW system.
- Provide a summary of all Amber alerts.
- Show locations of bridges, low underpass locations, truck routes and hazmat routes with specific information.

- Provide links to the permit authorities for oversize, overweight, and hazmat carriers.

- Fix the link to the social media sites such as Twitter and Facebook.

- Add links to go to the partnering agencies' websites and customer service centers.

- Add information about the existence of 511DFW Mobile App and sources where the users can download it.

- Add links to the neighboring 511 systems run by neighboring states (New Mexico, Colorado, Kansas, and Louisiana).

- Make the login and sign-in tabs larger.

- Add option to show travel time (both directions) just by clicking on the routes (established corridors by TxDOT for freeways and routes of significance by agencies).

- Add city cameras to the website.

- Add incident and construction information for routes of significance.

- Add detour information for any incidents taking place.

- For construction, add information on detour exit and reentry for freeways, and detours for Routes of Significance.

- Add options for automatic text or email alerts in a case when any events take place on the favorite routes in the My511 system.

- Add more major tourist and trip attraction locations in the menu in My511 system.

- Update the names of the major trip attractors when the names get changed for the change of ownerships or sponsorships in My511 system.

- Add a new link just after the Traveler Links with access to the coordination documents, meetings, etc. for the partnering agencies only.

- Add a performance measure dash board to the website.

Interactive Voice Response (IVR)

- Add option for broadcasting floodgate messages.

- Add roadway surface conditions in addition to the general weather information.

- Add construction and incident information on the routes of significance.

- Add option to get traveler information on the preferred routes only, as set up in the My511 Personalization account.

- Add options to connect to the neighboring 511 systems (New Mexico, Colorado, Kansas, and Louisiana).

- Add options to connect to a customer service representative of the partnering agency.

- Add shortcuts in menus.

- Fix some issues with recognizing the city name such as Watauga.

- Add reasons for congestion or slowdowns.

- Add direction for detouring or alternate routes for any closures.

511DFW Mobile App

- Add an icon to get a summary of all events by category that includes incidents, construction, and Amber alerts for both traffic and transit.

- Add links to get connected with Twitter and Facebook.

- Add phone numbers and website links of the neighboring 511 services (New Mexico, Colorado, Kansas, and Louisiana) with the appropriate options to go to the websites or call the respective numbers.

Phase 3 - 511DFW System's Performance Measure

- Keep track of and review the percent uptime of the website, IVR, My511 Personalization system, and 511 mobile app.

- Implement software to make sure that messages (construction, incidents, weather, travel time, etc.) being provided to the 511 system contain the latest, accurate information, and that the transmission of the information is successful.

Item 3: Marketing and Campaigning (RFP2)

The marketing and campaigning effort would take place in addition to the current marketing and campaigning plan. A separate RFP would be issued to hire a contractor to pursue this

effort. The cost for this effort has been estimated to be $700,000 – $1,500,000 depending on the extent and duration of the adopted marketing and campaigning program.

- The marketing area should extend to the entire 511DFW coverage area's agencies from the current plan.
- Also coordinate with the parking authorities at airports, transit stations, rental car agencies, garages at the CBD area, and sports stadiums for marketing and campaigning efforts.
- Provide advertisements along the highways on billboards or static signs to promote the 511DFW service.

Item 4: Bilingual Service (RFP3)

This RFP is to hire a contractor to add a Spanish version of the 511DFW components that include the website (including My511), IVR, and mobile app. This could be merged with RFP 1, as well. In that case, the additional cost for the implementation of this service needs to be incorporated in the budget. It is expected that the contractor will develop the Spanish version of the 511DFW components on the same platform that is used for the English version of it. The cost for this effort has been estimated to be $50,000 - $60,000 while some developers think the cost may be as high as about $250,000. This cost is for adding all components: website, IVR, My511, and mobile app in Spanish.

- Add website features in Spanish (add two buttons: English and Spanish at the top right corner of the website, which will change the language with just a click). The My511 feature also needs the Spanish version added to it.
- Add Spanish version for the IVR. Add a sentence just after the welcome sentence and before providing the list of choices to the caller. It is recommended that the Spanish IVR use concatenate system. If a sufficient amount of fund is not available at the same time

of other improvements, the 511DFW committee delays the deployment until the required fund for concatenate IVR system is available.

- Add option to use Spanish version of the mobile app for all mobile app users.

Item 5: Revenue Generation (RFP4)

With a significant amount of 511DFW users, it is recommended to pursue a public-private partnership for revenue generation. This RFP would be for hiring a contractor for the public-private partnership in order to generate revenue to reduce funding required from the agencies. The effort will not require any funds to spend but will require internal personnel hours. The total personnel hours have been estimated to be 260 for hiring a contractor, and 100 hours for continuing monitoring and collaboration with them.

- Create a project to develop and coordinate with potentially interested candidates to generate revenue through the process of public-private partnerships.

Table 6 – Effort Needed For Revenue Generation

Agency Personnel	RFP Preparation and Advertisement	Proposal Review and Award	Coordination and Monitoring
Program Manager	1 person @ 20 hours = 20 hours	1 person @ 40 hours = 40 hours	-
Project Manager	1 person @ 20 hours = 20 hours	1 person @ 40 hours = 40 hours	1 person @ 2 hours per week (2X52) = 104 hours per year
Planner	1 person @ 20 hours = 20 hours	3 persons @ 40 hours = 120 hours	-
Total hours	For RPF and contractor selection = 260 hours		Yearly = 104 hours

In addition to implement the recommended features to the existing 511DFW components and deploy other services, the 511DFW committee would cost about $1,100,000 annually for continuing operation and maintenance. This cost covers hardware and communication

maintenance, third party traffic data acquisitions, parking data acquisitions, quarterly data update, periodic and as required operations and maintenance, and overall project management. Table 7 shows detail cost estimates for continuous operation and maintenance.

Table 7 Annual Operation and Maintenance Costs

Item	Detail Cost	Cost (USD)	Total Cost
Hardware & COTS Maintenance	Voice Recording Updates	$5,400	$492,100
	Nuance Maintenance	$28,800	
	Cisco	$15,000	
	GoDaddy	$100	
	Symantec	$1,800	
	Dell	$15,000	
	VMWare	$30,000	
	MS SQL Server	$4,000	
	Weather Services and Radar	$30,000	
	Third Party Traffic Data	$145,000	
	Fixed Communications Cost	$62,000	
	Telephone Usage Cost	$85,000	
	Parking Mgmt O&M Services	$35,000	
	DBE Labor	$35,000	
Quarterly Data Update			$75,000
O&M Preventive Maintenance			$130,000
Remedial O&M	IVR Support	$20,000	$300,000
	PW Support	$25,000	
	EcoTrafiX Support	$150,000	
	Mobile Support	$80,000	
	Network Support	$25,000	
Project Management			$100,000
Total Annual O&M Cost			**$1,097,100**

Research team also reached out to different third party data vendors for freeway and arterial traffic data and found that the cost for the third party traffic data vary from $25,000 to $250,000.

A review of several other 511 traveler information system found an annually average of $400,000 for the continuing operation and maintenance. The systems disseminate traffic information from freeways only and the lead agency owns the software and purchases the third party data separately or uses its own detector data. But current 511DFW system does not own the software and also relies on the third party vendors for the traffic speed information.

Table 8 shows a summary of required costs for implementation of the recommendations and annual operation and maintenance.

Table 8 Summary of Recommended Enhancements and Continuous Operation and Maintenance Cost

Items	Costs (in USD)
Operational cost	$1,100,000 (annual)
Agency personnel training on data entry software EcoTrafiX	$40,000-$50,000 (one time training for each agency)
Enhancements of 511DFW (Website, IVR, My511, and mobile app	$250,000-$400,000 (one time improvement cost)
Bilingual System (Spanish version in addition to current English)	$50,000-$60,000, it could be as much as $250,000 (one time deployment cost)
Marketing and Campaigning	$700,000-$1,500,000 (one time cost)

IMPLEMENTATION SCHEDULE

Figure 12 shows the schedule for implementation of the recommendations. The first step of the 511DFW enhancement would be coordination among partnering agencies, including discussing and finalizing the game plan for moving forward. This effort would finalize the new management and organizational structure, as well as result in formation of both the Executive Committee and the operational sub-committees. At the same time, it is envisioned that the partnering agencies will secure funds through the appropriate sources for the implementation of the recommendations. Coordination with TxDOT, NTTA, NTE, and LBJ Express to utilize their DMSs for marketing purposes to display the campaign message should also take place at this

stage. Also, the coordination with the airport authorities can take place at this stage for the audio advertisement at the baggage claim areas. The lead agency should take the initiatives and coordinate with the RTC in working on the recommended policies for marketing efforts as well as putting the 511DFW logo on the partnering agencies' websites.

At the next stage, the 511DFW Executive Committee would hire a contractor through an RFP for implementing the recommended new features in website, IVR, and mobile app. In parallel, the effort for adding the Spanish version of the 511DFW system can take place. As the contractor completes each item of the enhancement and gets those items approved, the team can quickly get its Spanish version done, as well. For all types of enhancements in website, IVR, and mobile app, a system acceptance test (SAT) is recommended to be done before releasing the contractor for any specific task. This approach would ensure that the enhancements are done successfully. In the next step, the marketing and campaigning to promote the 511DFW system can take place.

Assuming that the 511DFW partnering agencies are able to secure funds for the implementation in fiscal year 2017, all enhancements in the website, IVR, and mobile app, and implementation of Spanish service could be completed by end of calendar year 2016. The additional marketing and campaigning efforts will take place after all the recommendations are implemented. By this way, the committee will get a chance to secure fund for marketing and campaigning in fiscal year 2018. It is recommended that the Executive Committee evaluate the popularity of the 511DFW system and monitor the increase in the usage of website, IVR, and mobile app. If the usage increases significantly, the committee could move forward with pursuing a project for public-private partnerships in order to generate revenue from the system. Upon a great success with an increased number of 511DFW users, it is envisioned that the revenue generation/public -private effort can take place in late 2017.

Functions	Year 2016				Year 2017			
	January - March	April - June	July - September	October - December	January - March	April - June	July - September	October - December
Funding	▮ Secure fund for operation and maintenance and implementation of the recommendations				▮ Secure fund for operation and maintenance, and marketing and campaigning			
Management & Organizational Collaboration								
Stage 1 - DMSs, Airports, RTC Policy	▨							
Stage 2 - 511DFW Operational coordination	▨▨▨▨▨▨ Executive committee meetings, operations sub-committee meetings, & day to day operation							
Marketing and Campaigning							▨▨▨ In addition to day to day campaign on DMSs, Airport, etc.	
Enhancement of 511DFW System								
Stage 1 - Partnership and Data Integration				▮				
Stage 2 - Enhancement of 511 Web, IVR & Mobile App				▮				
Stage 3 - 511DFW System's Performance Measure				▮				
Bilingual Service				▮ Launch Spanish version in addition to English				
Revenue Generation								▨ Public-Private Partnership and Revenue generation opportunities

Figure 12 – Implementation Schedule

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APPENDIX

Table 9 – 511 Back-Door Phone Numbers

Level of Operation	Location (source)	"Back Door" Number
Statewide Operation	Alaska (Alaska 511, 2015)	866-282-7577
	Arizona (Arizona 511, 2015)	888-411-ROAD
	Colorado (Colorado 511, 2015)	303-639-1111
	Florida (Florida 511, 2015)	866-511-3352
	Georgia (Georgia 511, 2015)	877-MYGA511
	Idaho (Idaho 511, 2015)	888-432-ROAD
	Iowa (Iowa 511, 2015)	800-288-1047
	Kansas (Kansas 511, 2015)	866-511-KDOT
	Kentucky (Kentucky 511, 2015)	866-RDREPORT
	Louisiana (Louisiana 511, 2015)	888-ROAD-511
	Maine (Maine 511, 2015)	866-282-7578
	Maryland (Maryland 511, 2015)	855-GOMD511
	Massachusetts (Massachusetts 511, 2015)	617-986-5511
	Minnesota (Minnesota 511, 2015)	800-542-0220
	Mississippi (Mississippi 511, 2015)	866-521-6368
	Montana (Montana 511, 2015)	800-226-ROAD
	Nebraska (Nebraska 511, 2015)	800-906-9069
	Nevada (Nevada 511, 2015)	877-NV-ROADS
	New Jersey (New Jersey 511, 2015)	866-511-NJDT
	New Mexico (New Mexico 511, 2015)	800-432-4269
	New York (New York 511, 2015)	888-GO511NY
	North Carolina (North Carolina 511, 2015)	877-511-4662
	North Dakota (North Dakota 511, 2015)	866-MY ND 511
	Oregon (Oregon 511, 2015)	503-588-2941

	Pennsylvania (Pennsylvania 511, 2015)	877-511-PENN
	Rhode Island (Rhode Island 511, 2015)	888-401-4511
	South Carolina (South Carolina 511, 2015)	877-511-INSC
	South Dakota (South Dakota 511, 2015)	866-MY SD 511
	Tennessee (Tennessee 511, 2015)	877-244-0065
	Utah (Utah 511, 2015)	866-511-UTAH
	Vermont (Vermont 511, 2015)	800-ICY ROAD
	Virginia (Virginia 511, 2015)	800-578-4111
	Washington (Washington 511, 2015)	800-695-ROAD
	West Virginia (West Virginia 511, 2015)	877-WVA-ROAD
	Wisconsin (Wisconsin 511, 2015)	866-511-WISC
	Wyoming (Wyoming 511, 2015)	888-WYO-ROAD
Metro-Region Area Operation	Dallas (511DFW, 2015)	877-511-DALL
	Honolulu/ Goakamai (Goakamai 511, 2015)	(unknown)
	Inland Empire, California (Inland Empire 511, 2015)	877-MYIE-511
	Los Angeles / Orange / Ventura (Los Angeles 511, 2015)	877-22-Go51
	Sacramento/Northern California (Sacramento 511, 2015)	877-511-TRIP
	San Diego (San Diego 511, 2015)	800-215-4551
	San Francisco / Oakland (San Francisco 511, 2015)	866-736-7433
	San Luis Obispo (San Luis Obispo 511, 2015)	866-928-8923

Figure 13 – Example Coordination Meeting Schedule for 2016

January						
Mo	Tu	We	Th	Fr	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

March						
Mo	Tu	We	Th	Fr	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April						
Mo	Tu	We	Th	Fr	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May						
Mo	Tu	We	Th	Fr	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June						
Mo	Tu	We	Th	Fr	Sa	Su
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July						
Mo	Tu	We	Th	Fr	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September						
Mo	Tu	We	Th	Fr	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October						
Mo	Tu	We	Th	Fr	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November						
Mo	Tu	We	Th	Fr	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December						
Mo	Tu	We	Th	Fr	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Legends: ★ Executive Committee Meeting   ⊕ Operations Sub-committee Meetings

Table 10 – Comparisons among 511 Systems

No.	Name	Area	Coverage	Weather Info. & Alerts	Roadway Congestion	Incident Warnings	Roadwork, Construction Zones, Road Closures	Travel Times	Alternate Routes	Special Events	Transit Info.	Parking	Ease of Use	Score (0-10)
3	Cotrip	Colorado	Statewide	1	1	1	1	1	0	0	0	0	1	6
5	511GA	Georgia	Statewide	1	1	1	1	1	0	1	0	0	0	6
7	Iowa 511	Iowa	Statewide	1	1	1	1	0	0	0	0	0	1	5
20	NMRoads	New Mexico	Statewide	1	1	1	1	0	0	1	1	0	1	7
21	511 NY	New York	Statewide	1	1	1	1	1	0	1	1	0	1	8
23	ND Roads	North Dakota	Statewide	1	1	1	1	0	0	1	1	0	0	6
25	511PA	Pennsylvannia	Statewide	1	1	1	1	0	0	1	0	0	1	6
28	SDDOT 511	South Dakota	Statewide	1	1	1	1	0	0	0	0	0	1	5
30	UDOT Traffic	Utah	Statewide	1	1	1	1	1	0	0	0	0	1	6
32	VDOT 511 Virginia Traffic	Virginia	Statewide	1	1	1	1	1	0	1	1	0	1	8
35	511 Wisconsin	Wisconsin	Statewide	1	1	1	1	1	0	1	1	0	1	8
37	**511 DFW**	**Dallas/Forth Worth**	**Regional**	1	1	1	1	0	0	1	1	1	0	7
41	Go511	Los Angeles	Regional	1	1	1	1	1	0	0	1	1	1	8
42	Sacramento 511	Sacramento	Regional	1	1	1	1	1	0	0	1	0	1	7
43	511 San Diego	San Diego	Regional	0	1	1	1	0	0	0	1	0	1	5
44	511 Transit	San Francisco Bay	Regional	0	1	1	1	1	0	1	1	1	1	8

Table 11 – IVR Call Requests in 2014

Month	Call Volume	Percentage
January	12,468	9.0%
February	11,298	8.2%
March	12,765	9.2%
April	11,677	8.4%
May	12,303	8.9%
June	11,867	8.6%
July	10,816	7.8%
August	10,857	7.8%
September	10,698	7.7%
October	11,686	8.4%
November	10,824	7.8%
December	11,086	8.0%
Total	**138,345**	**100.0%**

Table 12 – Website Visitors in 2014

Month	Unique Visitors	Total Number of Visits	Total page Views	Total Hits	Percentage (# of Visitors)
January	1,283	1,743	237,759	316,854	10.4%
February	1,203	1,577	219,327	293,708	9.4%
March	1,306	1,641	261,226	339,763	9.8%
April	1,050	1,518	2,088,350	2,145,592	9.1%
May	857	1,241	439,038	488,951	7.4%
June	848	1,219	531,951	576,580	7.3%
July	1,011	1,372	247,795	306,555	8.2%
August	808	1,068	224,595	273,987	6.4%
September	861	1,121	235,142	283,414	6.7%
October	1,122	1,517	253,476	323,621	9.1%
November	1,113	1,385	214,963	276,126	8.3%
December	1,051	1,310	233,355	293,264	7.8%
Total	**12,513**	**16,712**	**5,186,977**	**5,918,415**	**100.0%**

Table 13 – My511 Personalization System Use in 2014

Month	Number of Subscribers	Cumulative (as of 2014)
January	10	188
February	6	198
March	4	204
April	3	208
May	2	211
June	4	213
July	4	217
August	0	217
September	0	217
October	6	223
November	0	223
December	3	226
Total	**42**	**2,545**

Table 14 – Social Media Use in 2014

511DFW		Dallas		Ft. Worth	
Followers	Tweets	Followers	Tweets	Followers	Tweets
3	6,347	2	4,935	0	1,374

Table 15 – Transit Information Requests in 2014

Month	DART	DCTA	The-T	Total	Percentage
January	268	5	3	276	8.7%
February	248	9	5	262	8.3%
March	275	9	5	289	9.1%
April	248	4	3	255	8.1%
May	226	9	6	241	7.6%
June	235	11	4	250	7.9%
July	242	14	2	258	8.2%
August	243	11	4	258	8.2%
September	236	19	4	259	8.2%
October	244	9	6	259	8.2%
November	249	12	7	268	8.5%
December	271	7	6	284	9.0%
Total	**2,985**	**119**	**55**	**3,159**	**100.0%**

Table 16 – Airport Information Requests in 2014

Month	DFW Int. Airport	Love Field Airport	Total	Percentage
January	52	35	87	7.0%
February	54	52	106	8.5%
March	70	35	105	8.4%
April	46	26	72	5.8%
May	68	34	102	8.2%
June	203	51	254	20.4%
July	54	31	85	6.8%
August	58	44	102	8.2%
September	62	40	102	8.2%
October	57	28	85	6.8%
November	37	31	68	5.5%
December	52	26	78	6.3%
Total	813	433	1,246	100.0%

Table 17 – IVR Menu Requests in 2014

| Menu Item	January	February	March	April	May	June	July	August	September	October	November	December	Total
Traffic Menu	1,919	1,901	2,469	1,545	1,493	1,426	1,421	1,379	1,423	1,624	1,255	1,295	19,150
Traffic Conditions	1,964	1,980	2,561	1,669	1,517	1,323	1,399	1,296	1,426	1,851	1,315	1,308	19,609
Estimated Driving Times	124	139	214	98	91	104	85	99	119	106	93	96	1,368
Public Transportation	381	348	382	369	399	358	358	334	291	312	290	362	4,184
Transit Agencies	93	70	97	93	71	67	52	74	63	80	70	68	898
Vanpools	42	38	56	56	53	39	36	41	43	32	43	44	523
Transit Schedules	37	35	35	42	36	41	44	36	19	35	24	40	424
Airports	275	291	290	262	290	304	267	269	250	252	215	251	3,216
My511	346	346	400	317	330	370	334	323	305	282	297	345	3,995
Weather Forecasts	579	600	646	443	390	438	373	322	364	406	444	497	5,502
What are my choices	115	139	160	75	90	69	86	91	71	89	103	99	1,187
Help	2,024	1,928	2,082	1,593	1,737	1,656	1,520	1,162	1,451	1,391	1,483	1,795	19,822
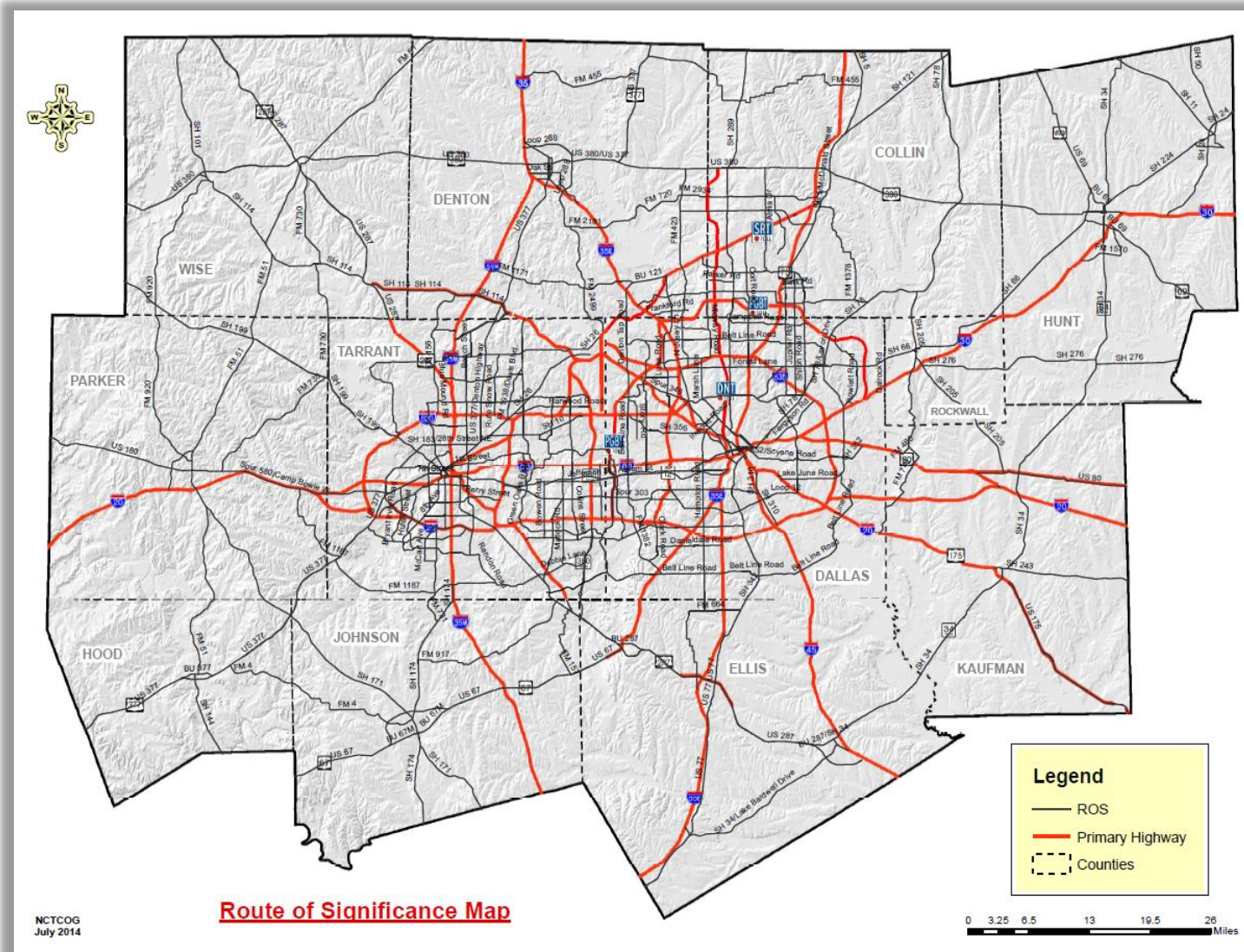
Figure 14 – Routes of Significance Map (NCTCOG, 2014)

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