Washington Metropolitan Area
511 Feasibility Study

Technical Memorandum #2
Implementation Plan

FINAL
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Table of Contents

LIST OF ACRONYMS ..... **IV**

LIST OF FIGURES ..... **V**

LIST OF TABLES ..... **V**

EXECUTIVE SUMMARY ..... **VI**

1 INTRODUCTION **1**

1.1 Study Overview 1
1.2 Document Purpose 1
1.3 Washington Area 511 Vision 2
1.4 Summary of Key Issues 2

2 511 SYSTEM COVERAGE AND IMPLEMENTATION **5**

2.1 Introduction and General Guidelines 5
2.2 Coverage Area 5
2.3 Information Content 6
2.4 Data Fusion 12
2.5 Telephone System 13
2.6 Website 16

3 PROCUREMENT AND OPERATIONS **19**

3.1 Procurement Approach and Business Model 19
3.2 Components of the 511 System 19
3.3 Roles and Responsibilities 22
3.4 System Expansion / Upgrades 23

4 MARKETING **24**

4.1 Washington, DC 511 Marketing Plan Background 24
4.2 Goals 25
4.3 Key Message 25
4.4 511 Logo and Branding 25
4.5 Marketing Plan Activities 25

5 SCHEDULE **26**

6 ESTIMATED 511 COSTS **27**

7 APPENDIX A: SUMMARY OF AVAILABLE CONTENT **31**

List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ATIS	Advanced Traveler Information Service
CAD	Computer Aided Dispatch
CHART	Coordinated Highways Action Response Team
CLEC	Competitive Local Exchange Carrier
DDOT	District Department of Transportation
FAQ	Frequently Asked Questions
FTE	Full Time Equivalent
HAR	Highway Advisory Radio
ILEC	Incumbent Local Exchange Carrier
IT	Information Technology
IVR	Interactive Voice Response
LATA	Local Access and Transport Area
MARC	Maryland Rail Commuter Service
NHS	National Highway System
PBX	Public Branch Exchange
RFP	Request for Proposal
PRTC	Potomac and Rappahannock Transportation Commission
PSTN	Public Switched Telephone Network
RITIS	Regional Integrated Transportation Information System
SRS/WON	Smart Route Systems / Westwood One
TAGS	Transportation Association of Greater Springfield
URL	Uniform Resource Locator
VDOT	Virginia Department of Transportation
VOIS	Virginia Operational Information System
VRE	Virginia Railway Express
VSP	Virginia State Police
VTTI	Virginia Tech Transportation Institute
WMATA	Washington Metropolitan Area Transit Authority
WWW	World Wide Web

List of Figures

Figure 1 / Washington, DC 511 Service Area 5
Figure 2 / 511 Virginia System Architecture 12
Figure 3 / 511 Conceptual Menu 13
Figure 4 / Maryland Area Code and LATA Map 14

List of Tables

Table 1 / Summary of Cost Estimates 4
Table 2 / DC Area Coverage Area Population 6
Table 3 / Basic Content Detail Needed for Each Highway Content Type 7
Table 4 / Summary of Recommended Content 11
Table 5 / Metropolitan 511 Systems 16
Table 6 / DC 511 Development Schedule 26
Table 7 / Estimated Startup Costs 30
Table 8 / Estimated Annual Costs 30

Executive Summary

The objective of this study is to determine if, and how, a 511 travel information system can be developed for the Washington, DC Metropolitan Area. The study is under the auspices of the Virginia Department of Transportation (VDOT) and is being overseen by the 511 Steering Committee – DC Metro Area (Committee). This document represents the completion of the third phase of a four phase study. The final phase will be a feasibility study that provides recommendations as to the feasibility of implementing a 511 system for the Washington, DC Metropolitan Area (defined as the District of Columbia, suburban Maryland and Northern Virginia) based on key decisions raised in this document and made by the Committee.

In order to develop this document, a short list of assumptions was used. The assumptions are just that, and may or may not be the approach ultimately taken by the Committee.

The key assumptions are as follows:

- This system will be a stand-alone system, and not part of Virginia's 511 system
- The system will use only existing data sources, and will not develop new data
- One agency will take the lead in developing, deploying, and operating 511, but other agencies will contribute staff time, in-kind marketing, and, potentially, funding

Using these assumptions, the 511 service for the Washington, DC system will have the following characteristics:

- Callers dialing 511 on landline and wireless phones in the coverage area described in Section 2.2 will reach the Washington, DC 511 service
- Roadway content will include incidents, construction, weather and special events on the roadways listed in the Technical Memorandum #1 Conceptual System Design
- Congestion information will be available for interstates in Maryland, and could be used to provide travel times
- Callers will be able to transfer to transit agencies, airports, and Virginia's 511 system
- Optional content, as described in Table 4, will be available
- There will be a web presence, but the exact nature of it is yet to be defined

Before the Feasibility Study Final Report can be completed, a series of seven key questions must be discussed and answered by the Committee. The seven key questions for consideration on the Washington Area 511 system are:

1. Will it be a stand-alone system or will it be part of the 511 Virginia service?

2. What will the overall management structure be? In other words, which agency or agencies will be responsible for the design, development, and operations of the Washington, DC 511 system?

3. Which agency will take the lead for the various functions (securing funding, leading the procurement, approving deliverables, operating the system, etc.)?

4. Which agency or set of agencies will be responsible for data quality and the ongoing accuracy of the phone numbers that callers may be transferred to (such as transit agencies)?

5. Will the system include speed and/or travel times on the phone and/or web page and, if so, how?

6. Who will be in charge of marketing and what is the expected contribution from partners for in-kind marketing (such as signs on buses)?

7. Will there be any private sector involvement (tourism, etc.)?

General cost estimates for developing and operating the Washington, DC 511 system are provided based on the assumptions used to develop this document. In addition, costs for another likely scenario were developed. The following table summarizes the cost estimates for developing and operating the Washington, DC 511 system.

	Stand-Alone System		**Extension of 511 VA**	
	Low	**High**	**Low**	**High**
Startup	$1.0M	$2.4M	$0.4M	$0.8M
Annual	$0.4M	$0.5M	$0.3M	$0.4M

1 Introduction

1.1 Study Overview

The objective of this effort is to develop a 511 implementation plan for the Washington, DC Metropolitan Area. The study is under the auspices of the Virginia Department of Transportation (VDOT) and is being overseen by the 511 Steering Committee – DC Metro Area (Committee). The study consists of the following four phases:

- Phase 1: Detailed Work Plan
- Phase 2: Conceptual System Design
- Phase 3: Implementation Plan
- Phase 4: Feasibility Study Final Report

Phases 1 and 2 have been completed, and the final version of this document, scheduled for January 23, 2005, will complete Phase 3. The final phase will be a feasibility study that provides recommendations as to the feasibility of implementing a 511 system for the Washington, DC Metropolitan Area.

Each phase of the project builds on work done to date. The Detailed Work Plan established the framework for how this work would proceed, and the Conceptual System Design described, at a high level, how a Washington, DC 511 system would be designed. The Conceptual Design will be discussed briefly in Section 2.

1.2 Document Purpose

The purpose of this Implementation Plan is to provide a roadmap for how the Conceptual System Design could be implemented. It will cover the following specific topics:

- Content, including Guidelines on Information Consistency, Accuracy, and Quality
- Data Fusion
- Telephone System Issues, including menu structure, call routing, and call volumes
- Website
- Procurement Approach, Business Model, and Operations
- Marketing
- Schedule
- Cost Estimates for Initial Deployment and Ongoing Operations

1.3 Washington Area 511 Vision

The vision for the Washington metropolitan area 511 is based on the national vision:

> *The Washington metropolitan area 511 is a customer-focused, multimodal traveler information service available across the region via phones, the Internet and other personal communication devices. The Washington metropolitan area 511 system will be interoperable with neighboring 511 systems resulting in a more satisfactory travel experience.*

1.4 Summary of Key Issues

This section lays out the assumptions underlying this plan and describes what the 511 system will look like; summarizes the key questions still facing the committee; and provides high-level cost estimates for the deployment.

1.4.1 Assumptions and Description of the System

This section lists the assumptions that we made and then provides a description of the resulting system. It is important to realize that the assumptions are just that, and may or may not be the approach ultimately taken by the Committee.

The key assumptions are as follows:

- This system will be a stand-alone system, and not part of Virginia's 511 system
- The system will use only existing data sources, and will not develop new data
- One agency will take the lead in developing, deploying, and operating 511, but other agencies will contribute staff time, in-kind marketing, and, potentially, funding

Using these assumptions, the 511 service for the Washington, DC system will have the following characteristics:

- Callers dialing 511 on landline and wireless phones in the coverage area described in Section 2.2 will reach the Washington, DC 511 service
- Roadway content will include incidents, construction, weather and special events on the roadways listed in the Technical Memorandum #1 Conceptual System Design
- Congestion information will be available for interstates in Maryland, and could be used to provide travel times
- Callers will be able to transfer to transit agencies, airports, and Virginia's 511 system
- Optional content, as described in Table 4, will be available
- There will be a web presence, but the exact nature of it is yet to be defined

1.4.2 Key Questions

In order to implement the system described above, the Committee will have to answer the following key questions. Ideally, at least some of these questions will be answered before we complete the Feasibility Study Final Report in March 2005.

For each question, we provide some context as to why it is relevant and recommend an answer, if possible.

1. Will it be a stand-alone system or will it be part of the 511 Virginia service? This plan assumes that the Washington, DC project will be a stand-alone project. The advantages of a stand-alone system are that it can be an independent system, designed specifically to reflect the Washington, DC region's needs. The disadvantages are that it will cost more and will take longer. An additional consideration relates to call routing. As of February 1, 2005, calls in the Virginia portion of the Washington, DC area will be routed to the 511 Virginia system. If the Washington, DC system is a stand-alone system, callers in Virginia will have to routed away from a system with which they will have become familiar and into a new system.

   Recommendation: The Committee will have to balance the desire to have an independent system with the cost, schedule implications, and implications for the user experience of doing so. This issue should be discussed and resolved at the January 13, 2005 meeting.

2. What will the overall management structure be? In other words, which agency or agencies will be responsible for the design, development, and operations of the Washington, DC 511 system?

   Recommendation: We recommend that the Committee select an agency and an individual to take the lead on the project, and then form a Policy Committee to give guidance on policy and day-to-day operational issues.

3. Which agency will take the lead for the various functions (securing funding, leading the procurement, approving deliverables, operating the system, etc.)?

   Recommendation: This issue can be addressed by the Policy Committee.

4. Which agency or set of agencies will be responsible for data quality and the ongoing accuracy of the phone numbers that callers may be transferred to (such as transit agencies)?

   Recommendation: This issue can be addressed by the Policy Committee.

5. Will the system include speed and/or travel times on the phone and/or web page and, if so, how?

Recommendation: We recommend including all available information on both the phone, if practical, and the web.

6. Who will be in charge of marketing and what is the expected contribution from partners for in-kind marketing (such as signs on buses)?

   Recommendation: We suggest that members of the Committee and allied agencies work to ensure that someone involved in the project—either through the 511 contractor, a separate consultant, or an employee of one of the agencies—have experience marketing consumer products. In addition, in order to leverage scarce funds, we urge the Committee to get as much in-kind marketing as possible.

7. Will there be any private sector involvement (tourism, etc.)?

   Recommendation: This will depend in part on whether the system is a stand-alone system or part of the Virginia system. We recommend, at the least, building the 511 system in such a way so as to not foreclose private sector and other public sector support and involvement.

1.4.3 Summary of Costs

The following table summarizes the cost estimates for developing and operating the Washington, DC 511 system. Cost drivers are discussed throughout the document, and more detail is provided in Tables 7 and 8 in Section 6.

Table 1 / Summary of Cost Estimates

	Stand-Alone System		Extension of 511 VA	
	Low	**High**	**Low**	**High**
Startup	$1.0M	$2.4M	$0.4M	$0.8M
Annual	$0.4M	$0.5M	$0.3M	$0.4M

2 511 System Coverage and Implementation

2.1 Introduction and General Guidelines

To establish and sustain 511 services, it is necessary to clearly articulate the general approach to how resources will be used. For the DC area's 511 system, we recommend the following principles:

- All landline calls for the basic service should be no more than the cost of a local call to the user
- The public sector anticipates supporting most or all of the basic service costs as described in Section 6
- Sponsorship and advertising on basic services can be used to defray the costs to the maximum extent possible
- Self-supporting or revenue generating "optional" content is possible but should not be relied upon to fund the system

2.2 Coverage Area

The coverage area for the DC 511 system, as determined in Technical Memorandum #1, Conceptual System Design, is shown in Figure 1.

Figure 1 / Washington, DC 511 Service Area

The roadways listed in Appendix A to the Conceptual Design include over 350 directional miles of interstate highway and over 500 arterial directional miles inside the Capital Beltway alone. The areas covered and associated populations[1] are listed in Table 2.

Table 2 / DC Area Coverage Area Population

Area	Population
District of Columbia	563,384
Virginia	
Arlington County	187,873
Fairfax County	1,000,405
Loudoun County	221,746
Prince William County	325,324
City of Alexandria	128,923
City of Fairfax	22,031
City of Falls Church	10,485
City of Manassas	37,166
City of Manassas Park	10,990
Maryland	
Montgomery County	918,881
Prince George's County	838,716
Frederick County	213,662
Charles County	133,049
Total Population of DC Coverage Area	**4,612,635**

2.3 Information Content

This section describes the information that will be made available over the DC area 511 system and the web page. It concludes with a table summarizing the sources and types of the information.

2.3.1 Basic Content

2.3.1.1 Roadway Content

According to the National 511 Deployment Coalition Implementation Guidelines, basic highway information is automated, corridor-based and focused on the National Highway System (NHS). Callers will receive recorded or automated messages for interstate highways throughout the coverage area. The highways will be individually selectable and divided into logical segments, as Coalition Guidelines suggest that roadway information be categorized not by city or jurisdiction, but by roadway segment.

[1] Populations noted are 2003 estimates by the U.S. Census

Information about major roadways will be a principal part of this 511 system. The proposed content, described in detail in the Conceptual Design and summarized here, is as follows:

- Regional Reports
- Roadway Coverage
- Segments

For each segment identified, specific types of content will be provided:

- Construction / Maintenance Projects
- Road Closures and Delays
- Major Special Events
- Weather and Road Surface Conditions

For each of these highway content types, it is necessary to provide details that enable callers to assess travel conditions and make travel decisions associated with a route segment. Table 3 illustrates the detailed information needed for each content type.

Table 3 / Basic Content Detail Needed for Each Highway Content Type

	Content Detail							
Content Type	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

Based on interviews with stakeholders and Regional Integrated Transportation Information System (RITIS) project research regarding data available for 511, there is sufficient data to provide reliable, useful information to travelers in the region.

2.3.1.2 Public Transportation Content

511 can assist public transportation operators to better serve their customers and possibly even attract new customers by leveraging the public transportation operators' established methods of communicating to the public about their services, including websites and customer service centers accessible by telephone.

Information access via telephone has proven to be extremely important in transit customer service. 511 will assist in providing travelers with general agency and service information and communicating service disruptions and changes. Travelers will be transferred to the agency or given the ability to get more detailed information and trip planning. We recommend providing, for each of the following agencies, a brief agency description, information on service disruptions, and call transfers to the agencies' customer service centers.

- Alexandria DASH
- Arlington Rapid Transit
- Fairfax Connector
- Fairfax CUE
- Falls Church GEORGE
- Loudoun County Transit
- MARC
- Metropolitan Washington Airports Authority
- Montgomery County Transit – Ride On
- Potomac and Rappahannock Transportation Commission (PRTC)
- Transportation Association of Greater Springfield (TAGS)
- TheBus (Prince George's County)
- Virginia Railway Express (VRE)
- Washington Metropolitan Area Transit Authority (WMATA)

2.3.1.3 Weather Content

Because rain, ice, snow and glare can affect travel in the Washington metropolitan area, weather information will be included, when applicable and available, as roadway content and public transportation "exception" messages. Similarly, winter road conditions (e.g., "Snow emergency routes are in effect in the District") may be included in roadway content as well.

National Weather Service warnings and advisories should be available to travelers as floodgate messages (played before the main menu and category menu script) due to their

likelihood to impact the entire region. Those watches, warnings and advisories that do not affect the entire metropolitan area should be available as regional reports. Should a public transportation agency wish to report the weather impacts on their services, they should utilize a recorded exception report for their agency.

2.3.2 Optional Content

The 511 Guidelines provide for optional content, based on a region's needs and information availability. The Coalition encourages 511 implementers to consider providing optional content that will benefit travelers. The following optional content should be included in the basic service:

- Roadway Content
  - Security Measures and Closures
  - Special Events
- Public Transportation
  - Airports
  - Carpool / Vanpool
  - Major Public Transportation Delays
  - Security Measures and Closures
  - Special Events
- Emergency Alerts
  - AMBER Alerts
  - Heightened Security Alerts
  - Security Measures and Closures
- Tourist Information handled through floodgates by the appropriate convention and visitors agency.

2.3.3 Content Quality and Consistency

The Guidelines note that the accuracy, timeliness and reliability of information on 511 is an important issue for 511 deployers and users. In an increasingly advanced information society, travelers are generally accustomed to high quality information and 511 content must be no different. ITS America, in its national consumer research on 511, determined that "those surveyed said that if they used 511 and found the information to be inaccurate in their first few uses, they would be unlikely to give the service another chance."

As described in the Conceptual Design, there are five quality parameters for 511 systems:

1. Accuracy
2. Timeliness
3. Reliability
4. Consistency of Presentation
5. Relevancy

2.3.4 Other Content Issues

Amber Alerts / Security. These should be handled through floodgates, and we recommend having a clear Concept of Operations specifying when and with what authorizations they are activated, message structure, and so on.

Timestamping. Maryland's Coordinated Highways Action Response Team (CHART) system, which the District Department of Transportation (DDOT) also utilizes, and VDOT's Virginia Operational Information System (VOIS) data are available with time stamps for the information. Timestamps should be used to give travelers a reference as to the latency of the information. The practice in other 511 systems is to stamp it with the time the incident was entered.

Other Optional Services. The Committee needs to determine if the 511 system will provide the following information / functionalities:

- Travel Time or Other Enhanced Traffic Information (e.g. Alternate Routes)
- Parking
- Personalized / Customizable Services
- Points of Interest
- Highway Advisory Radio and Variable or Dynamic Message Sign content (recommended for web only, if at all)

Travel times can prove to be valuable information to travelers, even when the information is available only for a portion of an otherwise established coverage area. For instance, the San Francisco Bay Area's 511 service introduced travel times in 2004 on just a few corridors. While the information is available only for a small portion of the 511 coverage area, users have responded very positively to the available travel time information.

In the case of the DC area, political considerations must be analyzed before a decision can be made whether to go forward with providing this information. Our recommendation is to provide whatever travel time information is accurate and available, making sure that a marketing campaign includes specific information on the coverage limitations of the region's travel times. The cost for the development necessary to include this information is included in the Data Fusion category in Table 7.

Other optional services listed above should be considered for later upgrades to 511. While a large suite of services is certainly a goal of any 511 implementer, an agency offering 511 is usually better off concentrating on a highly accurate, reliable basic level of service before considering what may be considered enhanced services.

2.3.5 Summary of Content

Table 4 summarizes the recommended content. There are many other data sources available, but in the interest of maximizing the investment, we recommend focusing on those that will provide the greatest return. The full results of the investigation into

content available in the DC area are included in Appendix A. Also included in Appendix A is a table developed in support of an October 2004 study of RITIS.

Table 4 / Summary of Recommended Content

	Content	Providing Agency	Geographic Coverage	Phone, Web, or Both
Roadway Information[2]	Construction	Maryland DOT	Maryland highways	Both
	Construction	Virginia DOT	Virginia highways	Both
	Congestion	Maryland DOT	Maryland highways	Web, Possibly Phone
	Speed Info	Montgomery County, MD	Major arterials	Web, Possibly Phone
	Road Closures, Delays, Incidents	Maryland DOT	Maryland highways	Both
	Road Closures, Delays, Incidents	Virginia DOT	Virginia highways	Both
	Incidents	District DOT	Washington, DC streets	Both
	Incidents	City of Fairfax	Major arterials	Both
	Weather-related Road Information	National Weather Service	Entire Region	Both
Transit Information	Service Disruptions	All transit agencies	Washington, DC Metro Area	Both
	Real-time tracking; schedules, fares, etc.	Virginia Railway Express	Washington, DC Metro Area	Web
	Schedules, fares, etc. Incidents.	WMATA	WMATA service area	Web
	Schedules, fares, etc.	Other transit agencies	Varies	Web
Optional Content	Special Events	Multiple agencies	Varies	Both
	Roadway Security Measures and General Security Alerts	Police, Homeland Security	Varies	Both
	Airport Info: Parking information, ground transportation	Metropolitan Washington Airport Authority; BWI	Airports	Both
	AMBER Alerts	Police	Entire Region	Both
	Tourism Information	Various	Varies	Both

[2] Only those roadways identified as covered in the Conceptual Design will be included.

2.4 Data Fusion

Data fusion is the process by which the content described above is made ready for dissemination over the 511 telephone system and the web page. The data fusion system takes all of the various inputs and ensures that they are in a format that can be recognized by the 511 phone server and the web server. In the 511 Virginia system, this process has three steps and is illustrated in Figure 2.

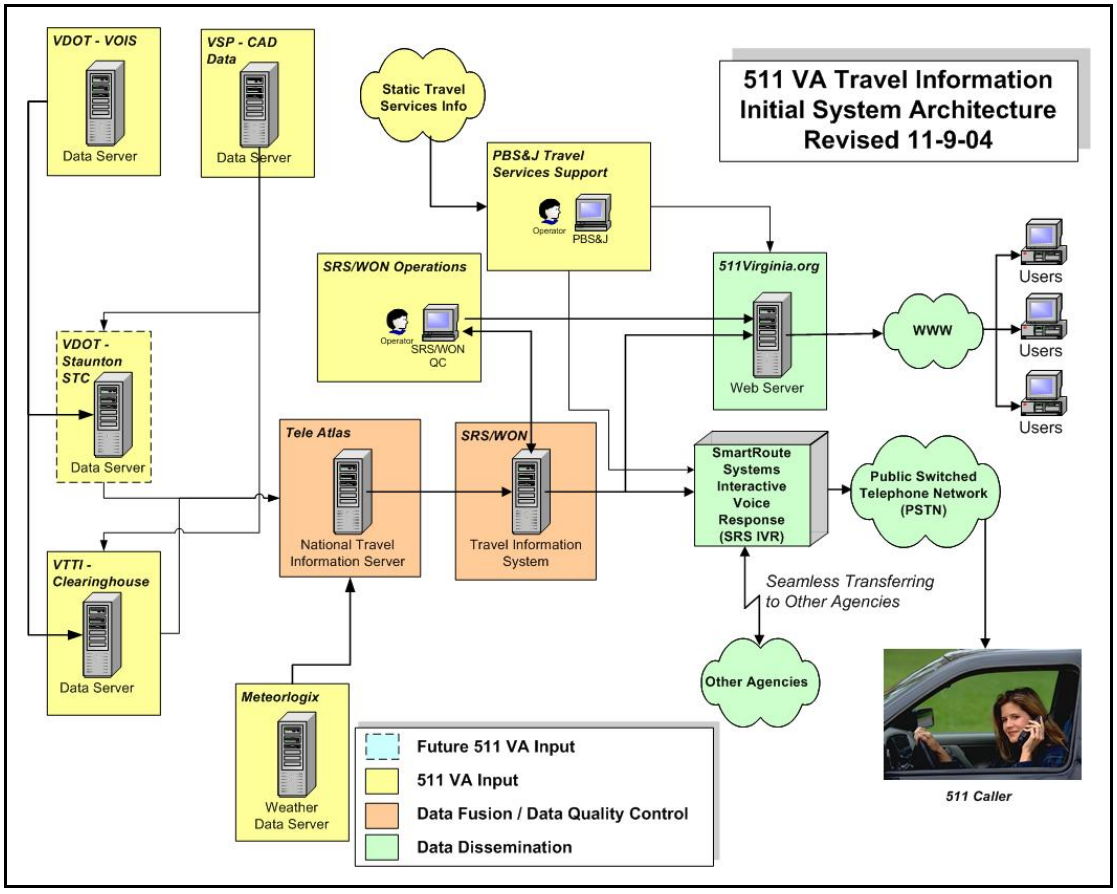

Figure 2 / 511 Virginia System Architecture

First, Virginia Tech receives data from VDOT and the Virginia State Police Computer Aided Dispatch (CAD) System and standardizes those data. Virginia Tech then sends a data stream to Tele Atlas, who fuses the Virginia Tech traffic data with weather data from Meteorlogix. Tele Atlas then sends the data stream to Smart Route Systems, who fuses it with its operations data and prepares it for dissemination over the 511 system and the 511Virginia.org web page.

The specifics would likely be different, but the Washington, DC system will have to perform similar functions to make information available over 511 and the Internet.

Depending on the number of agencies for whom data will be required and on whether any other system (such as RITIS) could be used, the data fusion task might be more complicated for the Washington, DC area than for the Virginia statewide system.

2.5 Telephone System

As per the National 511 Guidelines, key telecommunication elements of a 511 service allow the system to accept calls, interact with the users, process queries and commands and provide useful information back to the callers.

2.5.1 General Discussion

The Conceptual Menu for 511 in the DC area, as presented in the Conceptual System Design, is shown in Figure 3 for reference.

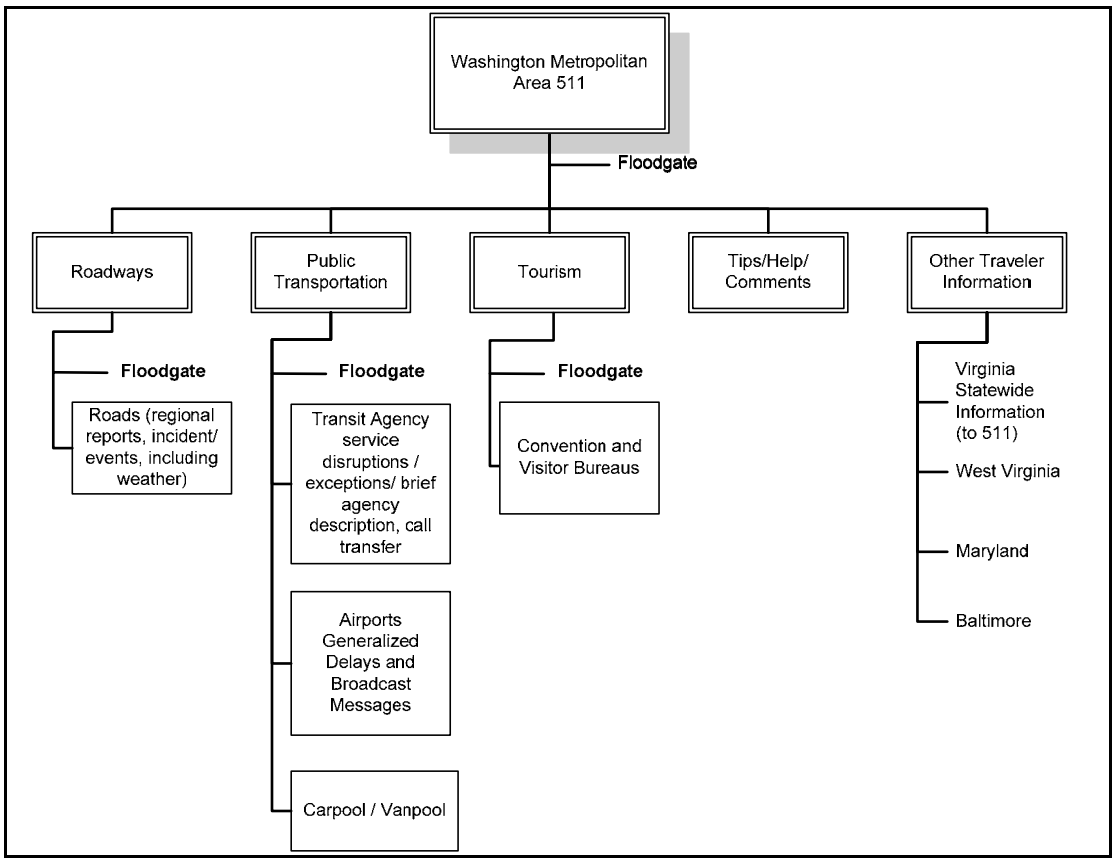

Figure 3 / 511 Conceptual Menu

To illustrate how the calls will actually be routed, DC's local calling area is presented in Figure 4 below. Local Access and Transport Area (LATA) 4 corresponds to the Maryland portion of the Washington, DC calling area. Note that the Virginia portion of

the Washington, DC metropolitan area will be operational with 511 as part of the 511 Virginia system as of February 1, 2005.

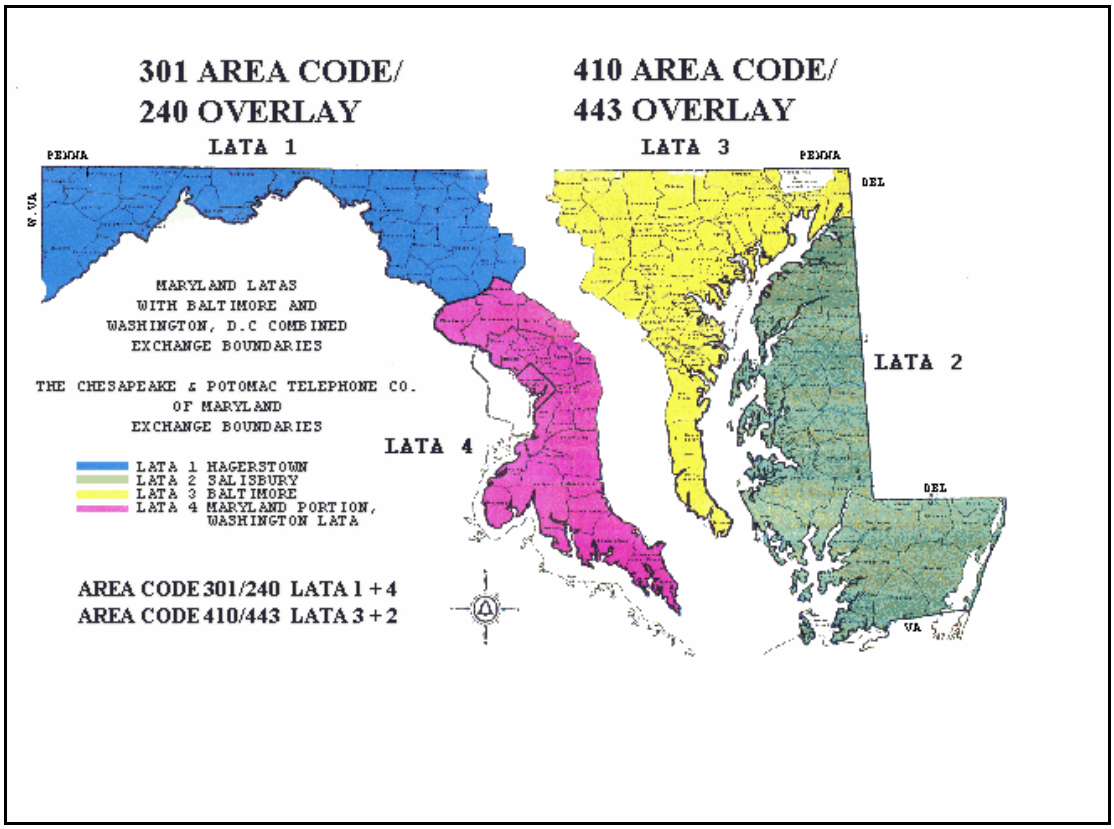

Figure 4 / Maryland Area Code and LATA Map

2.5.2 Call Routing

A successful 511 service has seamless and reliable call routing which should be unnoticed by the user: the call goes through and the call gets answered. Call routing and carrier coordination are not trivial matters, for both wireline and wireless carriers. When 511 is dialed on a wireline phone, the call is received by the telephone company central office and translated into a 7 or 10-digit number, where the call is answered by an automated 511 system. When 511 is dialed from a wireless handset, the call is received by a cellular tower and carried to a switch where the 511 code is translated into a 7 or 10-digit number, where the call is answered by an automated 511 system. Each of these routings has associated cost implications.

With an operational service in Virginia as of February 1, 2005, there are many telecommunications issues related to initiating 511 service in the region. Unfortunately, the calling areas that telecommunications carriers established – LATAs, central offices and switches – follow neither political boundaries and jurisdictions nor recognized regions and metropolitan areas.

2.5.2.1 Wireless

There are five major wireless carriers (Verizon, Cingular / AT&T Wireless, Sprint PCS, Nextel and T-Mobile) and many smaller wireless carriers to coordinate routing of 511 calls with. To insure proper coverage and that the traveler contacts the correct 511 system, routing of calls at the cell tower level may be necessary. Cell tower programming has cost implications; costs vary by carrier and average $25 - $100 per tower, or an hourly labor rate of approximately $200. In order to keep 511 calls pointed to the proper number for the Washington Area (as opposed to a future Baltimore or Maryland statewide 511 deployment) each tower on or near the coverage area border in Maryland would have to be programmed. However, it bears noting that most wireless carriers consider DC and Baltimore one market.

2.5.2.2 Wireline

Verizon is the dominant landline provider (one of the Incumbent Local Exchange Carriers or ILECs), but there are many other Competitive Local Exchange Carriers (CLECs), such as Starpower, Sprint, Cox and Comcast. The DC Public Service Commission regulates 11 ILECs and 189 CLECs – 41 of whom provide service. The Virginia State Corporation Commission regulates 14 ILECs and 191 CLECs throughout the state. The Maryland Public Service Commission categorizes telecommunications companies somewhat differently and regulates 132 ILECs and 92 resellers of local service. This may sound daunting, but most local wireline service is provided by a few large telecommunications carriers. Most landline providers perform 511 call translations at no or minimal cost. The preferred fee structure for a deployer with a tariff on file with the FCC is a one-time charge with no recurring (monthly) costs. Verizon, the dominant landline carrier in Maryland, is currently asking for $500 to program each central office. However, negotiations are taking place to agree to a more reasonable cost. More detailed cost information can be found in Tables 7 and 8.

2.5.3 Call Volume, Call Acceptance and System Sizing

A discussion of the number and architecture of phone lines must begin with the issue of call volume. Call volume is primarily a function of population, the quality of the data, and marketing. The expected call volume during both average usage periods and during usage spikes drives the number of lines or ports required. This, in turn, drives much of the cost for the system.

An effective way to estimate the size of a 511 system is to study lessons learned from other deployers of both 511 systems and other types of telephone based traveler information services. Table 5 lists six metropolitan areas that have 511 traveler information systems or, in the case of Boston, a widely-used non-511 system. For each system, the table shows whether the system is local or network-based, the peak port usage, and the average calls per month, the peak month usage, the peak day usage, and population.

Table 5 / Metropolitan 511 Systems

Metropolitan Area	On-premise or Network	Peak Port Usage	Average Calls/ Month	Peak Month Total	Peak Day Total	Population
Boston	On-premise	186[3]	500,000	630,000	50,000	5,800,000
Cincinnati /N. Kentucky	Network	27	50,691	88,360	14,608	2,000,000
Orlando	Network	133	106,026	178,023	19,392	1,800,000
South Florida	On-premise	144	129,164	211,648	21,345	4,800,000
Tampa	Network	N/A	52,203	83,106	14,656	2,500,000
San Francisco	On-premise	143	201,035	385,845	30,241	6,900,000

Based on the data from existing metropolitan 511 systems, we estimate that the DC area 511 system, serving a population of over 4.6 million, initially will receive approximately 100,000 calls per month. This suggests a need to handle approximately 50 simultaneous calls on an average day and approximately 140 simultaneous calls during usage spikes.

Among deployers who have chosen to use an in-house solution, the issue of call acceptance, or the number of simultaneous calls that are able to get through without the caller reaching a busy signal, is a critical one. One benefit to contracting with a network provider (as is our recommendation) is the ability of the provider to share ports among clients, so that one client does not have to pay ongoing costs for ports that are used only during emergencies or other instances of heavy call volume. That being said, however, it is important to understand that it is not essential that callers never get busy signals. The current Guidelines recommend building a system so that the 90th percentile of demand is met; in other words, at least 90% of the time, all calls should get through.

2.6 Website

People seeking travel information are growing increasingly technology-savvy, and have come to expect that information pertinent to their trip be available on the Internet. Websites offer a wealth of pre-trip information to the potential traveler, and the availability of accurate, reliable data is critical to many users. A co-branded 511 website, while not currently covered under the Guidelines, is often considered a standard part of a complete 511 service. Because there are existing traveler information web sites in the area (including Maryland's CHART project at http://www.chart.state.md.us/ and WMATA at http://www.wmata.com/, for example), it may not be essential to develop a co-branded 511 web site for the Washington, DC area. Alternatives include not building a web page at all; partnering with existing traveler information web sites; or building a 511 web site that only links to existing web pages but has no original content or services.

If a website is developed, it must be user friendly, offering basic information at a glance, as well as more detailed information deeper in the site. The task is not easy; Washington,

[3] Boston's system has a total of 186 ports, which allows the system the capacity to handle over 50,000 calls a day.

DC is a well traveled, often-visited destination, and is dense with heavily-traveled interstates, arterials, and a robust multi-modal transit system.

2.6.1 Content

2.6.1.1 General

The content available on a co-branded DC 511 website will be similar, if not identical, to the information offered via the 511 phone system. A website would offer information on roadway conditions, public transportation, tourism, context-sensitive help, and information on or links to neighboring traveler information websites. In addition, optional content recommended for inclusion on the phone system would be present on the website as well. The data disseminated via the DC 511 website will be generated from the same data streams that feed the phone system, thus resulting in a high level of commonality between the phone and website. In addition, if the Committee decides to make it available, speed and congestion information would be available on the web, as would be connections to transit information currently available at transit agency web sites.

2.6.1.2 Traffic Cameras

Traffic cameras are a critical part of a traveler information website and will be a significant offering of the DC 511 service. In addition, cameras are one of the elements available to users only online and not via 511. Trafficland, (www.trafficland.com) is the most sensible partner to seek in the provision of traffic cameras for the DC area. Trafficland aggregates traffic camera images from a variety of public and private sources to offer over 75 cameras in the coverage region. Still shots and short bursts of traffic video are available, depending on the capability of each individual camera. A hyperlink to the TrafficLand website from the DC website would be a low cost way to offer users access to camera images. It would also be possible to offer access to TrafficLand's cameras via a "Traffic Cameras" tab, which could open the application within a DC 511 frame. A more elegant (and more expensive) option is to offer the user a "camera map" of the region, providing a map of clickable camera locations. Each camera icon would open the current image or video of the chosen camera location. These issues will be raised and resolved in the system requirements definition and design process.

2.6.2 Design

The centerpiece of a traveler information website is an interactive map of the coverage area, including icons with event information and/or color-coded congestion, with accompanying textual list of events. Some deployments feature maps created using a GIS database and others are hand-drawn to better serve a region's particular needs. An interactive map lets the user determine at a quick glance the area covered with the service, and allows the user to get graphic information related to the desired route or area.

On the website, it is not necessary to segment roads as it is with the phone system. While the length of one entire road within the coverage area (such as the Capital Beltway) will often have an overwhelming amount of information to provide over the phone, the same is not true when dealing with an interactive map. A user can glance at an entire roadway and simply choose the area desired. An interactive map will let the user chose the desired area and receive information available for that road/corridor/region.

2.6.3 Domains

If the Committee decides to develop a web site, the lead agency should secure a short list of website Uniform Resource Locators (URL) or addresses, with "511" in the title. If more than one domain is purchased and implemented, each address can simply re-direct the user to the DC 511 website. Website addresses available at the time of this publication include:

- www.metrodc511.com (org/net)
- www.dcmetro511.com (org/net)
- www.511metrodc.com (org/net)
- www.511dcmetro.com (org/net)
- www.washingtondc511.com
- www.511washingtondc.com
- www.511dc.net
- www.dc511.net

Additional desired domains that are currently owned are not necessarily unavailable. "Cyber-squatters" are individuals or businesses that register and hold on to URLs that may be needed by other organizations. These squatters try to sell the name to the organization willing to pay for it. However, courts have in the past frowned upon such practice, and unless the squatter can prove a claim to the intellectual property that would necessitate continuing to own the name, the squatter often has to turn over ownership of the URL.

3 Procurement and Operations

3.1 Procurement Approach and Business Model

As the Conceptual System Design discussed, the prospects of any business model other than one that relies on government funding are extremely unlikely. Consequently, our recommendation is that the procurement be designed to lead to a fee-for-services contract with a 511 contractor. The details of the procurement approach largely depends on whether this system is included as part of the Virginia system or whether it is a separate system; where appropriate, the stages shown below highlight where decisions need to be made. The time frame for these activities is shown in the schedule in Section 5.

- Pre-Procurement
  - Identify Funding
  - Designate Lead Agency
  - Designate Project Manager from lead agency
  - Form Oversight Committee to provide input on strategy and policy; procurement oversight; oversight of system development and daily operations (including software development, telecommunications, marketing, and so on)
  - Evaluate Options, including:
    - Expand VDOT Contract with task order for DC 511
    - Procure separate system; develop procurement materials in-house
    - Procure separate system; hire consultant to assist with the procurement
- Contract
  - Develop specifications and/or functional requirements for 511 (either in-house or with consultant assistance).
  - Prepare a Request for Proposals (RFP) for a fee-for-services contract to develop, operate, and maintain the Washington, DC 511 system. Include an initial term and then options to renew.
  - Conduct procurement, select a contractor, and enter into the contract.

3.2 Components of the 511 System

The contractor, through the DC 511 procurement, will perform operations functions 24 / 7 / 365 including content management, operations and maintenance of the phone service, website, data fusion engine, and any optional services agreed to.

3.2.1 511 Telephone System

The contractor will be responsible for: the content on the phone system; maintenance of the phone system menu; transfers to other agencies; providing sufficient capacity to answer all calls to 511 at least 90% of the time; and other tasks related to making sure that 511 is reachable by as many callers as practical.

3.2.1.1 Content

The contractor will gather information from other agencies to populate the transit and airport messages, operate the data fusion system, and establish methods to obtain information from adjacent regions. A key question will be whether the contractor will be responsible for seeking out the information or whether the agencies will be responsible for alerting the contractor to changes in the information they provide. The operators also will be monitoring the quality of information provided by Committee agencies and alert the 511 project manager when persistent issues pertaining to data quality occur.

3.2.1.2 Menu Structure

The 511 system will allow for minor changes in the phone menu structure or composition within four hours of the request. "Minor" changes are defined as:

- Disable an existing prompt
- Replace existing prompt with a new prompt
- Change in transfer numbers

The region's stakeholders may identify other minor changes.

3.2.1.3 Call Transfers

The 511 contractor will work with the outside agencies that the Committee determines to enable a call transfer, ideally in each direction, between the agencies. When the 511 system transfers a call to an outside agency, it is anticipated that the call, after connecting, will be dropped from the 511 system, opening the port to allow other incoming calls. The 511 contractor will work with all outside agencies to determine the most cost efficient plan for transferring calls between the 511 system and the agency's system. Where possible, the contractor will attempt to put in place a call transfer program that terminates the charges to the DC 511 system once the call transfer is complete. Before a call is transferred, the user should be informed of the business hours of the organization receiving the call. An additional option is to set up the system with "attended transfers," in which a caller is returned to the 511 system if the number to which the call is transferred does not answer, is busy, or is otherwise unavailable.

The services to receive a call transfer include:

- Virginia's 511 services (unless this system is implemented as part of the 511 Virginia program)
- Statewide road conditions and construction information in Maryland, if appropriate
- Public transportation services
    - WMATA Customer Service Center (Note that WMATA would receive the bulk of transit calls, as they have information about all local providers'

services, significant staff dedicated to customer service, and an automated trip planning feature)
- Alexandria DASH
- Arlington Rapid Transit
- Fairfax Connector
- Fairfax CUE
- Falls Church GEORGE
- Loudoun County Transit
- Maryland Rail Commuter Service (MARC)
- Metropolitan Washington Airports Authority
- Montgomery County Transit – Ride On
- PRTC (serving Prince William Co.)
- TAGS
- TheBus (Prince George's County)
- VRE

When Maryland's 511 service comes online, the 511 contractor will work to enable call transfers between this system and the Washington, DC 511 service. The possibility to do data exchanges / transfers with other services also needs to be determined.

3.2.1.4 Call Spikes

Per the National 511 Deployment Coalition's Guidelines, 511 systems should be able to answer all calls 90% of the time. There are different methods—sharing ports, queuing callers, and so on—to achieve this. It will be the contractor's responsibility to do so.

3.2.1.5 511 Availability

The contractor will be responsible for monitoring the region's telecommunications providers to inform the Lead Agency of any who are not making 511 available to their customers. The 511 contractor should also perform the necessary carrier coordination to ensure that all carriers translate calls to 511 appropriately with the Lead Agency paying the carriers directly for the translation.

The Lead Agency may also wish to direct the contractor to explore having payphone providers in the coverage area offer access to 511 as well, although there are likely significant cost implications to this option. Currently, no operational 511 service includes comprehensive access from payphones.

The contractor will also be required to make users aware of Public Branch Exchange (PBX) programming information on the 511 website or through other means, so that callers using a PBX will be able to call 511.

As mentioned in the Coalition Guidelines, the Americans with Disabilities Act and environmental justice issues need to be considered in making 511 available to the public.

3.2.2 Traveler Information Website

If a co-branded website is developed as part of this deployment, it should have continuously updated information including:

- The basic content describe for the 511 phone system
- AMBER and public safety alerts
- Frequently Asked Questions (FAQs) about 511
- Instructions on using the telephone service
- Hyperlinks to specialized construction-related websites, if any
- Hyperlinks to the websites of all public agency partners and to private sector partners
- PBX dialing programming information

The 511 system will allow for minor changes in the website and its composition within four hours of the request. "Minor" changes are defined as:

- Change a hyperlink
- Enabling or disabling banner message
- Changing banner message
- Moving placement of banner message

The region's stakeholders may identify other minor changes.

3.3 Roles and Responsibilities

Perhaps the key issues facing the Committee relate to deciding who will be responsible for the day-to-day operations of the 511 telephone service and the allied website. The key areas of responsibility will be the following:

- Oversight of the 511 Contractor (including paying invoices, ensuring contractual compliance, etc.)
- Data quality assurance and control
- Oversight of the day-to-day functioning of the phone and website
- Marketing decisions
- Decisions on system upgrades and improvements

It is our recommendation that whichever agency leads the procurement effort also be responsible for all aspects of the system except, perhaps, for data quality.

There are various options, as follows, for ensuring data quality. For these purposes, the term "data quality" also includes the accuracy of the telephone numbers that are used for call transfers and the hyperlinks on the web page. The options are:

- The agency responsible for contractor oversight can also be responsible for monitoring data quality. Advantages of this approach are that the agency most invested in the successful operation of 511 is also the agency responsible for overseeing data quality, one of the key drivers of public acceptance. Disadvantages are that data monitoring is time consuming and sometimes requires special expertise. Additionally, agencies sometimes have little leverage over other agencies.
- Each agency can be responsible for monitoring the accuracy of its own data. The advantage of this approach is that the agency most knowledgeable about the data is responsible for ensuring the quality. The key disadvantage is that the diffuse responsibility can mean, in the end, that no one is in charge of overall data quality.
- A separate consultant can be procured specifically to monitor data accuracy. The advantage of this approach is that it allows a consultant to use its expertise to track data quality. The disadvantage is that it is more costly than the other approaches.

3.4 System Expansion / Upgrades

The 511 service will evolve from its launch on Day 1 and should be designed to be flexible and expandable as consumers' expectations for 511 evolve and grow. The 511 procurement should include provisions to modify menus, expand capacity, etc. The Lead Agency will work with the contractor after the initial implementation to determine upgrade plans.

These enhancements could include:

- Additional Data, should new sources become available
- Commercial Services / Services for a Fee
- Bike / Pedestrian Information
- Alternate Route Information
- Itinerary Planning
- Maintenance Information
- Parking / Park and Ride Information
- Train Information
- Bilingual Information
- Directions
- Additional Transit Agency Information / Transfers

The contractor will see that enhancements to the system do not degrade overall system performance and accessibility. The enhancements and expansion of the system must be carefully planned and designed so as not to disrupt normal system operations.

4 Marketing

Conceivably, the Committee could spend as much to market the 511 services as it will to build, operate and maintain the 511 system. On the other hand, many states operate effective statewide 511 marketing programs for $100,000 to $250,000 per year. The Committee can benefit from the experiences of other 511 deployers to "get the word out" about the availability of 511 in the Washington, DC area. The 511 Deployment Coalition has a variety of tools available to assist deployers with their marketing efforts.

In addition, the various agencies on the Committee have marketing professionals on their staff in Public Information Offices who know transportation and public awareness and the contractor should also have this competency. The goal of the 511 Marketing Plan will be cost-effective and resourceful approaches to create and maintain awareness, and to continually increase usage. Marketing the 511 services will require close cooperation between the contractor and the agencies on the Committee.

4.1 Washington, DC 511 Marketing Plan Background

511 is a true consumer service and effective marketing efforts are needed to ensure the success of 511 systems and the Committee needs a contractor with experience working with transportation public awareness campaigns and consumer products. The 511 message needs to be delivered to target audiences in the most efficient and effective way. National studies show that travelers get travel information mostly from radio and television in the form of traffic reports, but websites are becoming more popular.

During the development phase of the project, the Committee and the contractor should develop the 511 marketing theme and plan the marketing efforts. Beginning with the system launch, the Committee and the contractor would work to generate awareness and educate the public about the information available on the Washington, DC 511 and how to access it through earned and paid media tactics. During the operational phase of the 511 system, the marketing campaign would ensure that the public continues to utilize the Washington, DC 511 services. Existing 511 services marketing efforts run the gamut from relatively low-cost efforts such as roadside signs to full-blown advertising and marketing campaigns. Today, 511 nationwide is still in the developmental stages and most travelers, even those who can access the service on a daily basis, do not know of its existence.

The communications about and messages focused on 511 need to continue to resonate with the public while 511 is available in the region. The Committee and the contractor should use the marketing plan to "get the word out" about the benefits and features of 511 services (telephone, website and possibly others) to travelers (commuters, truckers, through travelers and tourists) in the Washington, DC area. Beyond travelers, there are three other important audiences to target: agency staff; partner organizations – both public and private; and the media.

4.2 Goals

The primary goal of the 511 marketing plan is to create awareness and use of 511 for travel information. The marketing campaign leading up to the launch should establish a baseline measurement for awareness of 511 in the region and ask consumers what they think 511 entails.

4.3 Key Message

The key message of this campaign will be that Washington, DC's traveler information services – consisting of 511 information access via the telephone (and website and other services if applicable) – provide easy and direct access to accurate, timely and reliable travel information.

4.4 511 Logo and Branding

The American Association of State Highway and Transportation Officials (AASHTO) has registered a 511 logo that deployers, except one, utilize to market their 511 services. This logo has become the de facto 511 "brand" nationwide and the Committee should use it to co-brand the telephone, website and other services. By using 511 as its traveler information "brand," the Committee will have a unified theme with consumers for all of its traveler information offerings.

Some travelers will immediately recognize the logo, and what it is associated with, as parts of Virginia have been using it, and Virginia's statewide service will launch in February 2005.

4.5 Marketing Plan Activities

The following activities should be included:

- Research
- Theme Development
- Creation of Communications Materials
- Media Tours / Speaking Engagements
- Launch Event
- Advertising
- Direct Mail Pieces and Other Collateral Materials
- Monitoring of Marketing Effectiveness
    - Awareness
    - Satisfaction
    - Usage
- Marketing Plan Update

5 Schedule

Table 6 illustrates the schedule for the procurement, development, and launch of the Washington, DC 511 system. This schedule is based on the following assumptions:

- There will be a new procurement for the DC 511 system
- It will take at least seven months from the end of this Feasibility Study to make a go/no-go decision on developing a 511 system
- There will be no RFP for a consultant to assist in the preparation of the procurement materials.

Table 6 / DC 511 Development Schedule

Task	Completion Date
Completion of Feasibility Study	March 25, 2005
Identify Funding	June 30, 2005
Designate Lead Agency/Project Manager	July 31, 2005
Develop Policy Group and Working Group	September 30, 2005
Decision to Procure 511	October 31, 2005
Specifications/Requirements	December 15, 2005
RFP Issued	January 31, 2006
Proposals Received	March 31, 2006
Consultant Selected	May 31, 2006
Contract Executed	June 30, 2006
511 Launched	February 1, 2007

Note that the total time would be significantly shorter if the system were done as part of the 511 Virginia. Instead of starting from scratch, doing the work as part of the 511 Virginia system would leverage the work done already for data fusion and for the 511 system itself. The primary effort required at that point would be to decide which new data to include and modify the phone system to include options for Washington, DC. In addition, because one option for the work would be a task order under the existing VDOT contract, there would not have to be a procurement. That option alone would save the six months needed to develop an RFP, wait for proposals, and select a contractor.

6 Estimated 511 Costs

The costs associated with designing, building, operating and maintaining a 511 system are extremely varied. The National 511 Deployment Coalition has published a report on the costs and benefits of 511, available at http://www.deploy511.org/docs/511_Value.pdf.

This section includes two parallel cost estimates for the Washington, DC area 511 system, one for a stand-alone regional system and one for an add-on to the (soon to be) existing 511 Virginia statewide system. Each one includes "high" and "low" estimates. In addition, there are separate estimates for the startup period costs (Table 7) and for the ongoing (operational and maintenance) costs (Table 8). The costs are further broken down into the following categories:

- Labor – All personnel (Full Time Equivalents (FTE's), part time workers, Information Technology (IT) staff dedicated to 511, man-hours spent training staff on new procedures and equipment, consultants and vendors working on 511) fall within this category. The bulk of labor costs are generally realized during the design and implementation of 511; as the system becomes operational, the labor costs decrease. During the design and implementation phases, the responsible agency for 511 in DC can expect to dedicate a project manager and IT resources, and may hire a contractor to assist in the early phases. Personnel may have to be trained on using new software and hardware.

- Equipment – Jurisdictions offering traveler information - on the Internet, via phone, or both - generally need to invest a significant percentage of an implementation and maintenance budget on hardware and software. Contracting with an outside application provider to host and manage the hardware and equipment may cause the responsible agency to realize some greater costs up front but may significantly reduce long term maintenance and operational costs.

  There are several ways to architect the flow of data to a network provider. Various data streams can be directed to the provider, or the agency responsible for DC 511 can create a central clearinghouse of data. It is possible that some day, the data available through the RITIS could serve as a single clearinghouse of information for 511. Regardless, some fusion will need to take place to ensure that the systems processing those data are compatible with the 511 phone system. In addition, a new co-branded website should be developed, offering information similar to, if not the same as, that offered via the phone system. Website costs include design, monthly hosting fees and upgrades.

- 511 Content Upgrades – The 511 Deployment Coalition has published Guidelines regarding recommended basic, and suggested optional, content that should be considered during the design and implementation of a 511 service. The Washington, DC area benefits from a wealth of agencies collecting and

disseminating myriad traffic, transit and tourist information, and it is our assumption that no additional content will be created. We have included a place-holder cost for this line item in the event that it is determined that a relatively minor investment could provide significant improvements in content.

- Telecommunications – One principle guiding the deployment of a national 511 is a seamless, transparent telecommunications structure. In short, the call goes through and the call gets answered. Carrier tariffs, call switching fees, central office programming and cell tower programming fees vary widely from one provider to the next. ILECs on the Virginia side of the District have been contacted and are implementing 511 in the region; costs for the majority of those carriers have already been settled.

  There are two ILECs in the state of Maryland: Armstrong Telephone Company and Verizon. Verizon is currently in negotiations with VDOT regarding the cost of programming their Virginia central offices. The same kind of negotiation is likely to be necessary for a DC region deployment. Armstrong Telephone Company operates one central office in Maryland, and while this carrier has no tariff on file for N11 call switching, they are expected to ask for the same per-central office cost as Verizon.

  There are five major wireless carriers (Verizon, Cingular / AT&T Wireless, Sprint PCS, Nextel and T-Mobile) and many smaller wireless carriers with whom to coordinate routing of 511 calls. Due to the unique characteristics of the region, i.e. the spanning of two states and its proximity to another large urban area, the issue of wireless carriers programming their cell towers to properly route 511 calls is a critical one. Most of the wireless carriers do not charge a fee for cell tower programming, with the exception of Cingular. Cingular has a standard charge of $400 to program a state or region, and between $25 - $100 per tower. With more than 100 towers in the DC area, the implementing agency can expect to be charged the $25 rate.

  Should Maryland DOT ultimately create a stand-alone system, the issue of call transfers to Virginia's statewide system, a Maryland statewide system, a Baltimore regional system or a Pennsylvania system, must be addressed.

- Marketing – Successful marketing of 511 involves many factors, not the least of which is highway signage. Evaluations of 511 implementations show that the traveling public often first learns of 511 from highway and arterial signage. Coalition Guidelines suggest that roadway signs be installed an average of every 10-12 miles on the highway. However, as DC is a highly urbanized region, a significant portion of the signage purchased and installed should be on arterials.

Radio and television advertisements, brochures available online and at tourist information centers, can also be components of a successful marketing campaign. The costs vary widely, but an urban area such as DC, as a major media market, may encounter higher than average costs for this type of marketing.

To summarize, creating an entirely new stand-alone system would cost significantly more than would implementing this system as part of the 511 Virginia system. There are economies of scale, and previous research, design and implementation that could be leveraged by using the 511 Virginia system. For instance, a significant amount of time and money has already gone into designing and implementing the architecture for data flow within and external to the 511VA system. Creating an additional "section" of information, i.e. DC coverage, would allow the lead agency to benefit from a proven architecture already in place.

Coordination with telecommunication carriers provides an additional opportunity to leverage existing work. Verizon is the dominant landline provider in the DC area, and covers a large amount of Virginia as well. As of the date of this plan, negotiations are being undertaken by VDOT with Verizon to secure a mutually-agreeable fee structure. Should the lead agency in DC choose to implement on its own, the leverage gained from these negotiations would be lost, and the labor costs to actually participate in these negotiations would be incurred again.

Table 7 / Estimated Startup Costs

Service	Stand-Alone System	Extension of 511VA
Labor		
Network host application development, engineering, IVR license purchase and implementation	$450,000 - $850,000	$50,000 - $95,000
Project management FTE	$85,000 - $130,000	$85,000
Training sessions for central and field personnel	$35,000 - $75,000	$35,000 - $75,000
Professional consulting for implementation phase	$0 - $250,000	N/A
IT staff	$65,000 - $120,000	$7,000 - $15,000
Equipment		
Data fusion development	$250,000 - $500,000	$50,000 - $95,000
Website design	$25,000 - $150,000	$25,000 - $150,000
Communications upgrade to feed network provider	$17,000 - $25,000	$17,000 - $25,000
511 Content Upgrades	$0 - $70,000	$0 - $70,000
Telecommunications		
Potential reprogramming of existing towers and central offices[4]	$0 - $45,000	$0 - $45,000
Verizon Tariff[5]	$7,500	$7,500
Armstrong Telephone Co. Tariff[6]	$500.00	$500.00
Wireless carrier implementation costs	$3,750	$3,750
Marketing	$150,000 - $250,000	$150,000 - $250,000
Total Estimated Startup	**$1,088,750 - $2,465,000**	**$430,750 - $820,000**

Table 8 / Estimated Annual Costs

Service	Stand-Alone System	Extension of 511VA
Telecommunication charges (toll-free backbone)[7]	$40,250	$40,250
Ongoing Maintenance of Telecom Equipment	$10,000 - $20,000	$10,000 - $20,000
Network Provider	$85,000 - $120,000	$45,000 - $65,000
Marketing	$150,000 - $200,000	$150,000 - $200,000
Professional consulting for operations and maintenance	$65,000 - $115,000	$30,000 - $50,000
Internal Staffing	$85,000 - $130,000	$40,000 - $65,000
Total Annual Estimated Costs	**$435,250 - $585,000**	**$315,250 - $400,000**

[4] Most carriers will do this for free, or a nominal fee. Cingular and Verizon charge for the service, however, and the exact amount must be negotiated.
[5] In Virginia, Verizon is currently asking for $500 per central office. While negotiations are taking place as of the publication of this document, this figure is being used for the purposes of calculation. Verizon has approximately 15 central offices in the proposed DC coverage area.
[6] Armstrong Telephone Company operates one central office in Maryland.
[7] Assuming 115,000 minutes monthly at an average of 3.5 cents per minute

7 Appendix A: Summary of Available Content

Please see attached Microsoft Excel File entitled “Appendix A”