

“First Responder Interoperability: Can You Hear Me Now?”

**A Joint Hearing of the
Subcommittee on National Security, Emerging Threats, and International Relations
and the
Subcommittee on Technology, Information Policy, Intergovernmental
Relations and the Census**

CapWIN

Capital Wireless Integrated Network



Building a Bridge in Transportation and Public Safety Communications

Written Testimony

by

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Executive Summary

What is CapWIN?

The CapWIN system provides a “messaging hub” that enables first responders and incident management personnel from different organizations to securely communicate mobile unit to mobile unit and coordinate activities by instant messaging, chat, and email despite differences in their respective mobile data communications systems. The system also allows secure, role-based access to critical information in other agencies’ systems. Over 40 local, state and federal agencies comprise the existing CapWIN consortium.

Brief History

Strategic planning and laying the institutional foundation were the focus of CapWIN for the first two years starting in December 1999. In these two years, an ad-hoc organizational structure was created, a strategic plan was developed, a pilot test was conducted, and a procurement process to acquire systems integration support services was initiated and completed. In August of 2002, with the systems integrator on board (IBM Corporation), the CapWIN system design and implementation was initiated. In just over a year, the system foundation was designed and built and the initial system is currently being deployed among public safety and transportation users in the D.C. Metropolitan area.

Lessons Learned / Observations

CapWIN’s governance is a true partnership between local, state, and federal agencies.

The CapWIN governance structure places emphasis on the importance of local jurisdiction participation in CapWIN’s voting and deliberation structure. The governance model created has a strong and complete role for each and every local jurisdiction as well as the state and federal department/agencies who are currently members of CapWIN. This structure is based on a true partnership.

“When people sit in the sandbox and play together you can see a lot of good things happening. [For example], Law enforcement traditionally didn’t deal with transportation, but we brought them all to the table. The transportation representative told them ‘I’ve got all this in my database’, the law enforcement representative said, ‘Man, I’d like to have that’. And all of a sudden people started working together. It’s just a matter of getting them in the same room, letting them understand what each one of them had, and where they were coming from.”

- George Ake, CapWIN Program Director

To meet the needs of the twenty-first century, people need to put away old methods and practices and learn to “play together in the same sandbox” for the common good of our citizens.

CapWIN leverages the investment in existing systems and provides critical functionality for agencies without an existing system.

“We’re saying to the agencies with current systems, “you don’t have to buy a new system.” Here’s an agency, for example, that spent millions of dollars on this new system. We can’t ask them to throw it away. That would be crazy. If they don’t have a system then we provide mobile technology. Even if we had the funds, we can’t afford to build one system for everyone because it would take a long time for implementation and we would waste taxpayer dollars. And then you have to worry about retraining everybody and then reworking the way people do business. It’s just not realistic. CapWIN bridges between the systems to provide inter-agency communications using the investments already paid by governments. When these systems need replacing then we should help agencies identify open systems based on standards. New systems should be built using current COTS software and systems.”

- George Ake, CapWIN Program Director

CapWIN is sharing “lessons learned” with agencies from around the country.

CapWIN staff has been working with the National Institute of Justice and SAFECOM to share information with agencies and regions throughout the country. The need for non-vendor information is critical throughout the U.S. Agencies need the ability to learn from their counterparts what has been successful and what has not.

Multi-year federally supported start-up funding is critical

The CapWIN Executive Leadership Group is working on long term funding issues. Complex multi-state initiatives such as CapWIN require several years of start-up funding to form trust-based partnerships, develop legal governance structures, and work together to plan, design, and implement an interoperable communications system. CapWIN would not exist without the federal funding support provided by congress. In the future, ongoing operations and maintenance support will largely be covered by state and local agencies;

however, continued federal support will allow the system to evolve to meet the need for new and innovative functionality that will allow emergency response agencies the ability to meet future incident response challenges.

Systems must be built with the end-user in mind and address everyday needs

It seems obvious, but systems are built everyday without taking into account the needs of the individuals that will use it. CapWIN's design process was built based on public safety and transportation user community input. In addition systems have to be used every day and not just for a terrorism event. Unless the system is used regularly, users will not know how to use it when a major catastrophic event occurs. CapWIN has been designed as a tool that can be used to support day-to-day incidents as well as major incidents.

Standards development needs to be coordinated at all levels

Many Federal agencies and standards development groups are involved in standards development activities and it is very difficult identifying those that are pertinent to CapWIN and how to implement them. In some cases, standards development activities are overlapping making it evident that all standards efforts are not coordinated under a single unified organization or entity. This leads to a great deal of frustration from the state and local agencies that are trying to "do the right thing" in terms of using standards in the systems the plan, design, and implement.

Public agencies need a place to go for technical advice and support

Public agencies need technical advice and support to build systems properly using the latest standards, technology, lessons learned, etc. Having easy access to this type of support can save dollars in the long run. CapWIN would support the creation of a Support Center perhaps under SAFECOM.

Public Safety Agencies need additional spectrum

Several CapWIN agencies including Washington D.C. are currently looking at broadband solutions that could enable first responders and command centers to receive video and other large files. CapWIN has the ability to move these files but spectrum is limited.

CapWIN History

The Woodrow Wilson Bridge in the Washington, DC metro area spans the Potomac River connecting the Maryland and Virginia portions of the Capital Beltway. The bridge serves more than 190,000 vehicles each day and is one of the most heavily traveled in the country. On November 4, 1998 a 32-year old man, upset because of a domestic dispute, climbed onto the wall at the edge of the span about 1:07 p.m. and told construction workers on the ground below that he planned to jump. The Alexandria, Virginia resident stood on the bridge for more than 5 hours before jumping, causing incredible traffic tie-ups as the bridge was closed. Much of the Capital Beltway was brought to a complete standstill during the rush-hour period due to the confusion that ensued as emergency personnel from multiple jurisdictions responded to the incident.

Most of the traffic problems stemmed from the fact that the agencies responding to the incident did not have the ability to effectively communicate with each other. The Wilson Bridge is federally owned and considered part of the District of Columbia, even though there is no way to directly access the bridge from the District. The Potomac River, flowing below the bridge, falls under the jurisdiction of the State of Maryland while the individual threatening to jump was on the portion of the bridge that is approached from Virginia. As a further complication, response to incidents on the bridge may be performed by state-level agencies (the Virginia Department of Transportation or Maryland State Highway Administration), county-level agencies (Montgomery or Prince George's Counties in Maryland, Arlington and Fairfax Counties in Virginia), or by municipalities (such as the City of Alexandria).

Charles Samarra, Chief of Police for the Alexandria Police Department stated, “[This incident] brought the region to a standstill -- it was a transportation catastrophe.” Part of the issue stemmed from the fact that emergency personnel on the scene had no way of communicating with each other via radio. Instead, officers sprinted back and forth across the bridge to deliver messages.

Currently, in order to transmit a message from a response unit in one agency to one in a different agency, responders must communicate with their respective communication centers and request that they phone their counterpart agency's communication center in order to have them relay a message to their respective unit on scene. This fragmented and indirect communication takes time and adds unnecessary delay in situations where every second counts.

Since responding agencies had no way to effectively communicate with each other, they were acting without knowing what their counterparts were doing. Thus, detours in one jurisdiction led to dead-ends in others. Back-ups stretched for miles. Some motorists sat in their cars for more than 6 hours without moving.

While this incident was by no means unique to the types of incidents that have occurred in the Washington D.C. region well before it, it happened to be the one that spurred two agencies – the Maryland State Highway Administration and the Virginia Department of Transportation – to initiate the planning and activities that led to the creation of CapWIN. A because of the events of September 11, 2001, the definition of a major regional incident changed forever further solidifying the partnership between the State of Virginia, State of Maryland and the District of Columbia and their mutual goal to develop an interoperable communications system for the region. The Capital Wireless Integrated Network (CapWIN) will be the first multi-state transportation and public safety integrated wireless network in the United States. It is designed to provide firefighters, police, transportation officials and other authorized emergency personnel with wireless access to multiple data sources during critical incidents. Improved access to information will help these ‘first responders’ and public safety officials make vital public safety-related decisions.

The CapWIN system is being designed to assist in alleviating confusion related to incompatible communication equipment and inaccessible information across agencies. Such a system will address frustrations experienced by emergency and other responding personnel and will allow a responding party to immediately (and simultaneously) contact other key personnel. To meet this challenge, representatives from more than 40 transportation, law enforcement and public safety agencies in the Washington area have come together to determine how technology can be used to coordinate incident management and share relevant information in a more accurate and time-sensitive manner.

CapWIN Overview

CapWIN has the potential to become a model for public safety and first responder information sharing, not only in the region, but nationally and internationally as well.

Initially, CapWIN will provide three critical capabilities:

- Furnish a mobile data communications capability to agencies that do not currently have it;
- Provide mobile access that will allow authorized users to instantly obtain criminal justice, transportation, and hazardous materials information; and
- Achieve interoperability between existing incompatible mobile data communication systems.

To facilitate system expansion, development, and maintenance over the long term, the CapWIN system has been designed using a standards-based technology approach for communications, software, and interfaces to external databases and systems. A crucial feature of this standards-based technology is the ability for CapWIN to leverage the investments of agencies that have already purchased mobile data communication systems. The primary components of the system include field hardware (e.g., notebook computers and handheld devices); the CapWIN client software that runs on these devices,

and the backend system that ties the hardware, software, and external system interfaces together. The system makes extensive use of general purpose, commercial, off-the-shelf products that are widely available, well supported, broadly understood, and easily maintained. Because the bulk of the software is located on servers, users only need a web browser to use CapWIN. Given that CapWIN uses proven Internet technologies, the solution will have the advantage of benefiting from the tremendous research and development that private industry is currently investing in these technologies. Further, the system will be able to use new wireless technology as it is introduced, without the need to rework existing applications.

CapWIN Progress

The CapWIN project has made extensive progress in a very short time period. Following is a summary of accomplishments since January 2002 when Congress provided \$20 million in funding to the CapWIN project to advance it from a concept to an operational system.

- A governance structure has been established that represents Federal, State, and local public safety and transportation agency stakeholders in the CapWIN system. The approved structure places emphasis on the importance of local jurisdiction participation in CapWIN's voting and deliberation structure. The governance option selected has a strong and complete role for each and every local jurisdiction as well as the state and federal department/agencies who are currently members of CapWIN. The current governance leadership team consist of:
 - Charles Samarra, Chief, City of Alexandria Police Department
 - Margret Kellems, Deputy Mayor for Public Safety, Washington, D.C.
 - Ed Plaughter, Chief, Arlington County Fire Department
 - Marylin Praisner, Councilwoman, Montgomery County, Maryland
 - Mr. Michael Byrne, Department of Homeland Security
 - Secretary John Marshall, Virginia Department of Public Safety

The organizational structure also includes technical and operational working groups representing participating agencies.

- Shared lessons learned with transportation and public safety agencies throughout the country.
- The John F. Kennedy School of Government has developed a case study to be used in their E-government seminars next year. This case study focuses on CapWIN's multi-state partnership/governance and the use of open internet based technology.
- The program has garnered the participation and support of over 40+ Federal, State, and local agencies representing, public safety and transportation agencies in the Capital region.

- Held summit at FBI Clarksburg, WV facility and reached agreements for regional criminal justice information sharing with representatives of Virginia, Maryland, and the District of Columbia.
- Established CapWIN office in Greenbelt, Maryland and created staff structure for planning, development, and operational support of the system. This facility houses the CapWIN network operations center (NOC).
- Completed RFP process and contract with system integrator for planning, design, and implementation of the CapWIN system.
- Established contractual relationship with International Association of Chiefs of Police (IACP) and the International Association of Fire Chiefs (IAFC) to conduct user needs assessments and policies and procedures for information sharing.
- Established contractual relationship with George Mason University to survey governance models, draft by-laws, and conduct institutional issues evaluation.
- Established contractual relationship with University of Virginia to gather transportation user needs, provide technical support related to transportation system data access and system interfaces.
- Conducted user needs assessment & design workshops with operational level representatives of law enforcement, fire, EMS, and transportation agencies in the Capital Region.
- Identified need for, and acquired through NIST, a standards manager position to ensure adherence to, and promulgation of, national public safety and transportation IT standards.
- Completed initial system design and started system implementation (see details below).
- Currently in the midst of focused beta release of software involving 50+ field units representing over 15 Federal, State, and local public safety and transportation agencies in areas where multi-jurisdictional and interagency coordination and communication has been a problem.
- The current system implementation will support 10,000 concurrent (simultaneously logged in) users representing the entire public safety user base in Maryland, Virginia, and the District of Columbia.

CapWIN System Implementation Progress Details

The following list of tasks are included in Phase 1 of the CapWIN project. All tasks below are covered by Phase 1 funding (through July 2004) unless otherwise noted.

Task 1 – Core Infrastructure

Beta testing is underway for the first task of CapWIN. This task includes:

- Law Enforcement Queries:
 WALES, MILES, VCIN, NCIC, NLETS
- Incident Management Support
- Messaging/Email
- Security
- Automatic Notifications
- Ability to locate first responders by location or discipline

Task 2 – Transportation and Hazmat Database access

- Design work completed
- Design allows for two types of transportation database functionality:
 - Query by location - User goes to “view transportation” page where all event and road sensor information is available
 - Traffic Alerts - Agency administrator selects criteria by which members of that agency receive an “alert” (flashing icon and sound) based on severity of event or other factors
- Current design will allow users to view streaming video (if sufficient bandwidth on client side) from any Maryland, Virginia, and D.C. transportation agency system
- Current design will allow access to Hazmat data sources to provide:
 - Query access to the Emergency Response Guide
 - Query access to truck and train carrier manifests
 - The ability to forward the results of the above queries to CHEMTREC (American Chemistry Council’s Hazmat emergency response service) and immediately open a chat session with a Chemtrec operator
 - The ability to email the results of the above queries to others responding to an incident

Task 3 – Development of standards-based CapWIN interface and the Integration of existing Mobile Data System

- CapWIN interface will most likely be based on a web services model and will be based on Global Justice XML data model version 3.0, IEEE 1512 and other widely accepted standards
- CapWIN interface will be published and available for other states / agencies / projects to adopt or incorporate into future RFPs
- CapWIN’s first use of the interface will be to connect Alexandria City Police Department’s existing Mobile Data System

CapWIN has received approval from its Executive Board to explore and pursue funding for the following tasks:

- Implementation of a fully-functional back-up facility in Northern Virginia
- Integration of other existing Mobile Data Systems in the Capital Area
- Pilot of integrating Voice-over-IP into Global Directory to provide “laptop-to-laptop” voice communications
- Exploring the integration of Computer Aided Dispatch (CAD) systems into the CapWIN framework
- Integration of Geographic Information System (GIS) and mapping functionality to provide resource location information and real-time intelligent routing to CapWIN users

CapWIN has received approval from the Executive Board to partner with the following programs:

- **“9-11 Connection Initiative”** A pilot program to connect and share information from the criminal justice databases in New York, Pennsylvania, Maryland, and the District of Columbia. This partnership will use the CapWIN network to deliver critical information to a mobile unit and some agencies.
- **“Regional Pawn System”** This system would be housed at the CapWIN Network Center and would provide information on pawned items in the Washington Region. This database would enhance criminal investigations and help recover stolen property. The pawn system would take advantage of the existing CapWIN network.

CapWIN Funding Summary

Federal Fiscal Year (FFY) 1999:

USDOT Intelligent Transportation System (ITS) Integration Program	\$500,000
Maryland State Highway Administration ¹	\$300,000
Subtotal	\$800,000

Federal Fiscal Year (FFY) 2000:

USDOT Intelligent Transportation System (ITS) Integration Program ²	\$1,600,000
National Institute of Justice ³	\$638,692

¹ Federal Highway Administration Federal-aid Funds (matching)

² \$400,000 of the \$1.6 million went to George Mason University through VDOT

³ Funding provided for staff positions at UMD/CATT. Does not include other staff support provided by NIJ through other sources (initial -\$438,692, supplemental - \$200,000)

Maryland State Highway Administration	\$600,000
Virginia Department of Transportation ⁴	\$600,000
Subtotal	\$3,438,692

Federal Fiscal Year (FFY) 2002:

Department of Justice Office of Justice Programs ⁵	\$20,000,000
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<u>Subtotal</u>	\$20,000,000
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<u>Total</u>	\$24,238,692
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Funding Notes:

FFY 99 funding went to the University of Maryland Center for Advanced Transportation Technology to conduct strategic planning in preparation for CapWIN implementation. An initial organizational framework was created as well as a number of documents including *Best Practices in Transportation and Public Safety Integration*, *User Needs Assessment for Transportation and Public Safety*, *Wireless Data Technology Survey*, and *CapWIN Strategic Plan*. In addition a pilot of the CapWIN concept was initiated to demonstrate a multi-jurisdictional vehicle-to-vehicle messaging capability.

FFY 2000 funds were used to begin implementation of CapWIN. The University of Maryland, on behalf of the CapWIN Executive Committee and Steering Groups, initiated and conducted the process of procuring a systems integrator that will build the CapWIN foundation infrastructure. Six vendors competed and the IBM Corporation was selected by the University's Technical Review Committee. On August 7, 2002, The MD Board of Public Works unanimously approved the awarding of the CapWIN Systems Integrator contract to the IBM Corporation. Initial functionality will include mobile connectivity to multiple state criminal databases, designed interfaces to transportation and HAZMAT databases, an interface to an agency with an existing mobile computing system, and mobile data communications capabilities for agencies that currently lack mobile computing.

FFY 2002 funds: \$19,055,000 will be used to: install the CapWIN foundation system infrastructure; pay for build-out costs, leased office space and network operations facility; provide grants to IACP and IAFC; and to fund CapWIN staff positions. University of Virginia and George Mason each received \$472,500 for supporting CapWIN related research.

DOJ Budget Update

The following charts reflect a high level budget update of expenditures and committed funds for the twenty million dollars provided by Congress. Funding received prior to FFY 2002 has been expended.

- Chart one represents USDOJ - NIJ categorical distributions in dollar amounts and individual percentages of the total funding.
- Chart two illustrates first year expenditures and second year commitments in dollar amounts and percentages of each respective category.

⁴ State Funding

⁵ DOD Supplemental Appropriations. Two year budget funding. 72% budgeted for systems integrator contractor. IBM bid for Tasks 1 –3 is \$6.3 million. \$950,000 of the \$20m went to George Mason University and University of Virginia.

- *Note that chart two shows funds expended in year 1 and committed for year 2. With the project now fully ramped up, projections indicate that funds will be nearly expended in most categories by June 30, 2004.*

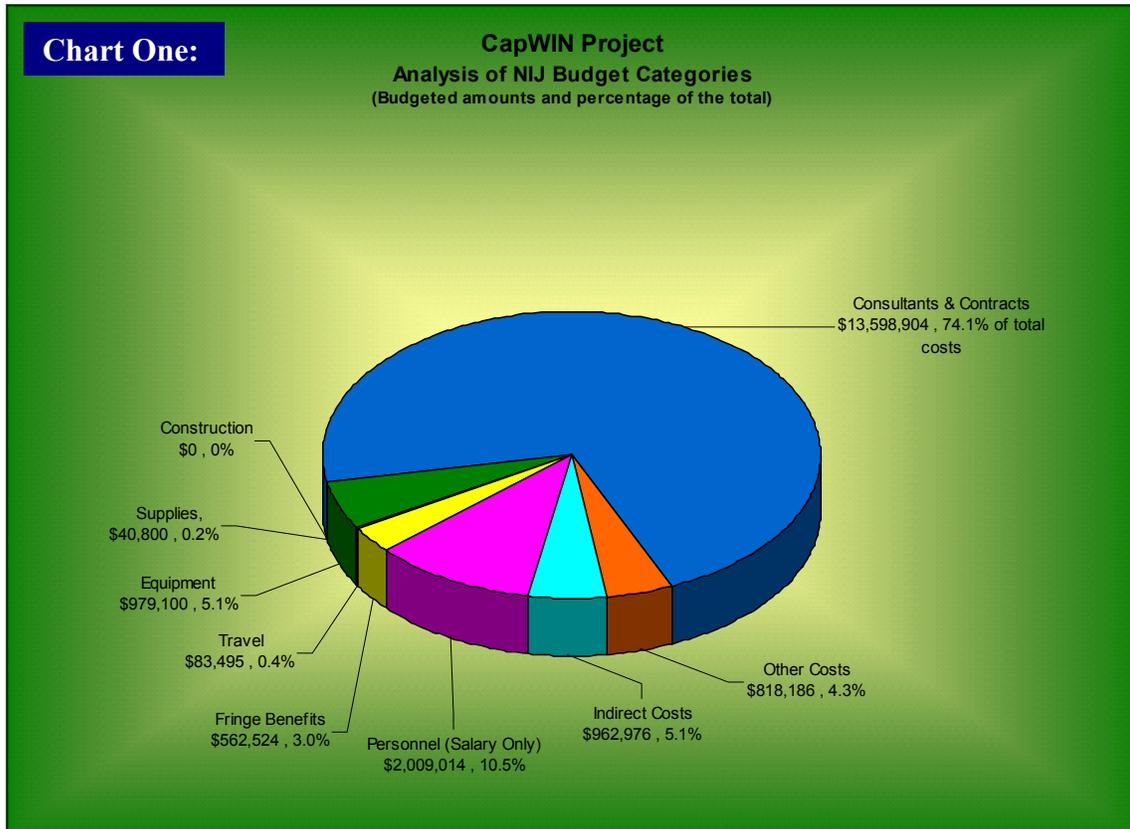
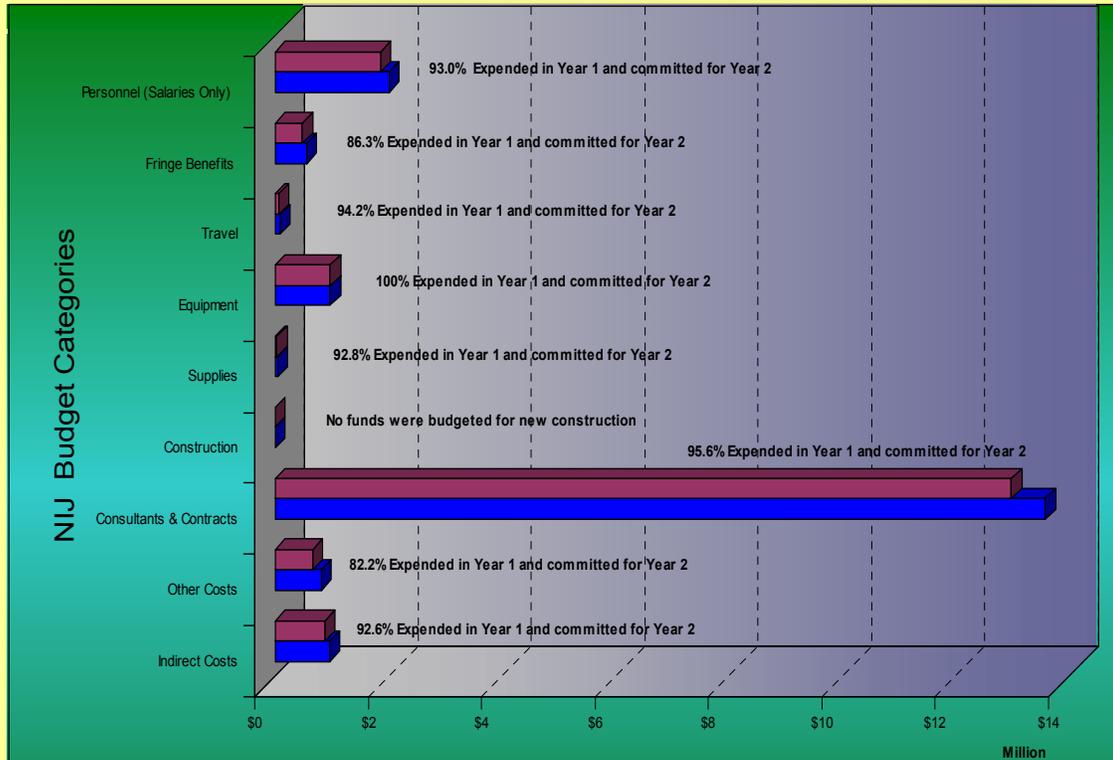


Chart Two:

**CapWIN
Two Year Budget Overview**



	Indirect Costs	Other Costs	Consultants & Contracts	Construction	Supplies	Equipment	Travel	Fringe Benefits	Personnel (Salaries Only)
■ Total budgeted for each category	\$962,976	\$818,186	\$13,598,904	\$0	\$40,800	\$979,100	\$83,495	\$562,524	\$2,009,014
■ Expenditures and commitments for Years 1 & 2	\$891,315	\$672,476	\$12,999,771	\$0	\$37,844	\$979,100	\$78,614	\$485,487	\$1,868,810