

**COUNTY OF SAN BERNARINO**  
**Department of Public Works**  
**IT Strategic Plan**



# COUNTY OF SAN BERNARDINO

## Department of Public Works Computer Services Division

# INFORMATION TECHNOLOGY STRATEGIC PLAN

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## Executive Summary

Establishing a strategic planning process and governance model for Information Technology (IT) is critically important for making sound IT investment decisions, obtaining support for IT projects, and proving IT as a strategic asset of the department. Strategic planning is about building consensus, both on goals and on a framework for making decisions.

### Mission/Vision

In support of the goals and objectives of the Department of Public Works, Computer Services will provide a means for the delivery of; automated engineering, surveying and business activities through quality IT customer service, reliable systems infrastructure and staff development.

### Objectives

The primary objectives of this IT Strategic Plan is to; identify the business goals and objectives of the Department of Public Works; to align IT with the business goals and objectives; and to develop a five year IT Strategic Plan and Governance Model.

### Methodology

A comprehensive methodology was utilized in the creation of this IT Strategic Plan. The various stages included Planning the Plan; Documenting the Business Strategy; Assessing the Current IT Environment; Proposing a New IT Structure (SWOT Analysis); Performing a GAP Analysis (analyze gaps between current IT operational goals and department strategy); Proposing a Strategic Vision and Governance Model; Building a Strategic Decision Making Framework, Identifying Options and Preparing the IT Strategic Plan.

### IT Governance

The Information Technology Steering Committee (ITSC) oversees the information technology investment for the Department of Public Works. Members of ITSC are appointed by the Director and are accountable to the Director. The Business Applications Manager will service as Committee Chairman. The ITSC will review all IT projects that meet any of the following criteria: The project exceeds \$25,000, the project impacts more than one division, or is considered strategic to the department by administration. This includes proposals from within Computer Services as well as proposals from other Divisions that have a significant IT component.

## Recommendations

1. **IT Desktop Initiative - \$775,000**  
Replace all CAD and Desktop PC's. Complete installation by second Quarter, 2009.
2. **IT Infrastructure Initiative – \$800,000**  
Replace Servers, Storage Area Network and Upgrade LAN. Complete installation by third Quarter, 2009.
3. **Cross Train Computer Services Staff - \$25,000**  
Cross train staff on all applications. Begin training by first Quarter, 2008.
4. **Department Web Site - \$17,000**  
Design and build the redesigned Internet and Intranet Web Site. Complete external site by fourth Quarter, 2007.
5. **Automate Department Conference Rooms – \$150,000**  
Automate conference room presentation equipment. Complete Director Conference Room by second Quarter, 2008.
6. **IT Staffing Initiative - \$289,000**  
Add three positions in support of the new and existing business applications and upgrade the Business Applications Manager to a Departmental Information Systems Administrator. Fill positions by third Quarter, 2008.
7. **Geo-Code Primary Facility Images - \$100,000**  
Develop a GIS application that integrates GIS, Filenet Images, PIMS parcel data, aerial photography, etc. into a single desktop research application. Begin project analysis by first Quarter, 2008.
8. **Automate Survey Field Crews - \$50,000**  
Provide rugged laptops for Surveyor Field Crews. Complete installation by third Quarter, 2008.
9. **Create Disaster Recovery Site – \$65,000**  
Create a Hot Site at the Needles Yard for disaster recovery. Complete installation by first Quarter, 2010.
10. **PDA Application for Strom Patrol and Inspectors - \$250,000**  
Perform real time storm route and field inspection data collection. Begin project analysis by first Quarter, 2008.
11. **Automate Scale House Operations – \$500,000**  
Install automated truck lanes for large volume haulers. Begin project analysis by second Quarter, 2008.
12. **Maintenance Management System (MMS) Initiative – \$535,000**  
Utilize Consultant to Select and Implement an Operations Scheduling Application. Approve Consultant contract by first Quarter, 2008.
13. **Automatic Submittal of Digital GIS Data – \$55,000**  
Allow digital track and parcel data submission. Begin project analysis by second Quarter, 2008.
14. **Data Warehouse Initiative - \$275,000**  
Develop a centralized SQL Data Warehouse. Begin project analysis by first Quarter, 2010.

**15. Develop a Regional Base Station Network - \$550,000**

Form a steering committee comprised of San Bernardino and Riverside County Surveyor staff and private firms to develop a public/private consortium to obtain radio band width and funding for a regional base station network. Begin project analysis by third Quarter, 2009.

## IT Steering Committee

### Charter

The Information Technology Steering Committee (ITSC) oversees the information technology investment for the Department of Public Works. Members of ITSC are appointed by the Director and are accountable to the Director. The Business Applications Manager will service as Committee Chairman. The committee will:

1. Provide strategic leadership for IT operations of the Department of Public Works through the alignment of IT strategic goals and objectives with the department strategic goals and objectives.
2. Prioritize IT investment initiatives and resolve resource allocation issues based on project prioritization.
3. Ensure open communications between the IT department and the other functional units of the department so as to promote collaborative planning.

### Mandate

- *The ITSC will meet at least four times per year.*
- *The ITSC will review all IT projects that meet any of the following criteria: The project exceeds \$25,000, the project impacts more than one division, or is considered strategic to the department by administration. This includes proposals from within Computer Services as well as proposals from other Divisions that have a significant IT component.*
- *Projects that fail to obtain proper authorization by the ITSC will not be funded or approved. All proposals must be reviewed and approved for technological merit by the Computer Services Division.*
- *All proposals must include clear definitions of business measures and benchmarks of progress. These include cost/benefit analysis and clear calculation of Return on Investment (ROI).*
- *The ITSC has the authority to reject any proposal that it deems not to have made a sufficient business case or that does not significantly contribute to the strategic goals of the department.*
- *At each meeting, the committee will receive progress reports on all approved proposals. The ITSC can recommend the termination of any project which is not meeting its projected goals.*
- *Each year the ITSC will provide the Director with a report that will review project progress of the previous fiscal year and set a priority list of projects for the coming fiscal year.*

**Members**

<u>Name</u>	<u>Title</u>	<u>Functional Unit</u>
Vana Olson	Director	Department
Dan Moye	County Surveyor	Surveyor
Peter Wulfman	Division Manager	Solid Waste Management
Mazin Kasey	Assistant Director	Planning
Annesley Ignatius	Assistant Director	Operations
Kevin Blakeslee	Assistant Director	Project Development
Timothy Meyer	Business Applications Manager	Computer Services

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**Business Strategy as Understood by the IT Department****Department Strategy and Goals: Director**

- Be the best department in the county
- Develop a marketing campaign to convey to the public, the services provided by the Board of Supervisors through the efforts of the department
- Obtain new space to house the employees within the department
- Improve employee morale
- Reduce legal judgments against the department
- Improve project delivery
- Increase the ability to recruit and retain professional Civil Engineers

**Department Strategy and Goals: Assistant Director Project Development**

- Improve staff accountability
- Provide staff development tools
- Improve customer service
- Coordinated activities between divisions within the department

**Department Strategy and Goals: Assistant Director Operations**

- Improve customer service

- Fully utilize the Permits Plus application
- Implement a Maintenance Management System
- Install remote IP cameras to monitor facilities
- Automate the conference rooms

#### **Department Strategy and Goals: Assistant Director Planning**

- Improve professional image
- Improve use of GIS products within the engineering planning and design groups
- Improve Permitting and Inspection activities
- Perform real time budget reporting
- Perform robust (collaborative) engineering
- Obtain additional space for department

#### **Department Strategy and Goals: Manager of Solid Waste Mgmt**

- Increase Landfill space
- Modernize scale houses
- Continue three year technology renewal cycle

- Retain valued employees

**Department Strategy and Goals: County Surveyor**

- Perform automated data collection in the field
- Conduct real time kinematics (RTK) in the field
- Perform GIS digital submission of tract and parcel maps
- Improve CAD technical support

**IT Direction****IT Vision**

In support of the goals and objectives of the Department of Public Works, Computer Services will provide for the delivery of automated engineering, surveying and business activities through quality IT customer service, reliable systems infrastructure and staff development.

**IT Core Values**

- Core Value 1: We commit to the Strategic alignment of IT Initiatives with the goals and objectives of the department.
- Core Value 2: We will lead the Department in the Early Majority (Progressive) adoption of proven technologies.
- Core Value 3: We commit to implement projects on time and within budget.
- Core Value 4: We commit to valuing our workforce by providing recognition, training and education, opportunities for customer service and career development, and a safe and healthy work environment.
- Core Value 5: We commit to providing the highest quality customer service and support.

### IT Strategic Objectives

<b>Objective 1:</b>	Increase efficiency and effectiveness of department staff through the acquisition and installation of current industry standard PC hardware and current versions of the Microsoft operating system and office software.
<b>Objective 2:</b>	Improve data utilization through upgrades to the department server infrastructure, storage area network (SAN) and network switches and routers.
<b>Objective 3:</b>	Provide cross training of IT Staff on all primary and secondary applications and all new Microsoft products.
<b>Objective 4:</b>	Increase department visibility and customer service by updating the department Web Site.
<b>Objective 5:</b>	Add additional key staff and upgrade the senior IT position to a Departmental Information Systems Administrator to provide adequate support staff and strategic planning.
<b>Objective 6:</b>	Complete the Backfile scanning of images and enhance the system by incorporating geo-coding and aerial photography to primary facility drawings.
<b>Objective 7:</b>	Acquire laptops and develop data capture application for Field Crews.
<b>Objective 8:</b>	Create a remote hot site outside of the USGS earthquake shake map epicentre. The Needles yard has been identified as a potential site for this facility due to the location of ISD support infrastructure for many County buildings in the area.
<b>Objective 9:</b>	Increase efficiency and effectiveness of department administration by improving technologies in the executive conference rooms and department hearing room.
<b>Objective 10:</b>	Reduce judgments against the department by automating storm patrol and field inspection activities utilizing PDA technologies.
<b>Objective 11:</b>	Develop plan to automate the existing scale house operations at all landfill locations.
<b>Objective 12:</b>	Automate the operations field maintenance and scheduling process through a Maintenance Management System.
<b>Objective 13:</b>	Develop ability to automatically submit digital GIS data for the Surveyor.
<b>Objective 14:</b>	Standardize and improve data integrity by developing a centralized Data Warehouse and developing interfaces to the functional unit applications.
<b>Objective 15:</b>	Establish a network of base stations to support real time Kinematics in the field.

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## Current IT Structure

### Computer Services Structure

With oversight by the Business Applications Manager, the division is organized into two functional units; the Business Systems section and the Systems Support section. The two units work with departmental staff, the Information Services Department (ISD), outside consultants and vendors to provide for a diversity of automated Civil Engineering and automated office systems.

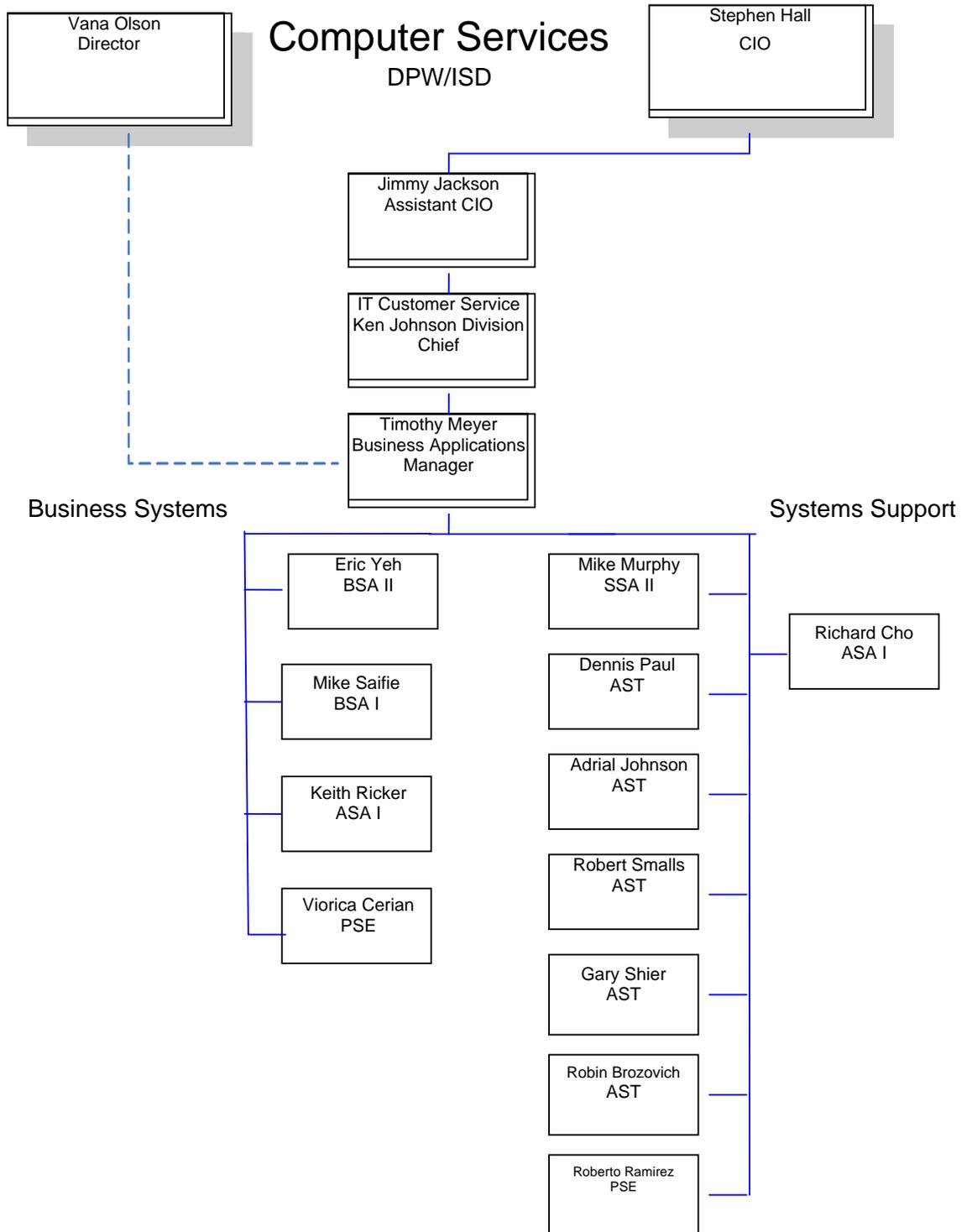
#### **Business Systems Section –**

Working with customers, ISD and vendor organizations, the Business Systems Section is responsible for the timely, effective and efficient analysis, design, acquisition, construction, testing, implementation documentation and post implementation support of all departmental Civil Engineering and Business applications. This includes major applications such as the Cost Accounting System, the Imaging System, Permits Plus, Solid Waste Systems, all host based systems, FAS and numerous departmental SQL database applications.

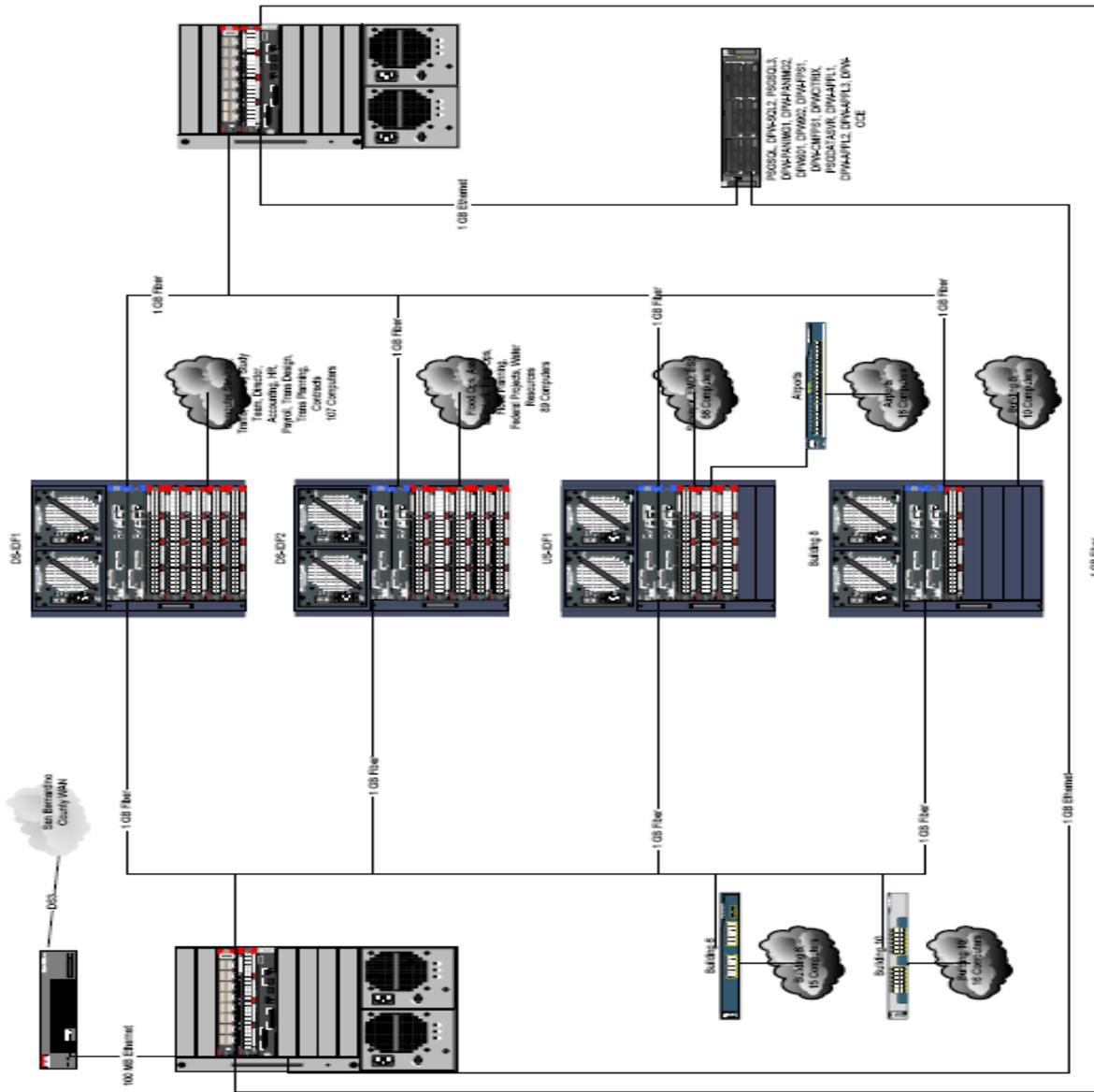
#### **System Support Section –**

Working with customers, ISD and vendor organizations the System Support Section is responsible for the timely, effective and efficient support of all Domain wide servers and network infrastructure. This includes system support of 18 servers and the Storage Area Network (SAN) at primary, secondary and remote locations. The server/network administrator is responsible for the coordination of all Public Works hardware and software purchases under direction of the BAM. Help Desk activities include; technical support for over 350 PC's, printers and peripheral devices at the primary, secondary and remote sites. The Help Desk currently services over 2,400 trouble tickets per year.

Organizational Chart –



Network Diagram



**Current Significant IT Project Summary**

<b>Job Cost Accounting System:</b>	Provide production support for the primary department accounting and payroll system. Perform ongoing system enhancements as requirements demand. The vendor is researching ways to enhance system performance.
<b>Imaging System – Front File:</b>	Oversee vendor back file scanning operations on approximately 250,000 project documents. Vendor conducting testing with full production scheduled for 3 <sup>rd</sup> Quarter, 2007.
<b>Imaging System – Map Room:</b>	Oversee vendor back file scanning operations on approximately 250,000 project and engineering drawings. 12,000 facility drawing scanned as component of the levee certification project. New vendor selected, and is testing with full production scheduled for 3 <sup>rd</sup> Quarter, 2007.
<b>Imaging System - SWMD:</b>	Vendor selected to perform pilot project with on site scanning services for the Mid Valley landfill. Production scheduled for 3 <sup>rd</sup> Quarter, 2007.
<b>Imaging System – Surveyor Web Site:</b>	Surveyor Web Site to provide subscription service images to Survey firms and the public. ACR and Surveyor developing procedures for credit card purchases. Project scheduled for production 4 <sup>th</sup> Quarter, 2007.
<b>Imaging System – Flood Control Operations:</b>	Application complete and vendor selected to perform back file scanning of approximately 250,000 Permit project document. Vendor testing scheduled for 3 <sup>rd</sup> Quarter, 2007.
<b>Imaging System - Contracts:</b>	Application waiting for final sign-off by customer, RFB scheduled for 4 <sup>th</sup> Quarter, 2007 to perform back file scanning of approximately 100,000 Contract project document.
<b>Imaging System – Water Resources:</b>	Application in final construction with RFB scheduled for 4 <sup>th</sup> Quarter, 2007 to perform back file scanning of approximately 500,000 drainage study, planning and hydrology documents.
<b>IT Strategic Plan:</b>	This is a five year business plan designed to align IT goals and objectives with the goals and objectives of the department. Presentation of the plan scheduled for 3 <sup>rd</sup> Quarter, 2007.
<b>Maintenance Management System:</b>	This application will provide a system to schedule and account for annual operations maintenance of the Flood Control and Transportation facilities. Proposal for vendor consulting services is under review by the committee with award pending 4 <sup>th</sup> Quarter, 2007. Next phase of project is to define requirements and prepare a RFP for the application software.
<b>Traffic Road Map:</b>	The project integrates the Traffic Road Map and GIS Street Network into one official map document. The project has already won a national award and the project team is finishing minor changes to the map. Anticipated completion of project is 1 <sup>st</sup> Quarter, 2008.
<b>HI System Conversion:</b>	The project will convert the legacy HI system to SQL tables, create a Web interface and incorporate new system features currently in the Cross Roads system. PDA application scheduled for completion 4 <sup>th</sup> Quarter, 2007.
<b>PW System Conversion:</b>	Convert legacy PW system data to SQL and build a Web interface to allow users to access and create ad hoc reports for FEMA, state and local audits. System will contain eleven years of historical data. Project scheduled for completion 4 <sup>th</sup> Quarter, 2007.
<b>Data Center Remodel:</b>	Facilities Management will install new primary air conditioner in the data center and re-allocate older unit to backup role. FM is also tying new building fire alarm system into the existing data center fire suppression system. Scheduled completion 4 <sup>th</sup> Quarter, 2007.

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<b>NPDES Web Hosting:</b>	Department to contract with RBF Consulting to host the NPDES database accessed by County and nineteen cities. Scheduled completion 4 <sup>th</sup> Quarter, 2007.
<b>Permits Plus System:</b>	Provide ongoing system support for production database. User has identified fourteen enhancements required to meet business needs. ISD programmer working with the vendor and a third party consultant to resolve all issues. Enhancements scheduled for completion 2 <sup>nd</sup> Quarter, 2008.
<b>Credit Card Payment at County Landfills:</b>	Eliminates hard copies of receipts and provides for payment by credit cards. Mid Valley pilot underway, Big Bear and Landers scheduled for 2 <sup>nd</sup> Quarter, 2008.
<b>SWMD Uniform Handling Exemption Database:</b>	Provides a database to track parcel owners exempt from weekly trash pickup services. Database in test with signoff pending from customer. Scheduled completion 4 <sup>th</sup> Quarter, 2007.
<b>SWMD Liens Database Project:</b>	Creates a database to track and administrate parcels that have a lien placed on them by SWMD for non-payment of trash services. Project testing is being conducted with completion scheduled for 4 <sup>th</sup> Quarter, 2007.
<b>SWMD GIS Mailing Labels:</b>	Utilize GIS mapping to identify parcels and create mailing labels for mail notification of projects and public hearings. Scheduled for completion 4 <sup>th</sup> Quarter, 2007.
<b>SWMD GIS Waste Disaster Management:</b>	Creates an application that will identify by parcel and the Uniform Building Code, the potential amount of waste created in a natural disaster and identify neighbourhood waste staging sites. Scheduled for completion in 3 <sup>rd</sup> Quarter, 2008.
<b>Helpdesk:</b>	Currently Computer Services is assigned over 300 helpdesk tickets per month from the Department of Public Works. Priority tickets are addressed on the same day, lower priority tickets are addressed within 3 business days.
<b>E2020 Project Management</b>	Enhance system to facilitate annual project load from the Transportation and Flood Control Planning Divisions.

## IT Expenditures Fiscal Year 2006/07

	<b>Current Annual Expenditure (Capital/Expense)</b>	<b>Percent of IT Budget</b>
<b>Labor</b>	\$ 970,351	21 %
<b>Outside Services</b>	\$ 32,258	1
<b>Hardware</b>	\$ 640,403	14
<b>Software</b>	\$ 330,897	7
<b>ISD</b>		45
<b>Phone</b>	\$ 312,209	
<b>Radio</b>	226,498	
<b>Microfilm</b>	16,466	
<b>Comp Operations</b>	542,103	
<b>Dept Services</b>	17,104	
<b>Professional Svcs</b>	12,755	
<b>Programming Svcs</b>	856,235	
<b>GIMS</b>	29,814	
<b>COWCAP (ISD)</b>	\$ 497,131	12
<b>TOTAL</b>	<b>\$4,484,224</b>	100 %

## Current IT Environment

The state of Computer Services is good, although the infrastructure is aging and is at end of life cycle, all major IT goals and objectives have been or are being realized for this five year cycle.

### Infrastructure

In 2003 the Department of Public Works; IT Delivery Model was published which outlined the business plan through 2008. Major accomplishments include implementation of a new Server Data Center, Storage Area Network (SAN), and Gigabit network to the desktop with fiber core. New desktop PC's were deployed to each employee and were standardized on Microsoft XP operating system and Office 2003. Active Directory, SMS and MOM have been implemented in the domain.

### Computer Aided Drafting (CAD)

The department promotes a robust automated Civil Engineering environment by utilizing high end CAD workstations and products such as Terramodel, Bentley, AES Hydrology, GIS and Autocad software. Within Public Works engineering applications are the most critical and bring the most IT value to the department. All other applications function in supporting roles for the various business units.

### Business Applications

Major applications have been developed such as the primary business application; The Job Cost Accounting System which is now in the second year of production. E2020 Project Management software utilized by Project Engineers and the Board of Supervisors staff. Permits Plus is operational and fourteen enhancements are in the process of development. The \$1 Million dollar department wide Imaging Project is underway with applications developed and deployed for the Front File Room, the Map Room and Flood Control Operations Permits, back file scanning is in progress for these three Divisions. Imaging applications for Contracts and Water Resources are being completed and back file scanning should commence at the end of 2007. The Transportation Design, Transportation Planning, Flood Planning and Land Development projects are pending. A pilot project to Geo-code the Flood Control facility drawings are scheduled to start at the end of 2007.

Other accomplishments include installation of stream monitoring cameras at seven locations across the valley and one at Green Valley Lake. Laptops for Permit and Traffic inspectors have been deployed, along with cell phones, blackberry and digital camera devices. Requests for the Helpdesk support were redirected to the ISD Helpdesk service. This service provides the customer with a single point of contact and formal tracking of their Helpdesk service request. This formal service also provides management with true work load and performance indicators.

**Surveyor**

The Surveyor has completed most of their Imaging Project with just a few outstanding items such as the Web Site and Rail Road maps. A project tacking database is under review at this time and PC hardware is being replaced on a three year replacement cycle.

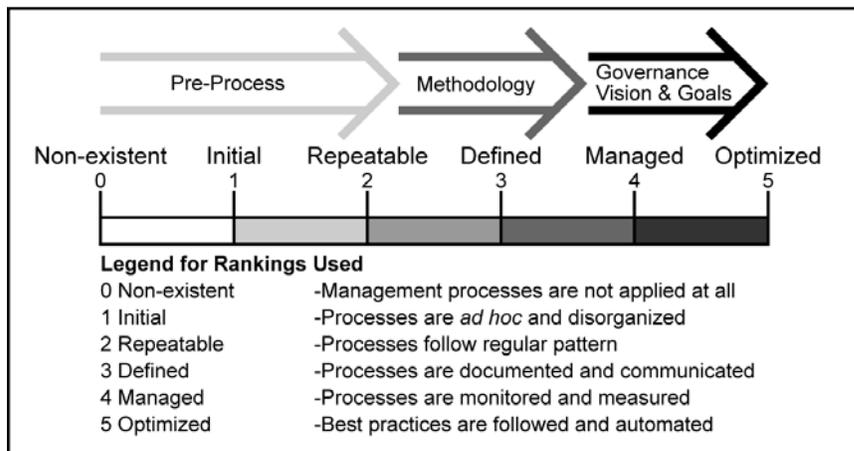
**Solid Waste Management Division (SWMD)**

Solid Waste has installed high speed phone connections and credit card payments in the landfills; they are planning on implementing automated lanes for large volume haulers. A new server and network switch have been installed at the SWMD building and PC’s are on a three year replacement cycle. The Division has recently begun a pilot Imaging Project to back file scan the SWMD library, they are developing a Liens database, a GIS mailing label database and are developing a GIS natural disaster database. In all, Computer Services is actively pursuing twenty two significant projects and another dozen secondary projects at this time.

**Staffing**

Staffing changes included upgrades of staff to one SSA II, one BSA II and the BAM. An additional AST was added to the SWMD IT staff to support Helpdesk activities. One additional BSA I and two PSE student interns were added this fiscal year. Staffing levels remain low when compared to other county departments with similar office staff and operating budgets. The IT training budget is less than 1% of the overall IT expenditures and will require additional resources to maintain staff knowledge and effectiveness in the future. With the BAM reporting to ISD it has facilitated the approval of projects and provided guidance for standards and procedures, additional resources have also been made available to assist the department in meeting their IT goals and objectives.

**IT Maturity Model**



The IT maturity model indicates that the department is in the *Defined Stage* and moving toward the *Managed Stage*. Many individual divisions including Computer Services do optimize IT by automating and following best practices. The creation of the IT Steering Committee will help promote this new direction in project development.

An example of this practice is the Filenet Imaging System. Each division is allowed to develop user interfaces, data libraries and secondary search keys based upon their business model, primary search keys are governed by either the Flood Control Facility Number or the Transportation Road Number which must be included in the division search criteria. All images are stored in a common database and can be accessed by anyone regardless of which division they work in. Using generic search criteria such as facility or road name, users can find all the images that pertain to a given facility or road regardless of which division owns the document.

The use of common data warehouses normalizes data throughout the department, standardizes application development and makes it much easier for IT staff to learn and maintain the applications. The previous practice of users creating a multiplicity of Access databases is being abandoned as the majority of these systems impact more than one division.

### **Conclusion**

Computer Services has done a good job with meeting the IT goals and objectives as identified in the 2003 IT Delivery Model Study. Changes in Goals and Objectives, IT Governance, Data Warehousing, Staffing and Training will need to be implemented to promote the IT Maturity Model to the next level and to extract additional value from Information Technology.

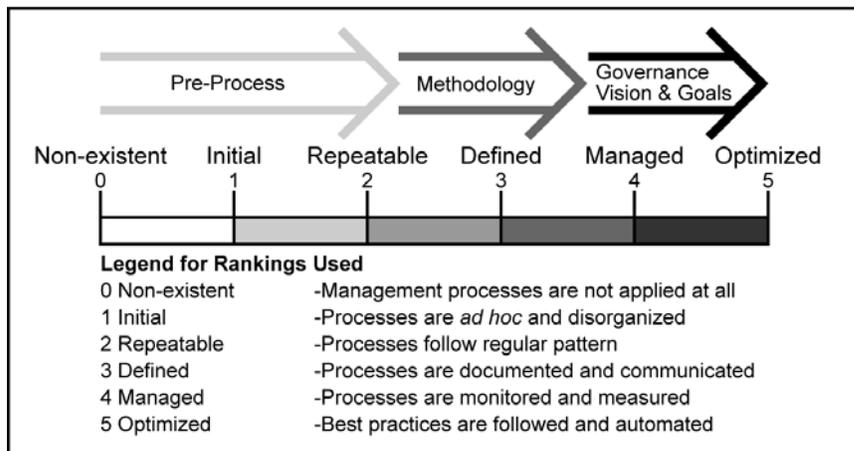
**Future of IT at Our Department**

**IT Governance**

The Information Technology Steering Committee (ITSC) will continue to oversee the information technology investment for the Department of Public Works. The committee will:

1. Provide strategic leadership for IT operations of the Department of Public Works through the alignment of IT strategic goals and objectives with the department strategic goals and objectives.
2. Prioritize IT investment initiatives and resolve resource allocation issues based on project prioritization.
3. Ensure open communications between the IT department and the other functional units of the department so as to promote collaborative planning.

**IT Maturity Model**



**Level 4 – Managed**

The Managed Stage occurs with the arrival of a strategic, enterprise resource that enables the department to achieve its goals and objectives. This unified Data Warehouse defines a common set of data elements, rules for usage, and is shared across the divisions. The unified architecture consists of a consolidated set of information contained in a single database. Reporting tools are then utilized to extract information as needed by the various divisions. The Data Warehouse is fully loaded with all of the data users need to perform their duties. It is flexible allowing programmers to make changes without having to rewrite all of the interfaces. The Data Warehouse is mission critical, monitored and overseen by the IT Steering Committee. By utilizing this approach to enterprise Data Base solutions the department will eliminate the majority of division level applications and integrate the same data throughout the department. This data could include project numbers, facility numbers, road numbers,

activity codes, overhead rates, cost centers, equipment, permit numbers, budget, employees, etc. these data elements are normalized throughout the department and available for any future need.

### **Infrastructure**

The utility infrastructure eliminates the direct association between an application and particular hardware components, allowing the application to be provided with the most efficient level of resources needed at any time. As the utilization goes up, more resources are automatically allocated to that application. As the utilization drops, those additional resources can be allocated to other processes.

**Server consolidation.** Some level of consolidation of servers within the department, along with the control of those servers by Computer Services, is required. This means that these servers, will reside in the data center in the department where they can be monitored, managed, and modified as needed. While these servers may currently be running applications specific to divisions or functions within the department, the data center has control over which server is running which application. Blade Servers provide a robust computing environment and are standardized on Tier 1 manufacturers such as Hewlett-Packard fully tested and certified as true business class Servers<sup>1</sup>. HP ProLiant BL 460c with Intel Xeon Processor, Quad Core/2.00 GHz/1333MHz-FSB and 2x4MB Level 2 cache memory.

**SAN storage.** By migrating to the SAN environment in the department, the physical storage is now separated from the physical servers. Separated storage is critical to allow applications to be run on different servers depending on the current operational requirements for that application. A Tier 1 manufacturer and industry standard solution such as Hewlett-Packard EVA 6100 will provide up to 21 Terabytes of storage for production and imaging file requirements.

**Virtualization of processing and storage.** The real key to creating a utility infrastructure is the separation of the physical servers from the physical storage. By using virtualization software (now enhanced with virtualization capabilities in hardware) an abstraction of the hardware environment can be created that allows the OS and application to be migrated to any appropriate physical platform. Products such as VMWare Infrastructure and VMWare VLC Management will facilitate this environment.

**Consolidated management and monitoring.** In order to ensure that applications are configured to run on a server with sufficient processing and I/O capabilities, there must be a mechanism to monitor all of the servers within the virtualized environment. The information gathered on the servers must then be available to the IT staff to ensure that the applications are performing as expected. Products such as Microsoft Systems Management Service, Microsoft Office Manager and Cisco Unified Communication Management suite of products will facilitate management and monitoring of all server and network operations.

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<sup>1</sup> Equipment quoted is based upon current industry standards, actual equipment will change at time of purchase.

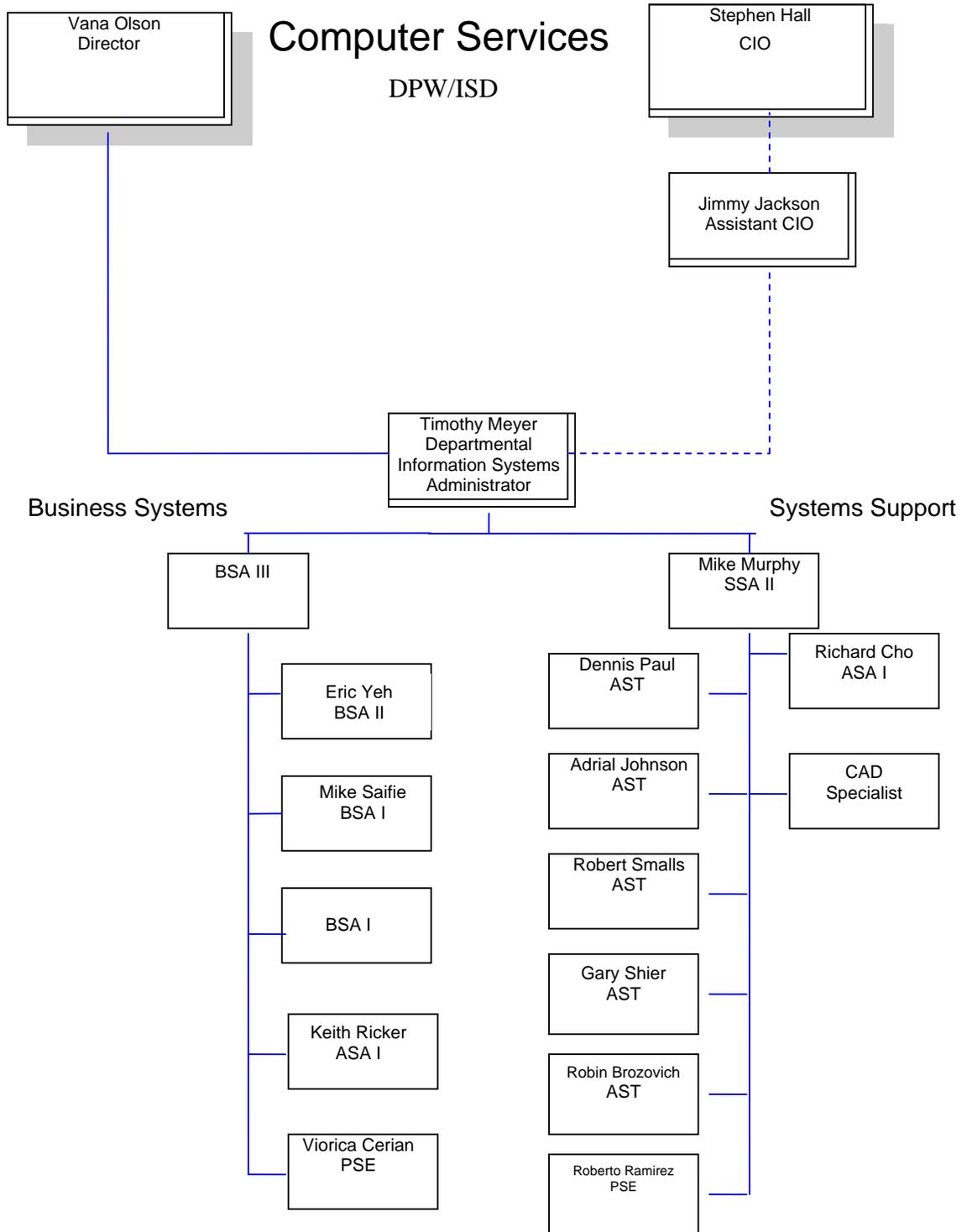
### **CAD and Desktop PC**

**CAD Workstations.** High powered CAD Workstations based upon PC architecture have been deployed in the department for the past decade. New technology will utilize fast 32-bit multiple processor architectures that rival RISC-based architectures. 64-bit processors are not currently supported by Terramodel and therefore will not be considered for this technology refresh cycle. The machines should be standardized on Tier 1 manufacturers such as Hewlett-Packard, fully tested and certified as true workstation class machines. These workstations are standardized on the Microsoft Vista operating system and Office 2007 suite of applications. These machines are differentiated by their processor power, faster chip sets and bus architectures, increased memory requirements and graphics rendering capabilities. CAD Workstations typically require dual monitor capability to enhance engineering productivity. CAD Workstations remain highly specialized machines that must handle demands far and above the average business class PC.

**Desktop PC's,** are recognized as core business assets and a key to modern office productivity. In the early 1990's when the Client/Server architecture was first inducted, the industry experienced 20-30% gains in office productivity. Today, with the proliferation of PC's in the work place productivity gains are incremental at best and average about 5% per refresh cycle. Repair and replace costs are now a key consideration in the acquisition of PC's. Desktop PC's should be standardized on Tier 1 manufacturers such as Hewlett-Packard, fully tested and certified as true business class machines. Ultra Slim line desktops with five year warranty provide a robust computing environment with product features such as: 9.90 x 10" foot print, Intel Core Duo processor, 3.00 GHz, 4 MB L2 cache, 1333 MHz Front Side Bus, 2 GB SDRAM and Intel Q35 Express Chip Set. These desktops are standardized on the Microsoft Vista operating system and Office 2007 suite of applications.

By standardizing on a single manufacturer IT staff can leverage common machine knowledge, limit images to business functions such as CAD and Desktop configurations and capitalize on five year warranties for parts replacement and service needs.

Staffing – Future Organizational Chart



**IT Organizational Structure**

In support of the goals and objective of the Department of Public Works, Computer Services will provide for the delivery of automated engineering, surveying and business activities through quality IT customer service, reliable systems infrastructure and staff development.

With oversight by the Departmental Information Systems Administrator, the division is organized into two functional units; the Business Systems section and the Systems Support section. The two units work with departmental staff, the Information Services Department (ISD), outside consultants and vendors to provide for a diversity of automated Civil Engineering and automated Office systems.

**Business Systems Section –**

With oversight by the Business Systems Analyst III, this section works with customers, ISD and vendor organizations. The Business Systems Section is responsible for the timely, effective and efficient analysis, design, acquisition, construction, testing, implementation documentation and post implementation support of all departmental Civil Engineering and Business applications. This includes major applications such as the Cost Accounting System, the Imaging System, Permits Plus, Solid Waste Systems, all Host based systems, FAS and numerous departmental SQL database applications.

**System Support Section –**

Working with customers, ISD and vendor organizations, the System Support Section is responsible for the timely, effective and efficient support of all Domain wide servers and network infrastructure. This includes system support of 18 servers and the Storage Area Network (SAN) at primary, secondary and remote locations. The server/network administrator is responsible for the coordination of all Public Works hardware and software purchases under direction of the BAM. Help Desk activities include technical support for over 350 PC's, printers and peripheral devices at the primary, secondary and remote sites and provides dedicated staff in support of CAD applications. The Help Desk currently services over 2,400 trouble tickets per year.

## Summary of the GAPS

### Infrastructure

- Aging Servers are at the end of life cycle
- Network switches at end of life and fiber core not meeting data through put demands
- Aging Desktops are at end of life cycle and unable to run new Microsoft Operating System

### Business Systems

- Information solos and unit specific databases do not share common data
- Images in Filenet System lack Geo Code reference
- Lack of maintenance scheduling capability for Flood Control and Transportation facilities
- Manual record keeping for Storm Patrol and Field Inspections
- Aging Web Site difficult to navigate and lacking in user interaction
- Budget database data not normalized and difficult to maintain
- Department Operations Center lack presentation equipment and common application
- Executive Conference Rooms lack automated conference equipment
- Aging dial in cameras have failed at most locations

### Surveyor

- IDM system lacking Web Site and Rail Road maps
- Base stations must be set up and manned for each Survey job
- Manual track and parcel map checking and entry into the GIS system
- Lack of test server for beta testing of ESRI applications
- Lack of laptops and data capture applications for Field Crews

### Solid Waste Management Division

- Lack of automated truck lanes for large volume haulers
- Lack of five year Infrastructure and Desktop replacement plan

### Staffing and Training

- Lack of adequate IT staff to support all applications and to provide cross training and support
- Lack of a Departmental Information Systems Administrator to lead Computer Services.
- Lack of adequate IT training on current Microsoft products and applications

## Bridging the GAP

### IT Department Goals

- **IT Governance** – Align IT goals and objectives with the Business goals and objectives. Create a forum to review all major projects that could affect the department outside of the annual budget process.
- **IT Staffing Initiative** – Add additional key staff and upgrade the senior IT position to provide adequate support staff and strategic planning. Due to the complexity of the business applications, computing infrastructure, level of staff and size of the IT budget, this division should be administrated by a DISA.
- **IT Infrastructure Upgrade** – Acquire necessary Server and Network equipment to meet the current and future performance needs of the Engineering environment.
- **Desktop Upgrade** – Acquire necessary Desktop computing equipment to service the needs of end users for the next five years.
- **IT Data Warehouse Initiative** – Eliminate silos of information and create and standardized source of data to be utilized by the various Business Unit applications.
- **Field Maintenance Initiative** – Acquire a Maintenance Management System to facilitate field maintenance and permitting activities.
- **Web Site Development** – Create a new department Web Site to better inform the public on goods and services provided by the department. Create internal site for staff development and social interaction.
- **Geo Code Images** – Identify key Engineering Images to GEO code with GIMS, PIMS, Aerial Photography and other useful intelligence.
- **Scale House Automation Initiative** – Develop long term plan to automate the existing landfill scale house operations with Credit Card capture, RFID and camera monitored fast track lanes for haulers. Provide automated lanes for Mountain residents in the uniform collection program
- **Surveyor Field Crew Automation Initiative** – Acquire laptops and develop data capture application for Field Crews. Perform real time Kinematics in the field.
- **Perform digital submission of Surveyor GIS data** – Develop ability to automatically submit digital GIS data.

- **Cross train IT staff** - Conduct training on the various application software to provide a greater depth of resources in support of products and services. Provide training for specific applications such as Wincams, Permits Plus, SQL database support, CompuServe, Server and Network administration, and general staff development.
- **E2020 Project Management** – Continue application enhancements to provide automated means to load project data at the beginning of the fiscal year.

## IT Budget Summary

Budget Item	FY2006/07	FY2007/08	FY2008/09
Personnel FTE	12	13	16
Personnel Expenses	\$970,351	\$1,170,500	\$1,459,770
Office Supplies	32,258	32,258	34,500
Equipment Costs	640,403	631,500	625,000
Software Costs	330,897	330,897	354,000
<b>Total CS Expenditures</b>	<b>\$1,973,909</b>	<b>\$2,165,155</b>	<b>\$2,473,270</b>
COWCAP (est.)	\$497,131	\$497,131	\$500,000
<b>ISD Expenditures</b>			
Phone	\$312,209	\$315,000	\$315,000
Radio	226,498	246,883	246,000
Microfilm	16,466	17,000	10,000
Computer Operations (ISD Servers)	542,103	590,892	590,000
Departmental Services	17,104	17,000	17,000
Professional Services	12,755	13,000	15,000
Programming Services	856,235	835,000	750,000
GIMS	29,814	30,000	30,000
<b>Total ISD Expenditures</b>	<b>\$2,013,184</b>	<b>\$2,064,775</b>	<b>\$1,973,000</b>
<b>TOTAL</b>	<b>\$4,484,224</b>	<b>\$4,727,061</b>	<b>\$4,946,270</b>

## Options Available

IT Staffing Initiative:						
	Costs	Time	Resources	Benefits	Deterrents	Department Compatibility
Hire Additional IT Staff	\$289,270	1 Yr	BAM	High Level Overview Application Support CAD Support	Increased Staff Costs	High
<b>Contract Services with ISD</b>	\$80/Hr	1 Yr	ISD	Annual Budget Renewal Product Specialists	Loss of Control May Compete with Other Projects	Mid

IT Infrastructure Initiative						
	Costs	Time	Resources	Benefits	Deterrents	Department Compatibility
Replace Server, SAN and Network Infrastructure *	\$115,000/Yr	2 Yr	SSA II ASA I Vendor	Virtualized Servers Up to 32 Terabytes Storage 10 Gigabit Fiber Core	In House Support	High

\* No other options were explored as the Department will retain the data center.

IT Desktop Initiative:						
	Costs	Time	Resources	Benefits	Deterrents	Department Compatibility
Replace CAD, Desktop PC's and Laptops *	\$200,000/Yr	2 Yr	SSA II ASA I Vendor	Provides Current PC Technology Provides Current MS Software Release and Compatibility	No Change in the Client/Server Architecture	High

\* Other options such as thin client were explored but determined not feasible as the Department will retain the current Client/Server model.

Data Warehouse Initiative:						
	Costs	Time	Resources	Benefits	Deterrents	Department Compatibility
Develop a Data Warehouse to Standardize Data Elements	\$240,000	3 Yr	BAM BSA II ISD	Standardized Data Elements Eliminates Duplicate Data	Increased Data Maintenance	High
<b>Expand Wincams Interfaces to All Mission Critical Applications</b>	\$120,000	2 Yr	BAM BSA II Vendor	Utilize Existing Cost Accounting System Normalized Data	Vendor Slow to Respond Application May not be Responsive	High

<b>Maintenance Management System:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use a Consultant to Identify an Existing Software Application	\$500,000	2 Yr	BAM BSA II Consultant	Standardized Data Elements Eliminates Duplicate Data	Increased Maintenance	High
<b>Modify the Existing Wincams Application</b>	\$120,000	2 Yr	BAM BSA II Vendor	Utilized Existing Cost Accounting System Normalized Data	Vendor Slow to Respond Application may not be Robust	High

<b>Department Web Site Initiative:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use a PSE to Design and Build a New Web Site	\$14,000	1 Yr	BAM PSE	Standardized Professional Interactive Site	Resource Subject to Promotion	High
<b>Use ISD Staff to Design and Build a New Web Site</b>	\$80,000	1 Yr	BAM ISD	Ensure Site is Built to County Standards	Higher Development Cost	High

<b>Geo Code Primary Facility Images:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use ISD Staff to Design and Build the Application	\$150,000	3 Yr	BAM BSA II ISD	Combines Imaging, GIS, PIMS, Aerial Photography into a Single Application	Inter Dependencies Between Existing Applications	High
<b>Contract with ESRI to Design and Build the Application</b>	\$150,000	3 Yr	BAM Vendor	Ensure Application Built to Industry Standards	Higher Support Cost	High

<b>Automate Department Conference Rooms:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Configure and Install an All in One White Board Solution	\$100,000	1 Yr	BAM SSA II ASA I Vendor	Increase Efficiency of Administrative Meetings All in One Unit	User Acceptance	High
<b>Configure and Install Custom Components</b>	\$100,000	1 Yr	BAM SSA II ASA I Vendor	Increase Efficiency of Administrative Meetings Customized Equipment	User Acceptance	High

<b>Automate Scale House Operations:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Hire a Consultant to Design, Build and Implement Automated Truck Lanes  *	\$50,000 Per Lane	2 Yr	BAM SSA II ASA I Vendor	Increased efficiencies of Volume Haulers, Time Reduction	User Acceptance	High

\* This project will require a qualified vendor to develop specifications, design, build and implement solution.

<b>Automate Survey Field Crews:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Purchase Laptops and Develop a Custom Data Collection Application	\$80,000	2 Yr	BAM SSA II ASA I ISD	Create Ability to Collect Real Time Data in the Field, Access Resources from the Field	User Acceptance	High
<b>Purchase Laptops and Utilize Vendor Developed Application for Data Capture</b>	\$100,000	1 Yr	BAM SSA II ASA I Vendor	Same as Above Utilizing Vendor Software	User Acceptance	High

<b>Regional Base Station Network:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use ISD Staff to Design, Build and Implement a Network of Base Stations	\$500,000	3 Yr	BAM SSA II LS ISD	Eliminate Setup of Base Station at Survey Site	User Acceptance Radio Frequency Public/Private Consortium	High
<b>Contract with a Vendor to Design, Build and Implement a Network of Base Stations</b>	\$600,000	1 Yr	BAM SSA II ASA I Vendor	Eliminate Setup of Base Station at Survey Site	User Acceptance Radio Frequency Public/Private Consortium	High

<b>Automatic Submittal of Digital GIS Data:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use ISD Staff to Design, Build and Implement a Secure Web Site to Download Data *	\$25,000	1 Yr	BAM SSA II LS ISD	Eliminate Need to COGO Data into GIS	Policy Change Private Acceptance	High

This solution was requested by the BOS.

<b>Disaster Recovery Site:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Utilize Existing Hardware and Remote Road Yard to Create Hot Site	\$50,000	2 Yr	BAM SSA II ASA I ISD	Business Continuity in event of Natural Disaster	Remote Location Failed Communications Ability to Transport Equipment	High
<b>Contract with Vendor to Provide Hot Site Services</b>	\$50,000/Yr	1 Yr	BAM SSA II ASA I Vendor	Business Continuity in event of Natural Disaster	Failed Communications Ability to Transport Equipment	High

<b>PDA Application For Storm Patrol and Inspectors:</b>						
	<b>Costs</b>	<b>Time</b>	<b>Resources</b>	<b>Benefits</b>	<b>Deterrents</b>	<b>Department Compatibility</b>
Use ISD to Design and Build a PDA Based Application	\$200,000	1 Yr	BAM BSA II ISD	Reduce Legal Judgments and Audit Exceptions	Remote Location Failed Communications Ability to Transport Equipment	High
<b>Utilize the MMS Module to support this feature</b>	Included	2 Yr	BAM BSA II Vendor	Reduce Legal Judgments and Audit Exceptions	User Acceptance	High

## Recommendations

### 1. IT Staffing Initiative.

Approve new positions and BAM upgrade to DISA. Work with ISD to select the most qualified candidate for the BSA III position once in place the DISA and the BSA III should interview and fill the BSA I and CAD Technician positions. The DISA will be responsible for staff development of the BSA III and the BSA III will be responsible for all other staff development and work assignments.

### 2. IT Infrastructure Initiative.

Purchase 5 new Servers to replace the existing 18 end of life units. Retain 1 existing server in support of the building security system. Purchase 3 new servers for SWMD to support remote site operations and scale house automation.

Purchase an Enterprise Virtual Array (EVA) with 32 Terabytes of storage in support of production and imaging data.

Purchase 10 gigabit Network supervisor engines and Server network cards to increase data through put on the fiber backbone and to the servers.

Upgrade the WAN connection to a dedicated OC3 to improve communications across the County WAN.

### 3. IT Desktop Initiative.

Replace all CAD PC's over one year old with high end CAD workstations. Replace all desktop PC's over one year old with new desktop PC's. Replace all laptops over one old with new laptops. Cycle older PC's to the Road and Flood Control yards for their aging equipment. Purchase the Microsoft Enterprise Software Agreement.

### 4. Data Warehouse Initiative.

Develop a centralized SQL Data Warehouse to normalize data across all department applications and eliminate duplicate data and information silos within individual divisions. Develop interfaces to all functional unit applications to automatically update data.

**5. Maintenance Management System (MMS) Initiative.**

If the department has a high level of confidence in the consultant, then proceed with the consulting contract however appoint the Business Applications Manager as the project lead and have the consultant report to IT.

Proceed with the RFP and select the most qualified vendor and software solution within a reasonable price. Selecting the lowest cost solution could result in a sub standard system with results similar to Wincams.

**6. Department Web Site.**

In a joint partnership with Cal State San Bernardino, utilize a student intern programmer to design and build the redesigned Internet and Intranet Web Site for the department. This project is currently under development and phase I will be implemented by the end of 2007.

**7. Geo-Code Primary Facility Images.**

Contract with ISD and ESRI to develop a state of the art and world class GIS application that integrates GIS, Filenet images, PIMS parcel data, aerial photography, and other information into a single desktop research application.

**8. PDA Application for Strom Patrol and Inspectors.**

If the MMS does not provide for this type of route tracking and field inspection documentation then proceed with a custom SQL application that provides for real time route tracking and field inspection data collection

**9. Automate Department Conference Rooms.**

Review recommendations with the Director and if approved proceed with the acquisition, installation, and configuration of the proposed equipment and conduct training of the department administrative staff on daily use and department technical staff to provide daily support.

**10. Automate Scale House Operations.**

Develop a RFP to select a qualified vendor to identify business requirements, design and develop system, provide project management, obtain permits, implement systems and test, train staff, train haulers, monitor and maintain system. Vendor would complete Systems Development Life Cycle (SDLC) for each site before moving to additional sites.

**11. Automate Survey Field Crews.**

Purchase five rugged laptops with airless cards and remote printers. Work with the Surveyor staff to identify existing surveying software for data capture. If no software solution is available, then work with ISD to develop a custom application capable of meeting the needs of the Surveyor Crews.

**12. Develop Regional Base Station Network.**

Form a steering committee comprised of San Bernardino and Riverside County Surveyor staff and private firms to develop a public/private consortium to obtain radio band width and funding for a regional base station network.

**13. Automatic Submittal of Digital GIS Data.**

Move forward with the policy item and once that is obtained begin the process of developing a secure Web site to up load data files from the developers and private parties.

**14. Cross Train Computer Services Staff.**

The division has started cross training and review of all documentation at this time, adding staff will facilitate depth of knowledge, support and separation of duties as new applications are developed and implemented.

**15. Create Disaster Recovery Site.**

Utilize the current Servers, Storage Area Network, and necessary network components to create a Disaster Recovery Site at the Needles Yard. This location was selected as the preferred site as it is outside of the USGS earthquake shake map epicenter and because ISD has support infrastructure in the general location to support the Sheriff and other County departments. Real time critical data replication would be accomplished using products such as Double Take software. This would allow the department to resume business from the point of disaster forward. This Hot Site would be contained in a self contained UPC cooled cabinet that can with stand the heat associated with Needles and could be loaded onto a truck and moved to any designated disaster Command Center as needed to provide for business continuity of mission critical applications.

**Prioritized IT Projects**

<b>Priority</b>	<b>Project Name</b>	<b>Score</b>
<b>Priority 1:</b>	<b>IT Desktop</b>	<b>87</b>
<b>Priority 2:</b>	<b>IT Infrastructure</b>	<b>86</b>
<b>Priority 3:</b>	<b>IT Training</b>	<b>86</b>
<b>Priority 4:</b>	<b>Web Site</b>	<b>86</b>
<b>Priority 5:</b>	<b>Conference Rooms</b>	<b>84</b>
<b>Priority 6:</b>	<b>IT Staffing</b>	<b>82</b>
<b>Priority 7:</b>	<b>Geo Code Images</b>	<b>80</b>
<b>Priority 8:</b>	<b>Automate Surveyor Field Crews</b>	<b>80</b>
<b>Priority 9:</b>	<b>Disaster Recovery Site</b>	<b>78</b>
<b>Priority 10:</b>	<b>Storm PDA</b>	<b>77</b>
<b>Priority 11:</b>	<b>Scale House Automation</b>	<b>76</b>
<b>Priority 12:</b>	<b>Maintenance Management System</b>	<b>74</b>
<b>Priority 13:</b>	<b>GIS Digital Data Submission</b>	<b>71</b>
<b>Priority 14:</b>	<b>Data Warehouse</b>	<b>70</b>
<b>Priority 15:</b>	<b>Regional Base Station Network</b>	<b>52</b>

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