



San Diego Geographic Information Source

# **Business Process Reengineering, Strategic Planning & Fee Structure Report**

**SanGIS Board Presentation  
July 20, 2007**

Andrew Abouna  
Executive Director, SanGIS

# SanGIS Overview

## Quick Facts

- Began in 1984 as Regional Urban Information Systems (RUIS)
- Created in 1997 as JPA between City and County of San Diego
- Maintain regional landbase, GIS data warehouse, and GIS services
- Annual Budget of \$1.5+M
- Board of Directors – City CIO, County Deputy CAO
- 13 Staff
- 450+ Geographic Information Layers
- 700+ City, County other Agency users
- 300 unique public users performing over 3,000 data downloads each month
- Model for landbase and GIS data warehousing systems
- Underutilized potential

# SanGIS Mission

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*To maintain and promote  
the use of a regional  
geographic data warehouse  
for the San Diego region  
and to assist in  
the development of shared  
geographic data  
and automated systems  
which use that data*

# SanGIS Objectives

- Formalize City/County GIS Partnership and Regional Support
- Develop, Centralize, Control & Standardize a Landbase Maintenance System
- Establish Regional GIS Data Warehouse
- Reduce GIS Data Redundancy
- Establish Strategic Partnerships
- Advance Local and Regional GIS

# Reflect

SanGIS processes are complex, involving many agencies and departments

Internal and external processes have evolved over time, but have not been reviewed

Ramifications of data currency and availability are large

SanGIS still central to regional GIS but expansion of GIS use could result in decentralization

Survey Says:

- Most Regional GIS users want to share their GIS data
- All Regional GIS users want centralized access to GIS data
- All Regional GIS users utilize SanGIS Data Warehouse

# Affect

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Define process maps of all operations

Streamline and reduce steps/handoffs

Standardize data integration and other policies

Multi-fold increase in the number of SanGIS partners who contribute, access, share data through the SanGIS Data Warehouse

Time to Review Processes, Needs and Goals.....



# **Business Process Reengineering Workshop**

June 4-7, 2007

# BPR Scope of Work

## Scope:

Reengineer the complex landbase management process from the time data is originally generated until the data is published on SanGIS's servers.

*Landbase = parcels, lots, addresses, roads & open space easements*

## Objectives:

- Improve the overall completeness of the SanGIS Landbase data
- Allow selective editing outside of SanGIS based on agreed standards
- Develop *Work in Process* Landbase to meet customer needs
- Develop standards for the use of GIS data

## Goals:

- Reduce the number of Assessor parcel maps in queue by 95% within 90 days
- Eliminate 100% backlog of recorded maps within 90 days

# Stakeholder Participation



## Team Members:

Phyllis Chapin  
Mike Klein  
Tom McDowell  
Melissa Hernandez  
Andrew Abouna  
Karl von Schlieder  
Bob Short

Susan Bender  
Susan Wynne  
Pam Gilb  
Desiree Ramos  
Drew Dowling  
Chantal Saipe  
John Hofmockel

Laura Brenner  
Dave Lindsay  
Ross Martin  
Rob Winslow  
Frank J Jessie III  
Chris Pyle  
Tram Truong

Deena Jamieson  
Candis Compton  
Joseph Harteis  
Sandy Woodhouse  
Bin-Bin Shang  
Noel Gilchrist

# Kaizen Methodology

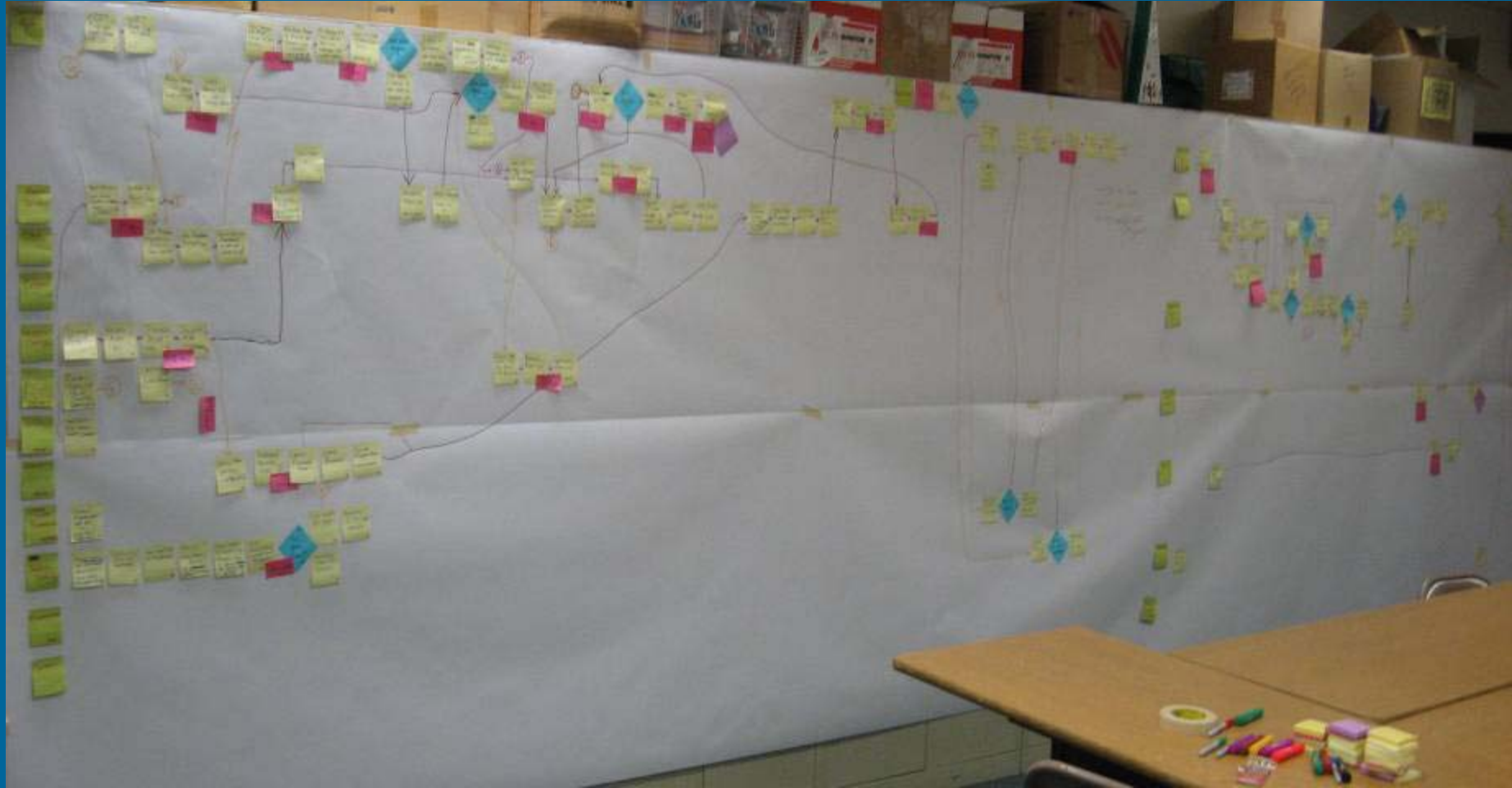
- “Continuous Improvement”
- Clear objectives
- Team process
- Tight focus on time
- Quick & simple
- Necessary resources immediately available
- Immediate results: start changing process by end of week
- 5S “mindset” use of steps to support the event activities:
  - Sort
  - Set in order
  - Shine
  - Standardize
  - Sustain



# “SIPOC”

Suppliers	Input	Process	Output	Customers
<ul style="list-style-type: none"> <li>• Assessor’s Office</li> <li>• Recorder's Office</li> <li>• Public Works Depts - Cities and Counties</li> <li>• Police / Sherriff Depts</li> <li>• Fire Dept</li> <li>• Development Svc Dept</li> <li>• City Planning Depts</li> <li>• Post Office</li> <li>• CALTRANS</li> <li>• DPLU</li> <li>• Federal Government</li> <li>• Indian Reservations</li> <li>• Staff</li> <li>• ESRI (Software Vendor)</li> <li>• Hardware Vendor</li> <li>• SDG&amp;E / AT&amp;T</li> </ul>	<ul style="list-style-type: none"> <li>• Recorded Maps</li> <li>• E-Mail Requests</li> <li>• SANGIS Forms</li> <li>• Assessor Parcels</li> <li>• Assessor Property - Owner Records</li> <li>• Attribute Records</li> <li>• Recorded Docs</li> <li>• Road Info</li> <li>• Address Info</li> <li>• Easements</li> <li>• Block Ranges</li> <li>• Equipment</li> <li>• Labor</li> </ul>	<ul style="list-style-type: none"> <li>• Log Map</li> <li>• Input in GIS</li> <li>• Set up For Reconciliation and Posting</li> <li>• Uploads Defaults in SANGIS</li> <li>• Move to Database</li> </ul>	<ul style="list-style-type: none"> <li>• Parcel Layer</li> <li>• Lot Layer</li> <li>• Open Space Layer</li> <li>• Road Layer</li> </ul>	<ul style="list-style-type: none"> <li>• Assessor’s Office</li> <li>• Recorder's Office</li> <li>• Public Works Depts - Cities and Counties</li> <li>• Police/Sherriff Depts</li> <li>• Fire Dept</li> <li>• Dev. Svs. Dept</li> <li>• City Planning Depts</li> <li>• Post Office</li> <li>• CALTRANS</li> <li>• DPLU</li> <li>• Federal Government</li> <li>• Indian Reservations</li> <li>• General Public</li> <li>• Google</li> </ul>

# Current State Process Map



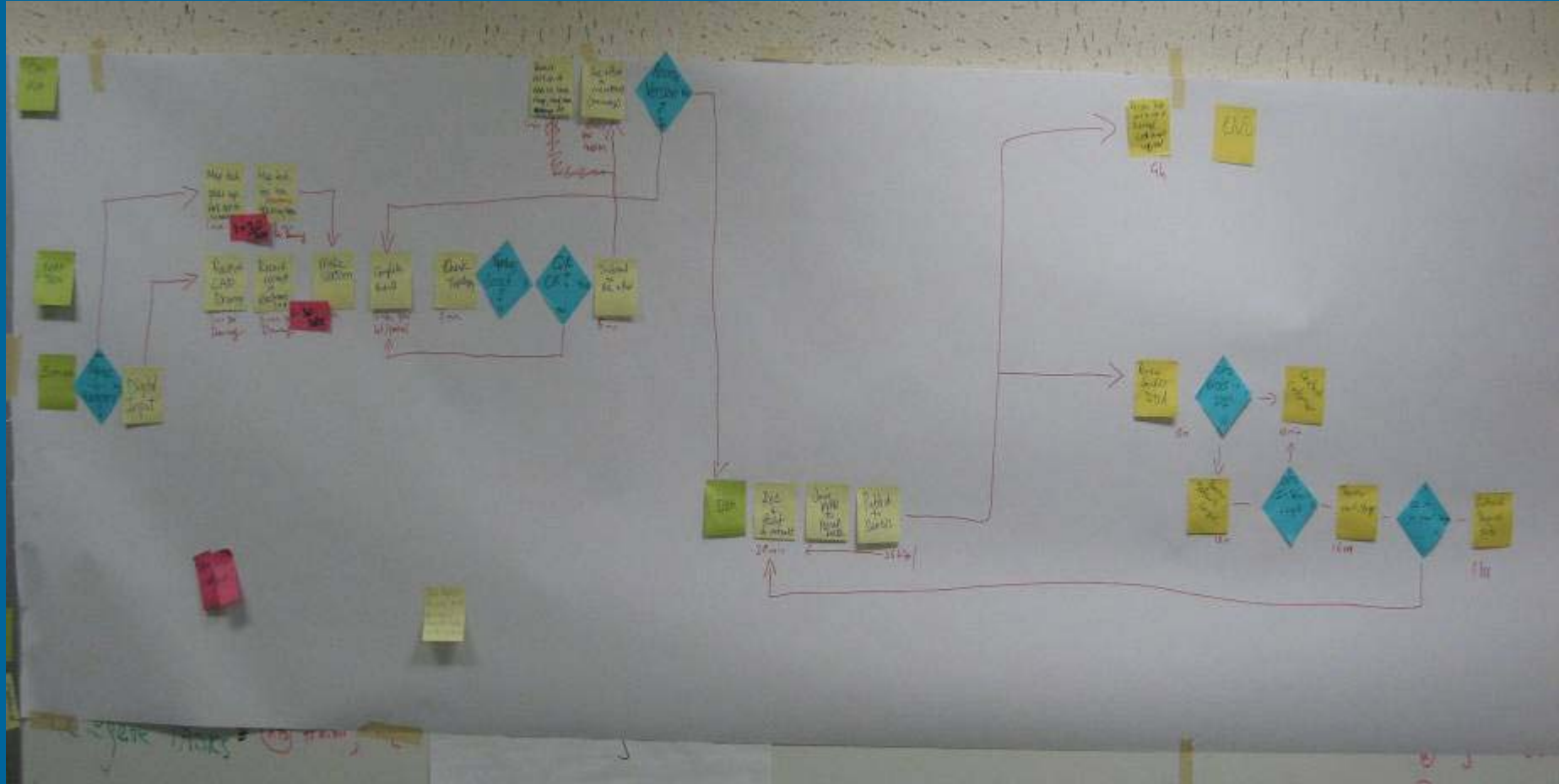
114 Steps, 28-310 days of Potential Delay



# Brainstorm for Improvement

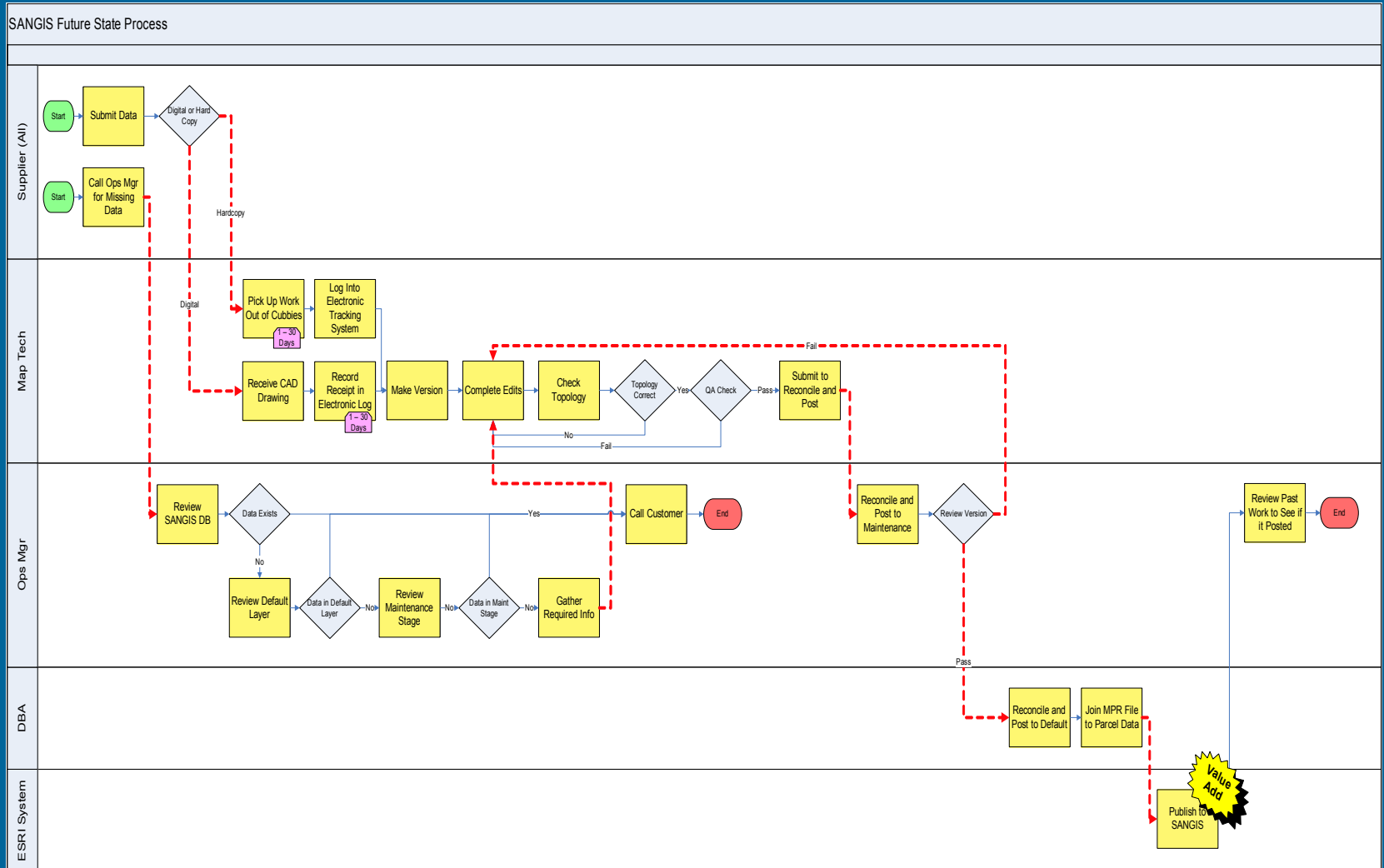
- Reduce lead time, higher value-added %
- 100+ ideas for ways to reduce steps and delays
- Selected high-impact, low-difficulty ideas
- Mapped new process steps and delays

# Future State Process Map



20 Steps, 2-60 days of Potential Delay

# Current State Process Map



# Process Improvements

Process Metrics			
	Current	Future	Change
Steps	114	20	82.5%
Decisions	13	7	46.2%
Electronic Handoffs	14	6	57.1%
Physical Handoffs	13	7	46.2%
Delays	19	2	89.5%
Delay Time Min - Days	28	2	92.9%
Delay Time Max - Days	310	60	80.6%
Loop Backs	5	3	40.0%
Value Added Steps	1	1	0.0%

$\Sigma$ Cycle Times - Hours			
	Current	Future	Change
Current	81.4	6.9	91.5%

Lead Times - Hours			
	Current	Future	Change
Min	813.4	114.9	85.9%
Max	7581.4	1506.9	80.1%
Avg	4197.4	810.9	80.7%

# Key Realizations



- I never knew the entire process
- Myriad of steps for the Operations Manager
- How differently data flows in from City of SD and unincorporated county
- How many addresses come in from Emergency Management Services
- There are innovative ways to solve problems
- Everybody has an idea about how to build a better mousetrap
- Number of potential delays and bottlenecks in the current process
- Digital submittal is not a scary monster (Demystified the term)



# Action Items

	WHAT	WHO	UPDATE	STATUS	WHEN
1	Develop standards (include SANGIS) in SDRGC for digital submittal	Karl	Document being finalized for submission to jurisdictions	95%	14-Jul
2	Setup SANGIS user meeting (define who, where, how often and agendas)	Andrew	1st Meeting agenda complete	100%	12-Sep
3	Add public contacts to "The Source" mailing list (2 <sup>nd</sup> mail list)	Andrew	Merge mailing lists	75%	13-Jun
4	Create public consumption newsletter "The Source"	Andrew	Draft complete	100%	7-Jun
5	SDE View of changes from last week	Chris Pyle	Created test view need feedback and finalize	85%	11-Jun
6	Have County Assessor sign off on digital submission of tentative APN's	Joe H	Waiting for cities to respond by 7/1	100%	1-Jul
7	Test digital APN submittal	Karl, Joe	Waiting for Carlsbad. File being sent today will rework to make visible	25%	12-Jun
8	Establish a lead position that would take some of Operation Manager's duties	Andrew, Dave	Take existing position and add duties	25%	1-Jul
9	Recognition and advancement of ALL SANGIS staff based on performance	Frank	Use existing county program in place, and other rewards for non-monetary recognition	80%	1-Jul
10	Evaluate (analysis) of current process versus buying new plotter	Frank, Dave, Desiree	Plotter found not to be financially beneficial	100%	7-Jun
11	Change pick up of map to be twice per week	Frank, Joe	Will run twice per week, Use DPW mail stop	75%	15-Jun
12	Create online message board that shows status of project	Frank, Drew			15-Jun
13	Test Beta of ArcEngine road editing applications	Drew, Deena, Laura	Notified all of meeting next week	50%	1-Jul

# Action Items

	WHAT	WHO	UPDATE	STATUS	WHEN
14	Communicate elimination of SANGIS Grid	Laura, Andrew	Write up complete, to be sent on 6/21	75%	21-Jun
15	Publish Landbase layers weekly on public ftp site	Drew (Bin)	Hold for Bin's return on 6/26 Also need to determine feasibility		7-Jul
16	Notify users of increased frequency in the public "The Source"	Andrew, Pam G	Write up complete, to be sent on 6/21	75%	21-Jun
17	Update Landbase for interactive mapping weekly	Drew (Bin)	Hold for Bin's return on 6/26		7-Jul
18	Query City of San Diego DSD for feasibility for compiling address/road info	Phyllis, Susan B	Responsibilities / discussions, more analysis required	50%	21-Jun
19	Meeting (SANGIS/DSD) for address/road info	Phyllis, Susan B, Mike K.	Meeting with Deputy Director	25%	Dependent on #18
20	Understand/quantify process (issues?) for data model changes	Deena, Drew, Susan W	Meeting with staff 6/28 to evaluate change management	25%	28-Jun
21	Delegate log/date stamp to map tech	Ross	Will be delegated starting 7/1	75%	1-Jul
22	SANGIS to develop MOA with other jurisdictions to submit digitally	Tom	Laura will inform Tom this was assigned to him		15-Jun
23	Create digital submittal policy standard through LUEG	Ross, Dave, Karl, Desiree	Policy statement drafted waiting for decision makers to review in report out	75%	7-Jun
24	Contact Sheriff for address updates	Sandy, Melissa	Draft complete and reviewed	100%	7-Jun
25	SANGIS to develop address submittal form with input from suppliers	Frank, Phyllis	Developed draft standard submit to regional meeting by Monday	75%	15-Jun
26	Create cubby system for incoming mail	Frank, Andrew			15-Jun
27	Deploy LAN assets to SANGIS from county network	Dave		25%	30-Jun

# Key Points and Goals

## Requirements

- Digital recorded map viewable on screen to aid digitizing
- Digital submission saves most digitizing = 75-85% reduction in process!
- 100% of all recorded maps to be submitted digitally by 6/30/08

## Metrics

- Current parcel/recorded map processing = 60/30 days
- New parcel/recorded map processing = 14/7 days

## Continuous Improvement Sought

- Typical implementation 90 days, reevaluation at 360 days
- Long term change requires 2-3 years of sustained leadership commitment
- Change and improvement occurring already



# Strategic Planning and Regionalization Workshop

June 11-12, 2007

# Strategic Planning

## Goal:

- Strategize on how SanGIS can best serve respective and regional GIS needs

## Who:

- 23 participants
- 16 public agencies, education institutions

## How:

- Use best practices
- Make recommendations
- Set actions items

SanGIS Strategic Planning Participants	
<u>Agency/Institution</u>	<u>Name</u>
Caltrans	Barbara Kent
Caltrans	Pat Landrum
City of Carlsbad	Karl von Schlieder
City of Chula Vista	Tom McDowell
City of Encinitas	David VanPelt
City of Escondido	Dan Hlidebrand
City of Oceanside	Debra Briski
City of Poway	Brad Rosen
City of San Diego	Laura Brenner
City of San Diego	Phyllis Chapin
County of San Diego	Candis Compton
County of San Diego	Dave Lindsay
County of San Diego	Ross Martin
County of San Diego	Sandy Woodhouse
Port of San Diego	Malcolm Meikle
San Diego Water Authority	Matt Brown
SANDAG	Steve Kunkel
SanGIS	Andrew Abouna
SDSU Foundation	Paul Hardwick
SDSU Geography Department	Harry Johnson
UCSD	Tracey Hughes
USD	Gene Rathswohl, Ph.D.
USD	Stephen Velez-Confer
Guidon, facilitator	Brent Jameson

# SanGIS Cooperative Vision

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Deliver the best public service to the citizens of San Diego  
by maintaining a centralized landbase  
and providing access to the most current,  
accurate and complete GIS data  
through regional collaboration and cooperation

# Roles & Responsibilities

The SanGIS Cooperative would fulfill the following roles by employing appropriate and cost-effective technologies and methodology using internal and/or external resources:

- Centralized landbase maintenance services
- GIS Data Warehouse
- Data Publishing and Integration Steward
- Contracting and Procurement Services
- Develop and Implement Data Standards
- Promote appropriate and innovative use of technology and data across a wide range of public and private projects and programs
- Provide limited services with the expert knowledge of SanGIS data
- Accountability and Responsiveness based on quality and performance measures

# Impacts & Benefits

Positive regional impacts and benefits would be expected through the cooperative:

- Increased timeliness, accuracy, and therefore public safety
- Improved emergency communications
- Reduction of duplication
- Ability to increase the number of published maps
- Increased public access to data
- Best Practice use of data
- Clarification of data integrity
- Ability to apply for more grants

# Business Processes

A number of business processes would be improved, further underscoring the important improvements stemming from the BPR:

- Establish and implement standards for submittal of data (digital, hardcopy)
- Publish business data processes, including models, parameters, geoprocessing
- Allow distributed maintenance/editing of landbase data
- Incorporate and publish temporary landbase layers as available
- Create notification process of data changes

# Data Layers & Standards

Create core landbase layers to meet the business requirements of the participating agencies and ensure that the data within the Data Warehouse is accurate, complete, and current according to the SanGIS Cooperative Data standards:

- Define regional data models, data layers, and attributes
- Develop regional layers based on local jurisdiction data accuracy and completeness standards
- Establish data accuracy standards and tracking method
- Integrate more accurate data
- Establish minimum standards for quality control for data inputs
- Design data sets to be flexible for changing environments and technology
- Develop metadata standards for acceptance and distribution of data

# Customer Relations

SanGIS services are intended to facilitate and provide high-quality, user friendly and downloadable online GIS data.

- Quality metadata
- Searchable tools for data discovery
- Efficient customer service

Ensure core data sets (and others as appropriate) are offered as a free service to all participants with increasing levels of data access and services based upon increasing levels of membership.

# Develop Guiding Principles

Establish agreed upon standards for:

- Data structures
- Data submittal processes
- Quality control
- Accommodate the business requirements of the member agencies

# Measurements

A variety of methods are proposed for gauging performance, some of which still need further definition:

- Cross jurisdictional standards
- Reduction in the number of times a layer is being mapped/digitized
- Measure the time from submittal to publication
- Availability of the unrecorded/approved tentative map
- Measurement of the number of maps published within a given timeframe
- Number of road segments that have accurate block names available in a shorter amount of time
- Increased hits on website
- Increased downloads of data
- Grants funding

# Governance Structure

The SanGIS Cooperative is an organization with representation from participating agencies.

Representatives establish and implement the policies and technical direction for providing quality products & services that meet the business requirements of its regional partners.

JPA/MOU/MOA Governance with provisions to include future members in addition to the City of San Diego and County of San Diego.

Participation on the Board of Directors could be based on funding of SanGIS, need, population, or in-kind service.

# Board of Directors

## Expansion Proposed in Two Stages

### 1<sup>st</sup> Stage - Core Board Members:

- City of San Diego (CIO)
- County of San Diego (CAO)
- SANDAG
  - Mission to benefit region
  - High level regional official/policy-setter/enforcer)
  - Require significant, collective data to support forecasts
  - Can drive what data requires focus

### 2<sup>nd</sup> Stage – Future Additional Members:

- North Cities Representative
- South Cities Representative
- Additional Representatives as appropriate

# STAB

## SanGIS Technical Advisory Board

- 3 City of San Diego representatives (GIS Manager & Coordinators)
- 3 County of San Diego representatives (GIS Managers & Coordinators)
- 1 SANDAG representative
- 6 San Diego Regional GIS Council appointed representatives.
  - Thematic election based on the following possible categories:  
Business, Military, Homeland Security/Public Safety, Transportation,  
Utility, Small Cities, Science/Education/Research, Environment
- Meet every other month or more often as needed

# Communication Plan

ITEM	WHAT	WHO	WHEN
1.	Champions – a Core Group	Paul, Ross, Phyllis, Steve (SANDAG), Tom (SDRGC Chair), Andrew	6/12/07
2.	Marketing Plan/Strategy (Benefits, Roles, Business Plan)	Champions	6/29/07
3.	STAB Meeting update	Andrew, Phyllis, Ross	6/28/07
4.	Funding Plan (Costs for Services)	Andrew	6/29/07
5.	Communication Plan (SDRGC, City Managers, Public Safety Committee)	Champions	
6.	Engage SANDAG about idea	Steve, Andrew	6/15/07
7.	Summary of SanGIS Strategic Plan	Andrew	6/14/07
8.	Rewrite of SDRGC Charter Topic	Tom	7/11/07
9.	Develop proposed JPA	Champions, counsel	9/1/07
10.	Contact counsel and set legal direction	Andrew	6/29/07
11.	Timeline of all phases	Champions	6/29/07
12.	Report of SanGIS Strategic Plan at SDRGC	Champions	7/11/07
13.	ESRI UC SD Users meeting SanGIS BPR Report Out	Andrew	6/19/07
14.	Email summary of SanGIS BPR and Strategic Plan	Andrew	6/15/07
15.	SanGIS Board Presentation of BPR and Strategic Planning Workshops	Andrew	7/13/07
16.	Follow up Workshop	Andrew	7/24/07

# Feedback Excerpts

“...unabashed commitment on the part of all to sharing freely and to providing the very best of what they have to offer to the public welfare.”

Stephen Valez-Confer, MNM  
Doctoral Research Fellow, USD

“The SanGIS Strategic Planning Workshop was a valuable tool in convening the myriad agencies to understand their perspective of the SanGIS processes and current services...I fully support the 'plan'...”

Debra Briski  
Project Manager, City of Oceanside

“Having been involved in SanGIS/RUIS since back in 1985, it has been a goal of mine to have region wide participation. This week was the first coordinated attempt to include other agencies in the SanGIS model...our draft action plan should yield results.”

Sandy Woodhouse  
Supervising Appraiser, County of San Diego

“The true planning on the part of SanGIS, and the open attitude of those involved was evident and allowed for an honest dialogue and process..., I see many improvements resulting from our process...”

Tracey Hughes  
GIS Coordinator, UCSD

# Feedback Excerpts

I was very pleased with the progress that you and others (including the new potential members of SanGIS) made over the past two weeks. The value of the workshop was tremendous in that we now have concrete direction on where we want to go. Success will require commitment and having a champion. I certainly am willing to make that commitment. I also believe that (since these efforts will be on top of our regular jobs for many of us), we will need you to be our champion - to keep us moving forward.

Tom MCDowell  
Applications Support Manager, City of Chula Vista

I was impressed with the 2-day SanGIS Strategic Planning workshop concerning regionalization issues. I was encouraged by the outreach that SanGIS along with the City and County of San Diego are doing to encourage more GIS coordination with local, regional, state, and education organizations. SANDAG staff are encouraged by the proposal to obtain a voting seat on the SanGIS Board of Directors. We look forward to working more closely with SanGIS in serving the GIS needs of both SANDAG and its member agencies.

Steve Kunkel  
Senior GIS Analyst, SANDAG

# Feedback Excerpts

Future collaborative efforts amongst local/regional GIS partners will help to ensure that a viable, sustainable SanGIS cooperative is formed and maintained. The development, maintenance and delivery of geospatial data by and for our regional partners will play an important role in how we shape the future growth of our region, as well as continue to provide the needed infrastructure and services for the citizens of the San Diego region.

Pat Landrum

Chief of GIS/Project Development Support Branch , Caltrans District 11



# Fee Structure Proposal

# Strategic Statement

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SanGIS will pursue reliable, balanced, revenue through member funding, data access public and private, in-kind and other services, and grant sources.

By necessity for public access to information or to improve data accuracy and SanGIS responsiveness, some services would be free.

# Fee Structure Proposal

- Strategic Planning Session “Champions”:  
(Chula Vista, City, County, SDSU, SANDAG, SanGIS)
- Contrasted to previous market for SanGIS data sales
- Review of SanGIS Operational Costs by business function

# Non-Member Data Access

## FTP Public Access

- Bi-annual update of Landbase + top 20 most popular non-sensitive layers
- Free

## FTP Secure Access

- Monthly update of landbase and layers
- MU1 – landbase, \$100/mo
- MU2 – landbase + top 20 non-sensitive layers, \$200/mo
- MU3 – landbase + all non-sensitive layers, \$400/mo
- Access can be tracked

# Member Data Access

## Technical Advisory Member

### Public Agency

- SDE/T1 & FTP Access to landbase & all non-sensitive layers
- Downloading/replication of landbase
- Imagery and Thomas Bros. data (with revisions to vendor agreements/cost)
- Contracting/licensing benefits (with revisions to vendor agreements/cost)
- Limited data hosting with editing to ensure layers align with SanGIS landbase (defraying clients in-house server/IT costs)
- Data acquisition and GIS services or subcontracting
- Technical support
- NAS distribution of data
- \$1,000/mo + T1 costs (plus 20%)

### Private Agency

- Public Agency features, less imagery, Thomas Bros., other licensed data

# Member Data Access

## Board of Directors

- Benefits of Public Agency Technical Advisory Member
- Governance (Policy setting, Financial management/approval)
- Landbase maintenance services provided (or offset to fees if member provides)
- Enhanced data hosting with editing to ensure layers align with SanGIS landbase (defraying clients in-house server/IT costs)
- No T1 costs
- Share based, total of 10 shares at \$125,000/share

# SanGIS Business Costs

Business Function	Expense
Landbase Maintenance	\$967,287
GIS Data Warehouse	\$455,425
GIS Services and Delivery*	\$163,080
<b>TOTAL</b>	<b>\$1,585,792</b>

## Assumptions/Steps

- Administration costs prorated across Business Functions
- Labor by Function (LF)
- $LF \times Budget = Expense$  by Business Function

\* GIS Services and Delivery includes mapping and data services for members and public, and prorated administration and website costs.

# Fiscal Analysis of Fees

LEVEL	Number	Annual Revenue
MU1 (\$100/mo)	40	\$48,000
MU2 (\$200/mo)	30	\$72,000
MU3 (\$400/mo)	20	\$96,000
STAB (\$1K/mo)	10	\$120,000
Board (\$125K/yr)	1	\$125,000
<b>TOTAL</b>	<b>101</b>	<b>\$461,000</b>

## Previous Data Sales:

- Quarterly data on CD
- 154 paying clients
- \$3500-\$13,500/year/client
- \$476,000 in FY06

New proposal superior because of significant value added components:

- Timeliness
- Reduced redundancy
- Increased accuracy
- Increased partnerships, repository, services
- Membership, governance
- Nominal fees for improved data access speed, services
- Interest evident
- Public Records Act compliant

# In-Kind Maintenance

- SanGIS-maintained landbase serves City, County, most cities, agencies
- Some cities also maintain their own landbase
- Many ancillary layers at SanGIS, cities, agencies but some maintenance and/or landbase-registration needed
- Need to identify the layers and responsibility for their maintenance
- Centrally host at SanGIS in Data Warehouse
- In-kind services for offset or validation of fees by assigning responsibility of landbase and ancillary layers
- Reduce redundancy of effort, increase timeliness, mutual savings

# GIS Responsibility Matrix

In-kind services for offset or validation of fees could be established by defining an agency's level of responsibility for landbase and ancillary layers development, maintenance and use

- Identify essential layers, such as landbase, emergency, land use, imagery
- Identify responsible agency
- Assign D/M/U and equated fee value
- Improves data integrity, reduces redundancy
- Greater value to SanGIS Cooperative

JURISDICTION	Parcels	Roads	Parks
City 1	U	M/U	D/M/U
City 2	M/U	U	M/U
Agency 1	D/M/U	D/M/U	M/U
Agency 2	U	M/U	U

D = Developer

M = Maintainer

U = User

# Other SanGIS Services

GIS and related services would benefit members and the region:

- Compilation and repository of regional GIS Data
  - Fire group consortiums, homeland security, other
  - Would generate revenue to support and advance these systems
- Consortium level contracting on GIS products, services with vendors
  - Imagery and data acquisition
  - Sub-licensing would generate revenue to lower overall costs
- Mapping and analysis
- Regional GIS Steward



San Diego Geographic Information Source

**Thank you.**

**Questions?**

Andrew Abouna  
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