

Flood Control District of Maricopa County Library
2300
Phoenix, AZ 85002

**Flood Control District
Of
Maricopa County**

VALUE ENGINEERING

**DURANGO REGIONAL CONVEYANCE CHANNEL
AND DETENTION BASINS**

30% Design Phase Value Engineering Study

April 26 & 27, 2005

Prepared by:

SiteTek
Financial Arts

April 29, 2005

**SUBJECT: DURANGO REGIONAL CONVEYANCE CHANNEL AND
DETENTION BASINS
VALUE ENGINEERING STUDY**

DATES: April 26 & 27, 2005

TEAM LEADER: John Pucetas – SiteTek Financial Arts, Inc.

TEAM MEMBERS: Bobbie Ohler – FCDMC
Michael Negrete – City of Phoenix
Gary Shapiro – FCDMC
Carlos Encinas – FCDMC
David Phelps – Stantec
Joe Bergquist – Stantec
Rick Noland – Stantec
Steve Tucker – FCDMC
Mark A. Glock – City of Phoenix
Hasan Mushtaq – City of Phoenix
Bob Stevens – FCDMC
Don Rerick – FCDMC
John Palmieri – FCDMC

DESIGN PRESENTATION BY:
Joe Berquist - Stantec
David Phelps - Stantec

DOCUMENTS USED:
Durango Regional Conveyance Channel (DRCC) and Detention Basins –
Phase 1, Preliminary 30% Submittal prepared by Stantec Consulting Inc.,
dated 02/2005
Engineer’s Opinion of Probable Cost at 30% Design Stage, prepared by
Stantec, dated 3/16/05

WORKSHOP OBJECTIVES

- Coordinate conflicts at 67th Avenue crossing
 - SRP irrigation line
 - Buildings relocation / demolition
 - May need to acquire entire Katrina Perkins property
- Earthwork alternatives
- Resolve environmental issues – auto shop, Target basin drywells & archaeology at Buzz Oates basin
- Reduce cost
- Maintain schedule – SRP coordination with 35th Avenue storm drain
- Clarify & coordinate copper grid requirements at radio towers

INFORMATION PHASE BRIEFING

1. This project is based on drainage features identified in the Durango Area Drainage Master Plan.
2. The City of Phoenix asked the District to combine this project with their 75th Avenue storm drain project which is currently out for bid. The storm drain size was increase from 2 year to 10 year capacity.
3. The Santa Maria Basin was created to contain flows so the pipe size could be maintained in 75th Ave. storm drain.
4. The Durango Regional Conveyance Channel picks up 570 cfs at 63rd Ave., increases to 850 cfs at 67th Ave. and outlets 950 cfs to the Target basin to contain the 100 year flow.
5. The Durango ADMP identified starting the basin further east of 63rd Ave., but there is a conflict with an existing SRP substation.
6. The channel is primarily an open, trapezoidal earthen channel with 4:1 side slopes with a box culvert crossing at 67th Ave. and an open, rectangular concrete at an existing structure west of 67th Ave. The velocities at the earthen channel section are 3 fps therefore there is no requirement for additional lining.
7. The Buzz Oates Basin has been planned as a two level basin to incorporate a soccer field with ten year flood protection.
8. The Santa Maria Basin is planned underneath power lines and will drain by percolation only.
9. The project will remove a section of flood plain in the neighborhood adjacent to the Union Pacific Railroad embankment.
10. The proposed channel alignment conflicts with an existing 250 ft. radius radio tower grid system. Construction of the channel in this area will need to be coordinated with the radio station.
11. Potential environmental issues include: existing auto part property, 15 existing drywells at the Target basin and an old archeological site (historical canal) at the Buzz Oates basin.
12. Project Schedule: 60% design due May 23, 90% design - mid August, 100% design end of September, bid at end of this year, start construction next year.
13. The cost estimate is based on a \$10 / CY cost for excavation and haul. (\$ 2.00 for excavation, \$ 8.00 for haul)
14. Schedules for 75th Ave. storm drain project need to be coordinated with this project so that we have an outfall for the DRCC upon completion.
15. Construction start anticipated for next year with a 6 months to a one year construction period.
16. Project schedules need to be sequenced with SRP canal dry-up in January 2006. This project is paying to relocate an existing 48" irrigation line, SRP will do the work, during dry-up
17. Appraisals have been received on all impacted properties except the Katrina Perkins property and the radio station property.
18. Project aesthetics: "wobble" channel where possible, use boulders for drop structures, textured formwork at headwall
19. Final VE decision on channel section through the Katrina Perkins property will be made after the appraisal is received.
20. Increase channel slope to the extent possible without requiring channel lining.

PROJECT COST MODEL

The following table identifies the highest cost functional elements of the project for potential Value Improvement. (see attached graphic cost model)

ELEMENT	FUNCTION	COST	PERCENT OF TOTAL
Earthwork: Cut/ Fill and Haul	Move Earth	\$ 9,500,000	69.5%
Contingency 20%	Mitigate Risk	\$ 2,279,131	16.6%
Mobilization / Demobilization	Commence Work	\$ 400,000	2.9%
Rip Rap 8"	Protect Channel	\$ 382,500	2.8%
Drop Structure near Sta. 137+00	Dissipate Energy	\$ 180,000	1.3%

Earthwork and Contingency represent approximately 86% of the total project cost and would become the primary focus of the workshop for value improvement.

FCDMC CONSTRUCTION BUDGET

Stantec 30% Cost Estimate: \$ 13,675,000
FCDMC Construction Budget: \$ 7,000,000
Estimate to Budget Difference: \$ 6,670,000

VALUE ENGINEERING ALTERNATIVES

(see the following summary matrix of VE alternatives and detailed narrative and cost estimates)

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: **Reduce haul quantity by spoiling material in berms & adjacent properties**

1

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist aprox 4 miles).

Proposed Design

Reduce haul quantity by using spoil to place at the various places:

- 1) Parking lot for DRCC Basin No 4 (21,000 CY @ 0 haul)
- 2) 67th Ave RR crossing (4,500 CY @ 0 haul)
- 3) Berming along DRCC on south bank (14,000 CY @ 0 haul)
- 4) 75th Ave south of Broadway (9,800 CY @ 1 mi haul)

Advantages and Disadvantages

Advantages:

- Reduce haul cost, which is major element of project cost
- Berming along south bank of DRCC adds aesthetic enhancement to project
- This option can be used with any other earthwork option to further reduce cost by \$330,000

Disadvantages:

-

Discussion

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>9,500,000</u>
Proposed Design	<u>9,165,530</u>
Potential Savings	<u>(\$334,470)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Reduce haul by spoiling material along railroad & Univ of Illinois prop

2

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist aprox 4 miles).

Proposed Design

Reduce haul quantity by using spoil to place at the various places:

- 1) At University of Illionis site (NEC of 67th & UPRR) (250,000 CY @ 0 haul)
- 2) Spoil along UPRR (94,000 CY @ 0 haul)

Advantages and Disadvantages

Advantages:

- Reduce haul cost, which is major element of project cost
- Elevating UPRR from 67th to east helps drainage to go to DRCC permanently

Disadvantages:

- Requires land owner approval to place spoil on site

Discussion

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>9,500,000</u>
Proposed Design	<u>6,920,000</u>
Potential Savings	<u>(\$2,580,000)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Reduce haul quantity by spoiling material at Park & School site

3

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist aprox 4 miles).

Proposed Design

Reduce haul quantity by using spoil to place at the various places:
1) Proposed COP park and school (500,000 CY @ 3 mile haul).

Advantages and Disadvantages

Advantages:

- Reduce haul cost, which is major element of project cost
-

Disadvantages:

- Requires land owner approval to place spoil on site

Discussion

Life Cycle Cost Summary

	Initial Cost
Original Design	<u>9,500,000</u>
Proposed Design	<u>9,000,000</u>
Potential Savings	<u>(\$500,000)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Reduce haul quantity by spoiling at ADOT 59th Ave freeway project

4

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist aprox 4 miles).

Proposed Design

Reduce haul quantity by using spoil to place at the various places:

- 1) ADOT 59th AVE (950,000 CY @ 3 mile haul)
- 2)

Advantages and Disadvantages

Advantages:

- Reduce haul cost, which is major element of project cost
-

Disadvantages:

- Need agreement with ADOT

Discussion

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>9,500,000</u>
Proposed Design	<u>8,550,000</u>
Potential Savings	<u>(\$950,000)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Reduce unit rate for haul

5

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist approx 4 miles).

Proposed Design

Reduce haul unit rate for any unknown reason (closer site, private development, etc)

Advantages and Disadvantages

Advantages:

- Reduce haul cost, which is major element of project cost
-

Disadvantages:

- Dependant upon free market conditions at time of bid. COP & FCDMC are at mercy of contractors.
-

Discussion

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>9,500,000</u>
Proposed Design	<u>7,600,000</u>
Potential Savings	<u>(\$1,900,000)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins
Item: Auction earth

VE No.
6

Original Design

Pay contractor \$2.50 per CY for Excavation + \$7.50 for haul cost for a total excavation cost of \$10/CY.
Excavate and haul 950,000 CY (haul dist approx 4 miles).

Proposed Design

Reduce earthwork cost by auctioning dirt

Advantages and Disadvantages

Advantages:

- Reduce earthwork cost, which is major element of project cost
- Broker can be another agency (ADOT, UPRR, GRIC) or private

Disadvantages:

- Long shot of finding someone to take all or a portion of the dirt
- Can be problematic finding someone willing to take or haul dirt

Discussion

over excavate Target basin for auction and then dump channel excavation in basin

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>9,500,000</u>
Proposed Design	<u>247,500</u>
Potential Savings	<u>(\$9,252,500)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Extend trapezoidal channel section across Katrina property

15

Original Design

30% design submittal shows an open, concrete, rectangular channel crossing the south portion of the Katrina property

Proposed Design

Extend earthen trapezoidal channel section across Katrina property to 67th Ave. crossing.

Advantages and Disadvantages

Advantages:

- Reduced construction cost
- Provides continuous maintenance access for channel
- Reduced liability with earthen, trapezoidal channel
- Reduction in number of different channel sections required

Disadvantages:

- Additional ROW costs
-

Discussion

Resolution of channel section type at Katrina is contingent upon appraised property value.

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>91,000</u>
Proposed Design	<u>255,000</u>
Value Enhancement	<u>164,000</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins
Item: Reduce estimating contingency

VE No.
17

Original Design

30% design phase estimate by Stantec has a 20% contingency for unlisted items on the entire estimated construction cost of \$ 11.4 million. This amount is \$ 2,279,131.

Proposed Design

Carry the 20% contingency only on the non-earthwork items since the \$10.00 / CY unit rate for cut,fill & haul for earthwork anticipates a "worst case" scenario.

Advantages and Disadvantages

Advantages:

- Provides a more accurate estimate of project costs at this design phase

Disadvantages:

Discussion

Project scope is fairly well defined for a project at this phase. There is a separate budget for SRP related utility relocations which is typically where the majority of contingency items occur. Minimal risk project issues remaining include potential environmental issues at Target drywells (Target responsibility), auto shop property and potential archaeological issues at old SRP canal site.

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	2,279,131
Proposed Design	379,131
Potential Savings	<u>(1,900,000)</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins
Item: Inlet Alternatives at DRCC: Swale

VE No.
19A

Original Design

Proposed Design

A swale of approximately 3.5 feet deep and 37 feet wide running 240 feet from Jackson Street straight south to the end of the DRCC channel can carry the 100-year, 24-hour flood of about 570 cfs. The engineer's opinion of probable cost for such a swale is about \$38,000.

Advantages and Disadvantages

Advantages:

- flexibility to handle flows up to and including the 100-year 24-hour peak
- provides access to the channel from Jackson Street
- does not require other structures to be functioning
- would be able to capture overland flows from the east moving west
- a smaller swale running between Jackson Street and the SRP facility could outlet into this swale

Disadvantages:

- does not gather flows off of Jackson Street without being deeper
- fairly deep channel (3.5 ft) which will restrict traffic moving east or west of Jackson Street

Discussion

It is important to note that both the swale and pipe could be made smaller and not be required to carry the 100-year flood, but the cost savings would continue to be with the swale if both are to convey the same flood event.

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	0
Proposed Design	38,000
Value Enhancement	<u>38,000</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins
Item: Inlet Alternatives at DRCC: Pipe

VE No.
19B

Original Design

Proposed Design

A pipe of approximately 66-inches in diameter running 240 feet from Jackson Street straight south to the end of the DRCC channel can carry the 100-year, 24-hour flood of about 570 cfs. The engineer's opinion of probable cost for such a pipe and the associated features like catchbasins and a dissipation structure is about \$157,000.

Advantages and Disadvantages

Advantages:

- flexibility to handle flows up to and including the 100-year 24-hour peak
- can be covered and thus provide access to the channel
- can be turned into Jackson Street to capture flows to the east, but this will reduce the capacity of the 66-inch dia pipe and could require a larger pipe to be sized to carry the 100-year flow

Disadvantages:

- requires large inlets in Jackson Street to capture the 100-year flood
- attracts unwanted animals and perhaps people to live in the pipe
- requires a dissipation structure to reduce the energy from the pipe as it discharges into the channel
- more costly

Discussion

It is important to note that both the swale and pipe could be made smaller and not be required to carry the 100-year flood, but the cost savings would continue to be with the swale if both are to convey the same flood event.

Life Cycle Cost Summary

	Initial Cost
Original Design	0
Proposed Design	157,000
Value Enhancement	<u>157,000</u>

Value Analysis Recommendation

Project: Durango Regional Conveyance Channel & Detention Basins

VE No.

Item: Covered box in lieu of rectangular channel at Katrina property

21

Original Design

30% design submittal shows an open, concrete, rectangular channel crossing the south portion of the Katrina property.

Proposed Design

Covered box culvert similar to 67th Ave crossing at Katrina property

Advantages and Disadvantages

Advantages:

- Provides continuous maintenance access for channel
- Reduction in number of different channel sections required
- Does not require additional ROW

Disadvantages:

- Length of covered box exceeds City of Phoenix maintenance standard length of 200'
- Additional cost

Discussion

Resolution of channel section type at Katrina is contingent upon appraised property value.

Life Cycle Cost Summary

	<u>Initial Cost</u>
Original Design	<u>75,000</u>
Proposed Design	<u>180,000</u>
Value Enhancement	<u>105,000</u>

**30% DESIGN PHASE
2-DAY VALUE ENGINEERING CONFERENCE AGENDA
DURANGO REGIONAL CONVEYANCE CHANNEL (DRCC) AND DETENTION BASINS**

April 26 & 27, 2005

Location: Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

DAY 1 – April 26, 2005 – New River Conference Room

8:30 **INFORMATION PHASE - INTRODUCTION TO WORKSHOP**
(Mike Negrete, COP, Project Manager, Bobbie Ohler, FCDMC, Project Manager,
John Pucetas, SiteTek, VE Team Leader,)

Welcome & Opening Remarks
Introductions
VE Briefing: VE Process, Workshop Organization & Agenda
Objectives of Workshop

9:30 **INFORMATION PHASE - PROJECT BRIEFING**
(Stantec Consulting, Inc., City of Phoenix, FCDMC)

Project Design: Project history & evolution
Presentation of proposed design
Identification of significant project issues
Project Schedule Review
Project Budget Review: Estimate vs. FCDMC Budget

10:15 **BREAK**

10:30 **INFORMATION PHASE – (continued)**

12:00 noon **LUNCH**

1:00 p.m. **FUNCTION ANALYSIS PHASE**

Function Identification
Review & Revision of Function Analysis System Technique (FAST) Diagram
Function - Cost - Worth Relationship
Identification of high cost / worth relationships for Value Improvement

2:30 **CREATIVE / BRAINSTORMING PHASE**

Brainstorm Large Variety of Ideas
Generate Ideas for Basic Function
Think of Ideal Solutions, Modify and Combine Ideas
No Judgment

5:00 **ADJOURN**

DAY 2 – April 27, 2005 – Buckhorn-Mesa & Guadalupe Conference Rooms

8:30 a.m **CREATIVE / BRAINSTORMING PHASE**
(additional ideas)

9:00 **EVALUATION PHASE**

List Idea Advantages and Disadvantages
Establish Evaluation Criteria
Evaluate Ideas By Comparison
Rank Ideas for Further Investigation
Weighted Analysis (if appropriate)
Select most promising alternatives for development

10:00 **BREAK**

10:15 **DEVELOPMENT / COSTING PHASE**

Review of Proposal Forms and Final Products
Team Member Proposal Development Assignments
Prepare Design Alternatives

12:00 noon **LUNCH**

1:00 **DEVELOPMENT / COSTING PHASE**
(continued)

2:30 **RECOMMENDATION PHASE**

Finalize Written Proposals (Present, Proposed, Discussion)
Finalize Sketches of Present & Proposed Design
Update Cost Information
Complete Value Summary Sheets

3:30 p.m. **VE PRESENTATION**
(presentations by team members by discipline / function)

4:30 **IMPLEMENTATION PHASE**

Process for Accepting / Rejecting Recommendations
Implementation Tracking Log
Develop Implementation Schedule of Events

5:00 **WORKSHOP CLOSING REMARKS**
ADJOURN

ATTENDANCE LIST

Value Engineering Workshop



Project: Durango Regional Conveyance Channel & Detention Basins
 Location: Phoenix, Arizona
 Date: April 26 & 27, 2005

PARTICIPANTS:

Name:	Organization/Address:	Phone/ Fax/ e-mail:
John Pucetas	SiteTek Financial Arts, Inc.	480-836-0594
	16010 Aspen Drive	480-836-0596
	Fountain Hills, AZ 85268	sitetek1@cox.net
Bobbie Ohler	Flood Control District of Maricopa County	602-506-2943
	2801 West Durango	602-506-8561
	Phoenix, AZ 85009	bao@mail.maricopa.gov
Michael Negrete	City of Phoenix	602-495-0565
	1034 E. Madison St.	602-495-3670
	Phoenix, AZ 85034	mike.negrete@phoenix.gov
Gary Shapiro	FCDMC	602-506-3076
	2801 West Durango	
	Phoenix, AZ 85009	ghs@mail.maricopa.gov
David Phelps	Stantec	602-438-2200
	8211 S. 48th St.	
	Phoenix, AZ 85044	dphelps@stantec.com
Joe Bergquist	Stantec	602-438-2200
	8211 S. 48th St.	
	Phoenix, AZ 85044	rjbergquist@stantec.com
Rick Noland	Stantec	602-438-2200
	8211 S. 48th St.	
	Phoenix, AZ 85044	moland@stantec.com
Carlos Encinas	Flood Control District of Maricopa County	
	2801 West Durango	
	Phoenix, AZ 85009	cse@mail.maricopa.gov

ATTENDANCE LIST

Value Engineering Workshop



Project: Durango Regional Conveyance Channel & Detention Basins
 Location: Phoenix, Arizona
 Date: April 26 & 27, 2005

PARTICIPANTS:

Name:	Organization/Address:	Phone/ Fax/ e-mail:
Steven Tucker	Flood Control District of Maricopa County	602-506-4872
	2801 West Durango	
	Phoenix, AZ 85009	sft@mail.maricopa.gov
Mark A. Glock	City of Phoenix	602-534-7066
	1034 E. Madison St.	602-495-3670
	Phoenix, AZ 85034	mark.glock@phoenix.gov
Hasan Mushtaq	City of Phoenix	602-262-4026
	200 W. Washington St.	602-262-7322
	Phoenix, AZ 85003	hasan.mushtaq@phoenix.gov
Bob Stevens	Flood Control District of Maricopa County	602-506-4073
	2801 West Durango	
	Phoenix, AZ 85009	rbs@mail.maricopa.gov
Don Rerick	Flood Control District of Maricopa County	
	2801 West Durango	
	Phoenix, AZ 85009	
John Palmieri	Flood Control District of Maricopa County	
	2801 West Durango	
	Phoenix, AZ 85009	

SiteTek
Value Engineering

Value Engineering
 Conference

30% Design
 Phase

**Durango Regional
 Conveyance Channel &
 Detention Basins**

*Flood Control District
 of Maricopa County
 in cooperation with
 City of Phoenix*

"Value Strategies for the Built Environment"

SiteTek
Value Engineering



THERE'S AN
easier way
 TO FIND
 cost savings

"Value Strategies for the Built Environment"

SiteTek
Value Engineering

"The Value
 Engineering Process"

- ◆ *What is it?*
- ◆ *History of VE & SAVE*
- ◆ *Why use it?*
- ◆ *Who uses it?*
- ◆ *How is it applied?*
- ◆ *Case Studies*

"Value Strategies for the Built Environment"

SiteTek
ESTABLISHED 1977

What is it?

The systematic application of recognized techniques which:

- ◆ Identifies the functions of the project, product or service
- ◆ Establishes the worth of those functions
- ◆ Provides the necessary functions to meet the required performance at the lowest overall (life-cycle) cost.

"Value Strategies for the Built Environment"

SiteTek
ESTABLISHED 1977

Brief History:

- ◆ Began at GE early 1940's
- ◆ Lawrence D. Miles
"Father of Value Engineering"
- ◆ US Navy - 1964
- ◆ Society of American Value Engineers (SAVE) - 1969
- ◆ SAVE International - 1996
www.value-eng.org



"Value Strategies for the Built Environment"

SiteTek
ESTABLISHED 1977

Reasons for Low Value:

- ◆ Pride
- ◆ Built-In Resistance
- ◆ Lack of Time
- ◆ Habits and Attitudes
- ◆ Standards and Specifications
- ◆ Lack of VE Budget



"Value Strategies for the Built Environment"

SiteTek
ESTABLISHED 1977

**Value Engineering
 vs.
 "Cost Cutting"**

- ◆ **Organized / Systematic Process**
- ◆ **Function Driven**
- ◆ **Team Oriented Workshop**
- ◆ **"The Second Opinion"**
- ◆ **Life Cycle Cost Analysis**
- ◆ **Value Added / Value Enhancement**

"Value Strategies for the Built Environment"

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Why Use It ?

- ◆ **Customer Satisfaction**
- ◆ **Performance Improvement**
- ◆ **Productivity Improvement**
- ◆ **Quality Improvement**
- ◆ **Proven over 50 years**
- ◆ **Functions Achieved**
- ◆ **Results Oriented**

- *Enhanced operation*
- *5 - 15% cost savings*
- *Lower life cycle costs*
- *Increased revenue*

- ◆ **Benefit to cost 20:1**

"Value Strategies for the Built Environment"

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ESTABLISHED 1977

Who Uses It?



Transportation



Manufacturing



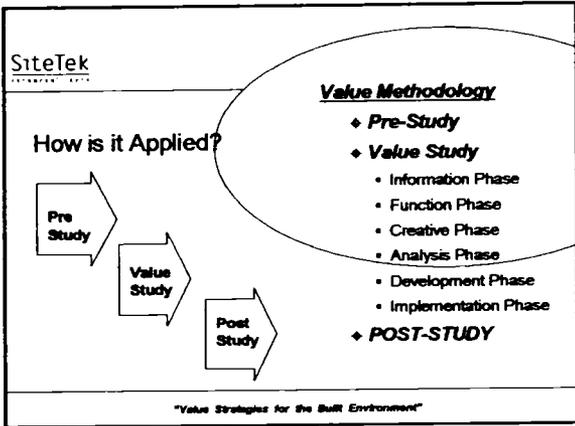
Healthcare

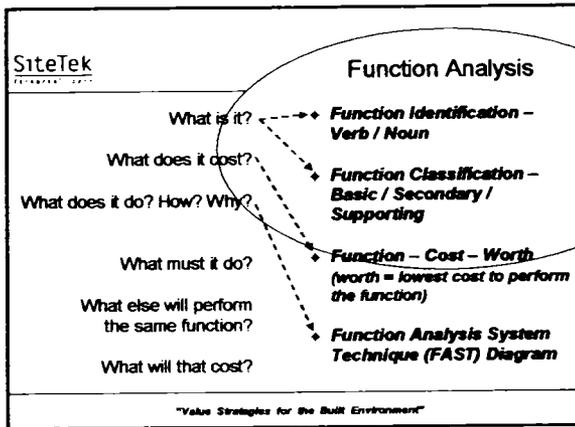


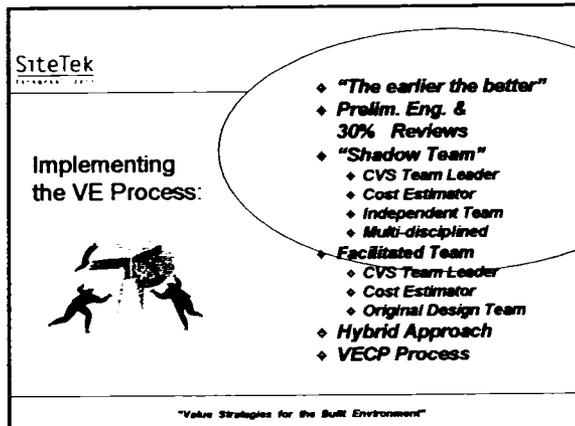
Construction

- ◆ **Federal Government**
 - *OMB Circular A-131*
 - *Public Law 104-106*
 - *BIA, NPS, GSA, FBOP, DOD, FHWA*
- ◆ **State Governments**
 - *Utah*
 - *Washington State Schools*
 - *Virginia*
 - *State DOT's*
- ◆ **Local Government**
 - *Flood Control District of Maricopa County, AZ*
 - *Maricopa County DOT*

"Value Strategies for the Built Environment"







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Case Study #1:

Bethany Home Outfall Channel – Reach A

Incorporation of Multi-use Functions in Flood Control Improvements



Flood Control District of Maricopa County
 \$45 million

"Value Strategies for the Built Environment"

SiteTek
CONSTRUCTION SOFTWARE

Case Study #2:

New River Channel Grand Avenue to Skunk Creek

Peoria, Arizona

- ◆ *30% Design Workshop – 4 Day (Shadow Team)*
- ◆ *Estimate: \$11.3 million*
- ◆ *Recommended Savings: \$ 2.4 million (21.2%)*

"Value Strategies for the Built Environment"

SiteTek
CONSTRUCTION SOFTWARE

Case Study #3:

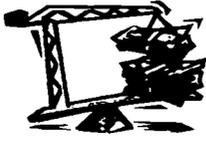
Loop 303 / White Tanks Area Drainage Master Plan

Flood Control District of Maricopa County

- ◆ *Preferred Alternative Workshop – 5-Day*
- ◆ *Estimate: \$400 million*
- ◆ *Recommended Savings: \$ 200.7 million*

"Value Strategies for the Built Environment"

Closing Summary:



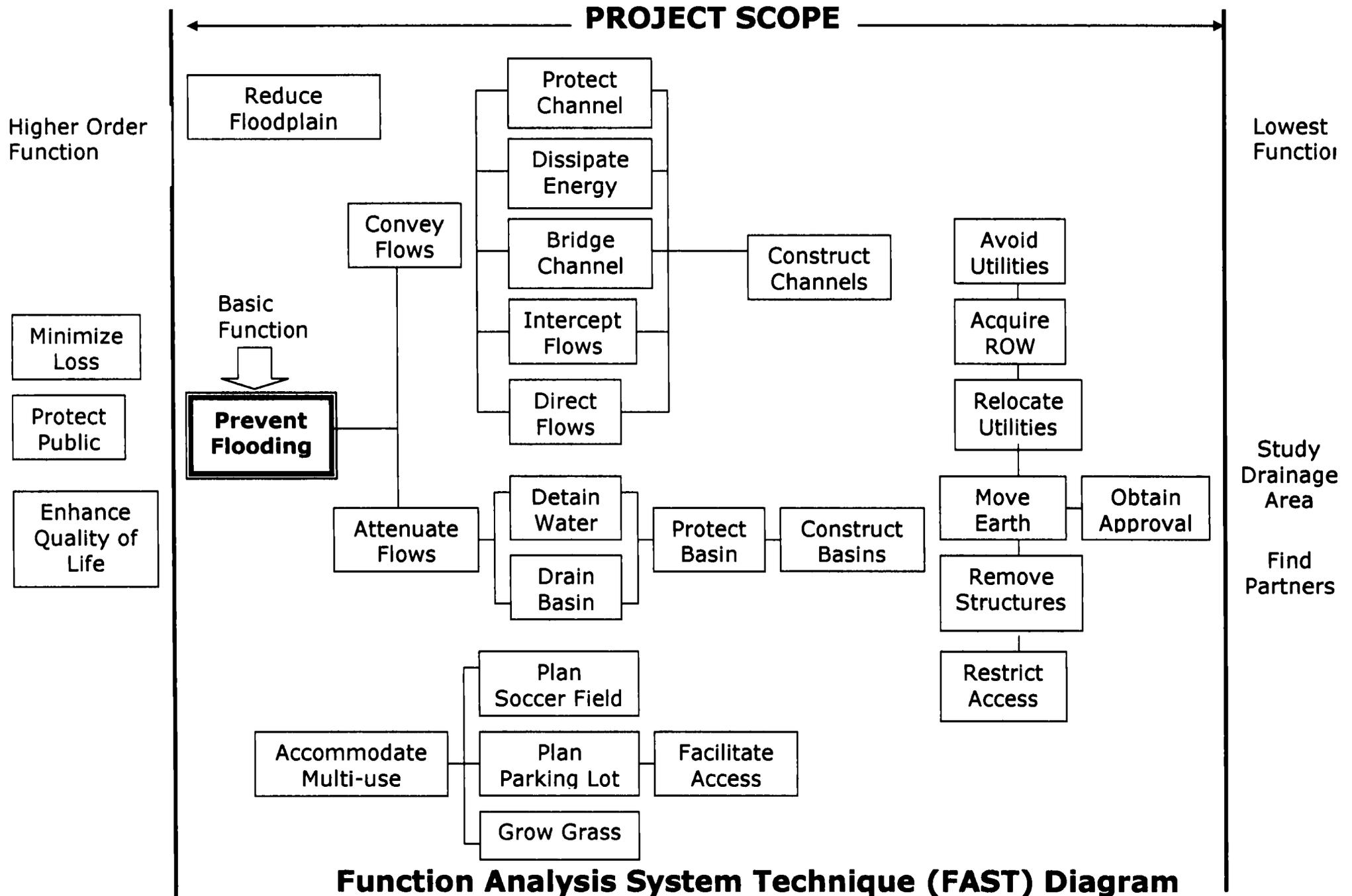
- ◆ *Conduct Early in the Design Process*
- ◆ *Involve All Project Participants*
- ◆ *Goal: Achieve "Best Value"*
- ◆ *Demonstrate Fiscal Responsibility*

"Value Strategies for the Built Environment"

HOW ?

WHY ?

PROJECT SCOPE



Function Analysis System Technique (FAST) Diagram

Durango Regional Conveyance Channel & Detention Basins

Function Cost Model

Durango Regional Conveyance Channel & Detention Basins

