

VEVA Team

## The Team

- q Sam Martin, PE, LCVS, LCVC, Facilitator, SAMI VE LLC
- q Carol Landau, QVT, Acumen VE
  
- q Danny Anderson, Geotechnical, PSI USA
- q Chris Chen, Water Treatment/Intake, AECOM
- q Bob Moran, Electrical, Coupland Moran Eng
- q David C. Rogers, Civil, Rogers Eng Hyd
- q Wayne Yevoli, Mech, Coupland Moran Eng

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SAMI Value Solutions Workshop

## Results of Value Engineering Workshop of Feb 15-19, 2009

### Eastern New Mexico Rural Water System Project

For CH2MHill, Occam Consulting

**DRAFT 1  
2/20/2010**

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SAMI Value Solutions Workshop

## Lead Consultants

CH2M Hill

- q Greg Gates, Project Manager
- q J. Brock McEwen, Water Business Group

Occam Consulting Engineers

- q Clay Koontz, PE, Project Engineer

AECOM

- q Estimating Group
- q Robert Jarnis, treatment process, AECOM

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*SAMI Value Solutions Workshop*

## Objective and Agenda

q Objective: To present the results of the VEVA workshop to identify, assess, and evaluate implementation of economic and effective applications to meet management objectives to generate added value for the ENMRWS project

q Agenda:

1. Background
2. Team activities
3. Summary of Results
4. Issues
5. Proposals
6. Implementation phase – the path forward



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*SAMI Value Solutions Workshop*

*Objectives*

## The Team's Objective/Missions

To identify potential improvements to existing baseline plans and add other alternatives that can add value for the subject project

- 1) Use VEVA review and analyses methods
- 2) Identify alternative VE options and costs for each
- 3) Assist in meeting management goal to meet authorized funding goals
- 4) Identify other opportunities which could add value for the client ("value added")
- 5) Share knowledge and experience
- 6) Meet legal and regulatory requirements



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*SAMI Value Solutions Workshop*

*Results*

## The results:


q Generated about 100 ideas

q Consolidated into about 50 area concepts

q Identified 20 concepts for expected optimum proposal development to generate high returns (priority one)

q Identified another 6 priority two concepts

q Proposing potential cost savings, and "value added" features



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*Qualifications*

## Caveats:

- Effect of each savings is shown for each proposal
  - expectation is that implemented savings will be reallocated to authorized scope or "value added" costs
- Some proposals may be mutually exclusive (e.g., 3 methods proposed, only one being built)



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## The Proposals

Danny Anderson, Geotechnical



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*Proposals*

## 1- Original Intake Structure

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Proposals

## 1- Alternate To Intake Structure

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Proposals

## 1- Alternate To Intake Structure

q Advantages

- § Eliminate Cofferdam To Install Intake Screens
- § Eliminate Wet Well Structure
- § Reduce Amount Of Rock Excavation
- § Reduced Land Disturbance

q Disadvantages

- § Additional Rock Excavation By Tunneling Methods

q Risks

- § Increased Underground Work/Seepage Issues

Amt Involved \$5.04M Pot Savings \$0.75M

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Proposals

## 2- Relocate WTP To Clovis

q Advantages

- § Closer To Major Area Of Demand
- § More Likely To Attract And Retain Qualified Operators
- § Less Isolated/Quicker Response Time
- § Reduce Initial Electrical Costs

q Disadvantages

- § Requires Additional Pipeline/Higher Land Costs

q Risks

- § None Noted

Amt Involved \$55.4M Pot Savings \$0.5M

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*Proposals*

### 3- Build Multiple WTP

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- q Advantages
  - § Closer To Service Areas
  - § More Likely To Attract And Retain Qualified Operators
  - § Reduce Initial Electrical Costs
- q Disadvantages
  - § Increased Costs In O & M/Land Costs/Piping
- q Risks
  - § None Noted

Amt Involved \$55.4M      Pot Savings \$value added



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*Proposals*

### 4- Build smaller intake

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- q Advantages
  - § Lower Initial Cost
  - § Lower O & M Costs
- q Disadvantages
  - § Funding May Not Be Available At A Later Date
- q Risks
  - § None Noted

Amt Involved \$5.4M      Pot Savings \$0.018M



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## The Proposals

Dave Rogers, Civil/Pipeline



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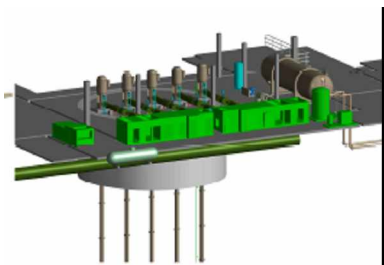
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## 5- Use Fewer VFD's

Proposals



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## 5- Use Fewer VFD's

Proposals

- q Advantages
  - § Lower initial cost
  - § Increased pumping efficiency
  - § Avoid duplication of flow flexibility provided by tanks
  - § Simpler automatic operation based on tank levels
- q Disadvantages
  - § More pump starts/stops
  - § Possibly larger tanks or more water level variation in tanks
- q Risks

Amt Inv: \$7.4 million Pot Savings: \$1.2 million LCC: \$1.2 million+

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## 6- Use Radio Comm System

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*Proposals*

## 6- Use Radio Comm System

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- q Advantages
  - § Lower initial cost
  - § Equipment only at discrete control sites
  - § No threat of cable damage or breaks
  - § Easy upgrade with future technology advancements
- q Disadvantages
  - § Possible voice communication disadvantages
- q Risks

Amt Inv. \$3 million / Pot Savings \$2.7 million / LCC \$2.6 million



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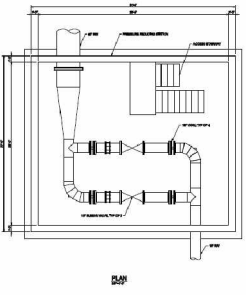
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*Proposals*

## 7- Hydropower generation

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*Proposals*

## 7- Hydropower Generation

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- q Advantages
  - § Net long-term cost savings
  - § Productive use of available energy
  - § Continuous power for WTP if conventional power is lost
- q Disadvantages
  - § Increased initial cost
  - § Increased complexity
- q Risks
  - § None noted

Amt Inv: \$0 million Pot Cost: \$5 million LCC: \$17.4 million



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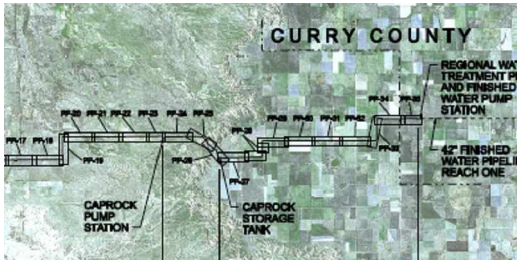
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*Proposals*

## 8- Optimize pipe size and layout

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*Proposals*

## 8- Optimize pipe size and layout

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- q Advantages
  - § Reduce pipe cost
  - § Reduce excess head at pressure reducing station
  - § More efficient piping configuration and component layout
- q Disadvantages
  - § Higher pipe flow velocity
- q Risks
  - § Amt Inv: \$13.1 million Pot Sav: \$1.45 million LCC: \$1.45 million

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*Proposals*

## 9- Use Redundant Vacuum Relief Valves

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Proposals

## 9- Vacuum Relief Valves

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- q Advantages
  - § Increased safety
  - § Reduce chance of expensive damage to pipe and surrounding area
  - § Prevent interruption of service
- q Disadvantages
  - § Slight cost increase
- q Risks
  - §

Amt Inv: \$0    Pot Cost: \$4000    LCC: \$10,000?



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## The Proposals

Chris Chen, Water Treatment/Intake



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Proposals

## 10- Eliminate Upper Intake

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Proposals

## 12- Minimize Building Area

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Proposals

## 12- Minimize Building Area

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- q Advantages
  - § Lower construction cost
  - § Lower associated HVAC cost
- q Disadvantages
  - § Less operational friendly
  - § Potential algae growth on process units
- q Risks
  - § None noted

Amt Involved \$3,365,000 Pot Savings \$2,520,000 LCC \$3,400,000

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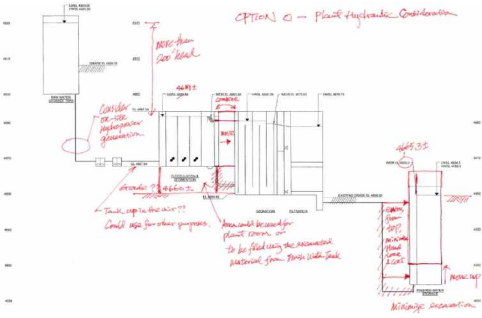
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Proposals

## 13- Optimize Plant Hydraulic

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*Proposals*

## 13- Optimize Plant Hydraulic

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- q Advantages
  - § Preserve hydraulic energy
  - § Minimize operational cost
  - § Minimize excavation cost
- q Disadvantages
  - § None noted
- q Risks
  - § None noted

Amt Involved \$1,000,000 Pot Savings \$210,000 LCC \$297,000



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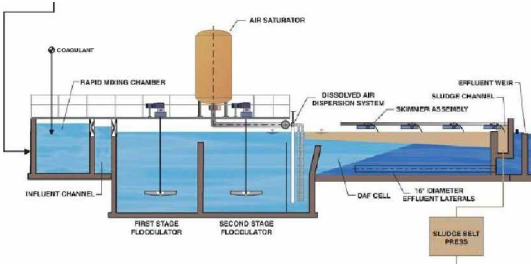
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*Proposals*

## 14- Apply DAF Treatment Process

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*Proposals*

## 14- Apply DAF Treatment Process

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- q Advantages
  - § About the same footprint of high rate clarification
  - § No sludge thickener
  - § Better taste and odor removal
- q Disadvantages
  - § More process equipment cost
- q Risks
  - § Not yet confirmed by bench/pilot testing

Amt Involved \$614,000 Pot Savings \$307,000 LCC \$332,000



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Proposals

## 15- Conduct Confirmation Studies

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- q Advantages
  - § Minimize process failure
  - § Optimize process design to save cost
- q Disadvantages
  - § Higher initial design phase cost
  - § Longer duration for design
- q Risks
  - § None noted

Amt Involved \$0 Pot Savings \$unknown Imp (\$50,000 to study)



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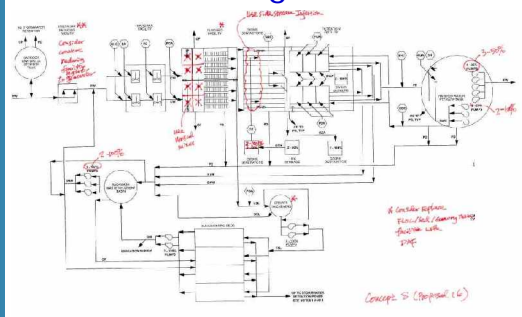
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Proposals

## 16- Process Design Modifications

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Proposals

## 16- Process Design Modifications

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- q Advantages
  - § Minimize cost of construction
  - § Minimize O&M requirements
- q Disadvantages
  - § None noted
- q Risks
  - § None noted

Amt Involved \$undet Pot Savings \$544,000 LCC \$715,000



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Proposals

## 23- Reduce PS Building Footprint

Final Note

No Building Footprint

Sketch - AF-23-1

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Proposals

## 23- Reduce PS Building Footprint

AF-23-2

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Proposals

## 23- Reduce PS Building Footprint

- q Advantages
  - § Lower construction cost
  - § Lower associated HVAC cost
- q Disadvantages
  - § Less aesthetics pleasing
  - § Less operational friendly
- q Risks
  - § Potential damage from vandalism

Amt Involved \$1,530,000 Pot Savings \$459,000 LCC \$649,000

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The Proposals

Wayne Yevoli, Mechanical

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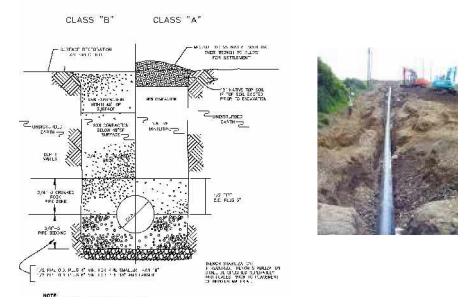
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17- Optimize pipe cover

Proposals



CLASS "B" CLASS "A"

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17- Optimize pipe cover

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- q Advantages
  - § Reduce costs
  - § Trench safety
- q Disadvantages
  - § Not a Bureau of Reclamation preference
- q Risks
  - § Damage by vehicles

Amt Involved \$ 201,000,000 Pot. Savings \$3,000,000

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*Proposals*

## 18-Storage Tank Material



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*Proposals*

## 18-Storage Tank Material

- q Advantages
  - § Reduce costs
  - § Material availability
  - § Reduce foundation size
- q Disadvantages
  - § Maintenance increase with steel tank
  - § May require second tank if steel tank utilized.
- q Risks
  - § None identified

Amt Involved \$ 850,000 Pot Savings \$250,000

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*Proposals*

## 19- Optimize HVAC



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Proposals

## 19- Optimize HVAC

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- q Advantages
  - § Reduce initial costs
  - § Reduce operational complexity
  - § Reduce maintenance
- q Disadvantages
  - § Reduce comfort levels
  - § Shorter equipment life span
- q Risks
  - § none identified

Amt Involved \$ 162,750 Pot. Savings \$93,000 LCC \$130,000



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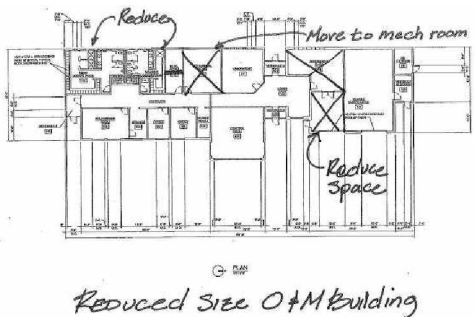
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Proposals

## 20-Reduce O & M Building

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Reduced Size O & M Building



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Proposals

## 20-Reduce O & M Building

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- q Advantages
  - § Reduce initial costs
  - § Reduce operations & maintenance cost
- q Disadvantages
  - § Less pleasant working environment
- q Risks
  - § Future expansion may be limited

Amt Involved \$ 697,500 Pot Savings \$112,500



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*Proposals*

## 22- Minimize Paving

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- q Advantages
  - § Reduce costs
  - § Materials availability
  - § Simpler maintenance and construction
- q Disadvantages
  - § Limited close to building dust control
  - § Need pad for crane control
- q Risks
  - Am't Involved \$113,000    Pot Savings \$113,000    LCC Undetermined

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## Other Concepts for Consideration (OCFC)

Bob Moran, Electrical

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## Example –OCFC -Generator

- q Concept K
  - Allow some utility during power outage
  - § Benefits
    - Better plant functions during power outages
  - § Disadvantages
    - None noted

“Other Concepts for Further Consideration”

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OCFC

**Other concepts for further consideration**

- q Defined as worthy of consideration but not fully developed by team due to time, simplicity, or other issues
  - § About 10 are suggested
  - § Please review written report for more details

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**Summary**

Sam Martin

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*Summary of cost issues*

**Total Savings**

- q Maximum potential identified at this time is:
  - § Total amount involved \$301 million.
  - § \$19.7 million total estimated overall maximum savings
  - § Many value added features identified
  - § \$33.4 million long term life cycle reductions, operations \$13.8 million savings

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Report

## Presentation ("Draft") Report

- q Supporting features in report
  - § Briefing attendance logs
  - § Consultation logs
  - § Documents logs
  - § Economic analyses
  - § Telephone and other records
  - § Other activity logs

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Making it all work

## The path forward

- q Consider the team's recommendations and determine the areas that warrant further action in the interest of all involved
  - § Provide feedback to Clay Koontz, Occam Consulting Engineers, 505-275-0022, CKoontz@occamconsultinggroup.com (SAMI's vereporting.com options will also be available)
- q Engineering, production, and others will develop, with others input, an implementation plan to ensure all achieve the proposed results

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Thanks

## Questions?

- q May we have your questions please

No	Conception	Presenter	amt	savings	lcc
1	B	Use Lake pump intake station	Danny	5,040,000	750,000
2	F	Relocate WTP to Clovis	Danny	55,400,000	500,000
3	G	Relocate WTP to multiple sites	Danny	55,400,000	500,000
4	AL	Size intake pipe for 28MGD	Danny	5,040,000	18,000
5	AD	VFD reduce number	Dave	7,400,000	1,200,000
6	AH	Use radio SICADA	Dave	3,000,000	2,700,000
7	L	Use hydro power generator at WTP	Dave	5,000,000	17,400,000
8	AB	Optional pipe layout and size	Dave	13,100,000	1,450,000
9	Y	Add redundant vacuum relief valves	Dave	4,000	4,000
10	C	Eliminate sapper intake (2 to 1)	Chris	198,000	100,000
11	D	Use top equal size intake tunnels	Chris	505,000	103,000
12	M	Minimize building cover	Chris	3,368,000	2,520,000
13	O	Adjust treatment plant hydraulics	Chris	1,000,000	210,000
14	W	Use alt tx process	Chris	614,000	307,000
15	X	Conduct addition bench scale studies	Chris	-	-
16	S	Process unit improvements	Chris	-	544,000
17	AA	Reduce pipe cover from 5' to 4'	Wayne	201,150,000	3,000,000
18	AC	Storage tank materials	Wayne	850,000	250,000
19	J	Optimize H/VAC units	Wayne	162,750	93,000
20	N	Smaller M&O space	Wayne	697,500	112,500
21	P,Q	Alternate materials	Wayne	2,400,000	250,000
22	AE	paving vs not paved	Wayne	112,500	112,500
23	AF	size building	Chris	1,530,000	459,000
		OCCF	Bob	-	-
				301,828,750	19,683,000
					33,441,000
					op savings 13,756,000

\* Amount shown is earth only. Savings of risers, access, etc are not computed. Expect much higher savings than amount shown upon further analysis. Data not found during study to compute.  
\*\* Significant life cycle savings not computed due to time available to value study team.

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*Thanks*

## Report clarifications feedback

- q COB next Monday (2/22/2010)
- q Response and final report within 5-10 business days after that point
  
- q [vereporting.com/reports/gov/enmrws/](http://vereporting.com/reports/gov/enmrws/)



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