

**TECHNICAL INTERCHANGE MEETING NO. 5
MEETING MINUTES AND RESPONSE TO STATUS OF ACTION ITEMS
FOR WATER AND WASTEWATER EVALUATION AND WATER SYSTEM
REHABILITATION AT
CAMP STANLEY STORAGE ACTIVITY, TEXAS
FA8903-04-D-8675/DELIVERY ORDER 0022
PARSONS 745006-01000**

Date: Wednesday, 20 June 2007

Time: 2:30 pm – 4:30 pm.

Place: Camp Stanley Storage Activity (CSSA)

Subject: Progress Meeting to review draft comments on the latest version of the IWP and draft drawings and specifications and to discuss other topics relevant to the subject task order.

Attendees:

Attendee	Organization	Phone
Glaré Sanchez	CSSA ENV	(210) 698-5208
Tom Tijerina	CSSA Facilities Engineering	(210) 336-2372
Kent Rohlof	AFCEE	(210) 536-2543
Brian Vanderglas	Parsons	(512) 719-6059
Kyle Caskey	Parsons	(210) 204-8529
Henry Dress	Parsons	(512) 719-6063

*Minutes prepared by Henry Dress and Brian Vanderglas, Parsons

Meeting Objectives

The meeting was started by discussing the meeting objectives. The objectives were stated as follows:

- (1) Discuss review of comments on the IWP, draft drawings and specifications submitted to CSSA and AFCEE on May 25, 2007,
- (2) Discuss disinfection change request/draft transmittal letter,
- (3) Discuss budget status, implementation sequence/prioritization and schedule.
- (4) Discuss other appropriate topics pertaining to the project such as CATEX, Well 9 rehab, SWPP Plan, and SCADA components.

Parsons received a list of comments from Tom Tijerina by e-mail dated June 8, 2007. These comments were reviewed.

Tom Tijerina Review Comments and discussion:

Parsons acknowledged Mr. Tijerina's first two comments on hydropneumatic tank systems in the residential quarters area and the need to work with CSSA if contractor will need to mobilize a construction trailer on post.

3. Reusing valves can be risky and also be difficult to rework. Contractor can not bid the project with accuracy if they don't know if a new valve is required..
 - *CSSA indicated that they are willing to take a risk by reusing a small number of new valves, although Tom Tijerina recognizes that warranty issues could be a problem since the reused valves will not be warranted. CSSA indicated that if there are concerns raised by construction contractor, then it would be acceptable to specify only new valves.*
4. Parsons indicated its understanding that CSSA Environmental needs to prepare the manifest forms if waste (such as asbestos pipe) has to be managed for off-post disposal.
5. CSSA indicated that Mueller Brand hydrants are used throughout the facility and would like to specify the same hydrant make and model to simplify their maintenance.
 - *Parsons agrees with this comment and will specify "Mueller and no substitutions" for hydrants, and other appurtenances such as saddles, and check, gate and post indicator valves.*
6. CSSA inquired about how Parsons intends to manage the Asbestos containing material (ACM) removal/incentive.
 - *Parsons indicated that the incentive will be removed, and that the specification will be rewritten to pull out all of the ACM for management and disposal with other debris from the identified trenches. CSSA agrees with this approach.*

Parsons acknowledged the comments provided on shoring and bracing (#7), on normal working hours (#10), condition of the pipe (#12), storage of materials (#13), and CSSA statement on providing transformer, if available (#14), and will make changes to specification of statements of work, as appropriate.

8. CSSA noted that compaction of structural base over the water line is the best way to minimize settling, particularly at roadways, and wanted additional notes added to the specification describing the method or standard of compaction. Tom Tijerina also indicated that 6" asphalt is only required at roadway crossing.
 - *There was considerable discussion on backfill and testing during the meeting. Kent Rohlof suggested that backfill compaction only needs to be tested under roads, while every other place, it could be backfilled with native soil with*

mounding. Additional consideration discussed was the use of flowable fill. CSSA agreed to consider flowable fill as an alternative. An Action Item was created for Henry Dress to resubmit the trench cross-section drawings (2 pages) and backfill specification for Tom Tijerina to review.

11. Due to existence of buried utilities, CSSA wanted to ensure that the contractor will be equipped with a detector to located buried utilities, and requested a statement requiring the contractor to use such a detector, and to check the path of the excavation before digging.

- *This comment created discussion related to CSSA buried utilities, and one of the biggest concerns is the detection and location of fiber, which was installed without any "tracer" wires. Kyle Caskey explained how the digging permit process was implemented on the SCADA project, and CSSA requested that we implement the same process for the waterline construction. Mr. Caskey indicated that he would work to obtain the digging permits at least 2-3 weeks ahead of the excavation efforts.*

15. CSSA noted that requiring geotechnical testing for all backfilled areas is expensive and may not be necessary.

- *Parsons agrees with this comment, and will revise the specification for backfill which includes testing frequency, and will resubmit it to CSSA for re-review (see item 8).*

16. A new warehouse building is in the planning stages on the East site of W-96. The line shown on Drawing Segment A will need to be relocated..

- *Henry Dress had revised a drawing based on conversations with CSSA staff prior to the meeting and he showed the revised line location to meeting attendees, who concurred with its new orientation. Kent Roholf noted that where the waterline crosses the sanitary line, he believes there are some requirements that need to be met, possibly even up to 9 feet of concrete lining. Parsons will look into this requirement and revise the design as appropriate.*

17. The drawings need to show buried communications (copper & fiber) lines even if it is only representational.

- *Parsons understands the sensitivity associated with the locations of the buried fiber and copper lines. Parsons will provide Chris Beal with a final shape file of the system so Chris can add to these drawings the areas where potential copper and fiber interferences are located.*

18. For Segment E, CSSA requested that a storm water culvert should be installed across the road during the waterline construction.

- *Parsons indicated that adding the storm water culvert would be a deviation from the task order's primary objective, and might possibly take funds away that are needed for waterline construction activities. Mr. Tijerina acknowledged the issue and does not want to add it at this time, unless it appears that there are sufficient funds to cover the costs.*

The focus of the discussion then moved on to specific drawings of line segments. Of note, Mr. Tijerina needs to provide a drawing of Segment J to the USACE because of their planned design of a new Armory Building. Parsons will update the Segment J figure shape file and send it to Chris Beal at CSSA.

A discussion of the excess excavated soils from the waterline construction was discussed, and CSSA suggested that the excess soils be moved to the East Pasture on the back side of the berm. Tom Tijerina indicated that the berm is the only location that he could approve for those materials at the moment, but that other locations may be considered on a location specific basis.

The height of manhole rings was discussed. Mr. Dress indicated that they are currently specified at 2" rise. Mr. Caskey indicated that CSSA maintenance staff have noted a preference for higher (about 1 foot above grade) to make them visible to maintenance personnel so mowers do not run into and damage manholes. Parsons will discuss this matter with Joe Ovalle when he returns and update the specifications if necessary.

Glaré Sanchez Verbal Comments (made during this meeting)

1. Glaré Sanchez requested that Figure 3.5 needs to be revised to provide more explanation in the legend to differentiate new pipe, etc. .She also requested that linear footage estimates be included on both the existing and proposed waterline scenario figures.

- *Parsons concurs and will update the figure as requested.*

2. Ms. Sanchez noted that there were some inconsistencies between Table 3.3 and the referenced locations or segment IDs in the text or table. More clarity and a better understanding of what these model output numbers actually mean are needed in the IWP.

- *Parsons recognizes the inconsistencies applied to the various hydrants and pressure monitoring and modeling locations. One of the problems was that there was never any location IDs assigned to any of the hydrants. The solution discussed to resolve this was to create a map that shows all of the hydrants located in the CSSA waterline system and assign a location ID for each one. Those IDs can then be used to display flow rates and residual pressures at each hydrant under both existing and proposed scenarios. The associated text and figures in the IWP will be revised to discuss the updated figures and model runs.*

3. In addition to the model results from the hydrants, CSSA also requested that Parsons update the water age model run figure for both the existing and proposed configurations.

- *Parsons indicated that the water age figure provided in the IWP was generated from a previous version of the model that was not fully calibrated, and would attempt to rerun the water age using the final fully calibrated models for inclusion into the IWP.*

4. CSSA and AFCEE wanted assurances from Parsons that after Parsons is done with the rehabilitation construction, that a technical construction report (with as-built drawings) will be prepared for the entire system and not just the piece that Parsons is constructing. For instance, Parsons has 19 new hydrants currently planned for installation on this project, but CSSA wants the final report to show all hydrants that are operational.

- *The IWP provides an engineering report of the entire existing water system, and the construction activities planned to rehabilitate the waterlines. A final technical report will be prepared after the construction is complete, and that report can include final model runs to include any additional changes (such as new buildings, new hydrants, etc.) made to the waterline during the project construction.*

Disinfection (Tablet System) status and draft Submittal Letter

Parsons indicated that PPG met with TCEQ on May 8, 2007 and that TCEQ had acknowledged PPG's tablet disinfection systems might actually be acceptable for use in potable water supply systems in the State of Texas. However, they requested that PPG conduct a pilot study at one of their proposed locations to demonstrate its performance before they will approve any system for use. PPG intends to conduct this test at one of their proposed systems for the City of El Paso. The duration of this study, and the time until a determination is made by TCEQ was unknown at the time of the meeting.

A draft response letter to the disinfection rejection letter received from TCEQ was prepared and distributed to the meeting attendees for review. The letter is intended to be a transmittal letter of the IWP with drawings and specifications to TCEQ stating CSSA's request for TCEQ's determination that the changes described in the IWP do not constitute a significant change, but also requesting reconsideration of switching disinfection to the tablet chlorination. Ms. Sanchez indicated that she would review the draft letter and provide her markups/comments to Parsons once the IWP and drawings are finalized and ready for submittal to TCEQ in July.

Budget Status and Cost Comparisons

A PowerPoint slide depicted the original budget for TO-22 and the status to date. Although all tasks (by WBS) are within budget, the subtask to rehabilitate Wells 9 and 10 significantly exceeded the originally proposed budget. Also of note was the expenditures to date for IWP and requirements development are significantly higher than the original budget, although that is mostly offset by lower costs associated with the existing system evaluation/reporting.

Parsons prepared an estimate to complete (EAC) cost estimate for the proposed design based on subcontract unit rates from the September 2005 proposal submitted to AFCEE. Although this estimate suggests that there may be sufficient funds to complete construction of the entire design included in the IWP, Parsons cautioned

that the unit EAC numbers did not include an escalation factor or other miscellaneous items such as rock cutting, asphalt patching, debris disposal, and analytical costs.

Once the IWP for the water system is finalized and the drawings and specifications are approved by CSSA and the TCEQ, a Request for Proposal can be issued to selected subcontractors. After obtaining “actual” subcontractor bids, an assessment can be made on whether the entire project can be constructed, or if various lower priority segments need to be removed from the construction scope.

Parsons presented the recommended construction bid format for discussion. CSSA and AFCEE agreed with the approach to break down the bid into multiple fixed price bid items (68 in version presented in IWP). For instance, waterline removal will be estimated by linear footage while waterline installation will be estimated by linear footage of various pipe diameters. Items such as valves, Megalugs mechanical joint restraints, etc. will be priced on a per or “each” basis.

Other TO-22 Discussion Topics

The following items were also discussed:

- ⇒ Well CS-9 rehabilitation is finally complete. Parsons will prepare final technical report for submittal to TCEQ on rehabilitation of both Well CS-9 and CS-10.
- ⇒ Parsons will prepare a draft CATEX for the waterline construction project since the expected total disturbed acreage associated with new pipe is less than 5 acres.
- ⇒ Parsons reminded CSSA and AFCEE that the IWP includes items that are not part of the waterline construction efforts planned by Parsons under this task order, such as installation of a new production well and wastewater system repairs.

Follow-up Issues and Action Items

1. Parsons to consider flowable fill as alternative to traditional compaction/testing/repair. Also, AFCEE and CSSA requested Parsons reconsider testing backfill compaction in areas where waterline does not cross road or go under pavement, instead opting to backfill with native soil mounding to allow for settling. ***ACTION:** Parsons considers flowable fill a viable technical alternative to standard backfill, compaction and testing for road crossings, but this is believed to be a much more expensive alternative considering the number of road crossings. Therefore, the design does not include flowable fill, however, the Subcontractor may propose it as an alternative and if cost-effective, it is acceptable.*

2. Henry Dress to resubmit trench crossing design to Tom Tijerina for review (2 pages). Henry will also run final specification for backfill by Mr. Tijerina for re-review. ***ACTION:** Revised trench cross-sections were emailed on 6-27-07 to Tom Tijerina for review. His comments were received on 6-28-07. The backfill and compaction specification was modified based on Mr. Tijerina’s 6-28-07 comments and forwarded to him on 6-28-07 for review. The creek crossing section was modified as requested to eliminate the gravel bedding and instead show complete encasement of the pipe in concrete.*

Mr. Tijerina also asked whether a TCEQ requirement that pipes under flowing or intermittent creeks be installed with watertight encasements and isolation valves was a requirement for CSSA on this project. The regulation does specify these requirements, however, it also allows for a variance by the Agency at its discretion. CSSA has never installed creek crossings meeting this regulatory requirement and has not reported problems with leakage at crossings. Several paragraphs in the IWP discuss this requirement, explain the CSSA crossings as designed and request a variance from the double pipe encasement and isolation valves requirement. If the TCEQ agrees, then the requirement can be omitted. If the TCEQ disagrees, the creek crossing design will have to be modified to include double pipe encasement and isolation valves at all creek crossings.

3. Parsons to check into whether 9' concrete lining needed where waterline crosses over sanitary line, per AFCEE comment.

***ACTION:** The design complies with the separation requirements of TCEQ Regulation Chapter 290 Public Drinking Water and the International Plumbing Code, 2006, for new potable water lines and existing non-pressurized wastewater lines. Neither has a requirement for a concrete lining to separate the lines when there is less than the required 9' minimum horizontal separation. The requirements are to inspect the wastewater piping for leakage, to center a new pipe section at the crossing so the joints are a maximum distance from the crossing and to maintain a minimum vertical separation.*

4. Parsons to send shape file to Chris Beal of waterline locations so Chris can add notations where copper and fiber are likely to be encountered.

***ACTION:** Garner Peterson will send the proposed final alignment shapefile to Chris Beal so locations of copper and fiber interferences can be identified and returned to Parsons for inclusion on the design drawings to be issued for bid to construction contractors.*

5. Tom Tijerina requested a final copy of drawing of Segment J (new armory bldg) so he can send it to USACE as they work up their design. Parsons to update Segment J shape file and send to Chris Beal.

***ACTION:** The design drawing was emailed to Chris Beal on 7-19-07. The shapefile of the latest alignments will be emailed by Garner Peterson.*

6. Parsons to ask Joe Ovalle about manhole preference related to height.

***ACTION:** Joe Ovalle requested the elevations of manholes and valve vaults (top of concrete) to be flush with finished grade. The design drawings have been revised to reflect this requirement.*

7. Chris Beal requested that Parsons send a shape file showing all hydrant locations.

***ACTION:** The shapefile of the fire hydrant locations for the proposed rehabilitated system will be emailed to Chris Beal by Garner Peterson.*

8. Parsons to look into Table 3.3 and appendix with model outputs to see if the information can be presented more clearly and consistently in the IWP. .

ACTION: In progress, waiting for fire hydrant results to finalize this response.

9. CSSA requested that Parsons re-run the water age for existing and future based on final modeled output. They would also like a copy of all model files sent to AFCEE and CSSA on disk.

ACTION: Rerunning the water age models for the existing and proposed rehabilitated systems will require more man-hours than expected. If funds remain at the end of the project, water age can be rerun and included in the final technical report.. All final model files will be provided to CSSA and AFCEE on CD or DVD.

TIM #4 FOLLOW-UP ISSUES AND ACTION ITEMS

- Parsons will proceed with completing the rehabilitation of Well CS-9. *All well rehabilitation activities are complete.*
- Parsons will proceed with preparation of a CATEX and a construction storm water pollution prevention plan for the project. *SWPP Plan included in IWP. Draft CATEX due to CSSA in July 2007.*
- The IWP will be finalized the plan and profile drawings will include all of the latest proposed piping including optional Segments G and I. These drawings will be issued as part of the final IWP to CSSA for review and approval prior to issuing them for bid. *Submitted on May 25, 2007.*
- The testing specification will be written to instruct the Subcontractor to strive to conserve water, to use the chlorine water for hydrostatic testing and to dechlorinate all chlorine water released to the ground surface from testing activities. *Included in IWP.*
- Parsons will contact TCEQ to arrange meetings with the appropriate group to discuss the various issues of concern. *This meeting was held on April 5, 2007 at TCEQ- Austin offices with Theresa Rodgers and David Laughlin.*

TIM #3 FOLLOW-UP ISSUES AND ACTION ITEMS

- All actions items from TIM #3 have been completed.



DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, RRAD
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

*Agenda for TIM#5
Implementation Work Plan, Drawings, and Specifications
Comments and Review Progress at CSSA
Water & Wastewater System Evaluation and Water System Rehabilitation
CDRL B006
AFCEE WERC, Task Order 22*

Time: Wednesday, June 20, 2007; 9:00 am to 11:30 am

Place: Camp Stanley Storage Activity, Boerne, Texas, Environmental Office

Proposed Order of Discussion

Date & Time	Topic
09:00 pm– 09:15 am	Meeting Objectives Discuss review of IWP, Drawings, & Specs (May 25, 2007 submittal) Discuss disinfection status and draft TCEQ transmittal letter Discuss budget status & implementation sequence (prioritization) Determine other topics (Well 9 rehab, CATEX, SWPPP, SOW, SCADA)
09:15 am – 10:00 am	IWP comments Review changes planned to address CSSA comments Changes related to additional internal engineering review(s) Additional CSSA Comments & Questions
10:00 am – 10:30 am	Disinfection (Tablet System) status and draft TCEQ transmittal letter Impact of PPG meetings with TCEQ, Pilot test requirements? Draft TCEQ transmittal letter (response to rejection letter)
10:30 am – 11:00 am	Budget status and implementation sequence (prioritization) Expended to Date by WBS (Task) Current Cost to Complete Estimates vs Original Cost Basis Recommended Construction Bid Form (Proposed vs Design Comparison)
11:00 am – 11:30 am	Other TO-22 Discussion Topics and Action Items Well 9 Rehabilitation CATEX & SWPP Plan requirements Items included in IWP to be covered by different TOs (WW, new well) SCADA requirements & design needs SOW issues

Task Order No. 0022

Technical Progress Meeting #5

Water and Wastewater System Evaluation and
Water System Rehabilitation at

Camp Stanley Storage Activity
Boerne, TX

June 20, 2007

Project Objectives

- Main objectives of Meeting
 - Discuss review of IWP, Drawings, Specifications (May 25, 2007 submittal)
 - Discuss disinfection change request/draft transmittal letter
 - Provide Overview of Budget Status & Implementation Sequence and Schedule
 - Discuss other appropriate related topics (CATEX, Well 9 rehab, SWPP Plan, SCADA)

IWP & Design Comments/Changes

- Review changes already made or planned to address CSSA comments (see handout)
- Changes made due to internal engineering technical review (see Drawing markups)
- Are there any additional comments to be addressed?

Disinfection (Tablet System) status and Draft Submittal Letter

- Impact of PPG meetings with TCEQ:
 - what did TCEQ decide?
 - what is TCEQ likely to require?
 - where does this leave CSSA?
- Draft transmittal letter (response to TCEQ rejection letter):
 - should it be inclusive of all issues, or only chlorination?
 - any comments on draft letter?

Current Budget Status

Status through May 25, 2007

WBS	Task Description	Budget	Spent to Date
90	TO Mgmt (58% complete)	\$71k	\$46k
01	Meetings (48% complete)	\$46k	\$23k
02	Existing System Evaluation (99.5% complete)	\$282k	\$195k
03	IWP & Requirements Development (95% complete)	\$119k	\$186k
04	Rehab Construction (5.6% complete)	\$2,422k	\$214k
05	Final Reports	\$58k	\$1k
		\$2,998k	\$665k

Cost to Complete Estimate vs Original Cost Basis

Based on subcontract unit rate prices in September 2005 proposal submittal

WBS	Task Description	Budget	EAC
90	TO Mgmt	\$71k	\$71k
01	Meetings	\$46k	\$46k
02	Existing System Evaluation	\$282k	\$198k
03	IWP & Requirements Development	\$119k	\$205k
04	Rehab Construction	\$2,422k	\$2,364k
05	Final Reports	\$58k	\$58k
		\$2,998k	\$2,942k

Funds Remaining to Complete Construction (wbs 04000)

Subcontract costs based on September 2005 pricing

	Budget	EAC	Difference
Labor & Misc ODCs	\$136k	\$188k	-\$52k
Piping, Equip, & Install	\$1,857k	\$1,749k	+\$108k
Well Rehab & New Well	\$108k	\$138k	-\$30k
Misc Construct Support	\$135k	\$186k	-\$51k
Water Testing	\$10k	\$44k	-\$34k
SCADA Components	\$173k	\$57k	+\$116k
			+\$57k

EAC Budget Considerations

- Estimate for subcontract unit rates mostly based on September 2005 and does not include escalation.
- EAC does not include line item for pressure testing, cleaning, and disinfection.
- Could need more quantities than included in estimate for items such as:
 - rock cutting LF
 - asphalt patching (repair)
 - debris disposal
 - analytical costs (compaction & disinfection)
 - labor if construction longer than 4 months

Piping, Equipment and Installation							
Item Description	Quantities		Quantity Difference	Unit of Measure	Estimated Unit Cost \$	Estimated Design Cost \$	Estimated Savings \$
	Proposal	Design					
Mob/Demob	1	1	0	EA	5,000	5,000	0
12" dia. pipe	11,342	6,461	4,881	LF	56	361,816	273,336
10" dia. pipe	0	2,240	-2,240	LF	54	120,960	(120,960)
8" dia. pipe	12,862	14,508	-1,646	LF	45	652,360	(74,070)
6" dia. pipe	200	4,788	-4,588	LF	29	138,852	(133,052)
4" dia. pipe	12,192	3,110	9,082	LF	25	77,750	227,050
2" water service	400	900	-500	LF	20	18,000	(10,000)
12" valve & box	12	15	-3	EA	1,500	22,500	(4,500)
12" service taps	17	5	12	EA	1,500	7,500	18,000
10" valve & box	0	6	-6	EA	1,442	8,654	(8,654)
10" service taps	0	3	-3	EA	1,300	3,900	(3,900)
8" valve & box	12	28	-16	EA	1,200	33,600	(19,200)
8" service taps	17	5	12	EA	1,200	6,000	14,400
6" valve & box	0	16	-16	EA	1,114	17,831	(17,831)
6" service taps	0	5	-5	EA	1,000	5,000	(5,000)
4" valve & box	12	4	8	EA	625	2,500	5,000
4" service taps	16	3	13	EA	500	1,500	6,500
FH assembly	0	19	-19	EA	7,000	133,000	(133,000)
ARV & valve box	0	15	-15	EA	1,550	23,250	(23,250)
RPZ BFP assembly	12	0	12	EA	7,417	0	89,000
Reconnect Service Connections	50	21	29	EA	475	9,975	13,775

Item Description	Quantities		Quantity Difference	Unit of Measure	Estimated Unit Cost \$	Estimated Design Cost \$	Estimated Savings \$
	Proposal	Design					
Commissioning activities, as-built drawings & warranty	1	1	0	LS	6,500	6,500	0
Cut & plug 8" line for abandonment	2	18	-16	EA	400	7,200	(6,400)
Trench shoring & bracing (4' to 6')	0	2,700	-2,700	LF	2	5,400	(5,400)
Trench plugs	0	6	-6	EA	500	3,000	(3,000)
Additional excavation in rock to 4'	2,370	0	2,370	LF	12	0	28,440
Additional conventional excavation & interferences	9,000	0	9,000	LF	2	0	18,000
Temporary service	1	6	-5	LS	2,500	15,000	(12,500)
Erosion controls	2,370	32,000	-29,630	LF	3	96,000	(88,890)
Asphalt repair	1,200	1200	0	SF	6.5	7,800	0
Curb & Gutter Repair	1,000	0	1,000	LF	18	0	18,000
Sidewalk Replacement	300	0	300	SY	36	0	10,800
Debris Disposal	1,000	1,000	0	CY	35	35,000	0
Total						1,935,929	55,856

Water Rehab Quantity Comparison							
SCADA Equipment, Installation & Integration							
Item Description	Quantities		Quantity Difference	Unit of Measure	Estimated Unit Cost	Estimated Design Cost	Estimated Savings
	Proposal	Design			\$	\$	\$
10" Flowmeters	0	1	-1	EA	5,591	5,591	(5,591)
8" Flowmeters	2	0	2	EA	6,000	0	12,000
6" Flowmeters	0	3	-3	EA	4,805	14,415	(14,415)
3" Flowmeters	0	1	-1	EA	4,371	4,371	(4,371)
2" Flowmeters	2	0	2	EA	6,000	0	12,000
Chlorine Analyzers	0	2	-2	EA	3,044	6,089	(6,089)
Supply well automation	1	0	1	LS	22,500	0	22,500
Supply well chlorination	1	0	1	LS	9,000	0	9,000
Solar Panels	2	0	2	EA	2,500	0	5,000
Wireless RTUs & Radios	4	0	4	EA	12,000	0	48,000
Pressure Sensors	4	0	4	EA	2400	0	9,600
Integration	20	7	13	LS	2000	14,000	26,000
O&M manuals	1	1	0	LS	3000	3,000	0
Training	1	1	0	LS	3000	3000	0
Total						53,494	120,452

Analytical Costs							
Item Description	Quantities		Quantity Difference	Unit of Measure	Estimated Unit Cost	Estimated Design Cost	Estimated Savings
	Proposal	Design			\$	\$	\$
Compaction	0	100	-100	DAY	359	35,900	(35,900)
Heterotrophic Plate Count (HPC)	0	60	-60	EA	30	1,800	(1,800)
Coliform Bacteria Test	0	60	-60	EA	30	1,800	(1,800)
Chlorine Residual	0	120	-120	EA	0	0	0
Water VOCs (SW8260)	8	0	8	EA	90	0	720
Soil VOCs	2	0	2	EA	90	0	180
TCLPs	0	0	0	EA		0	0
Drinking Water Parameters	2	0	2	EA	4000	0	8,000
Total						41,870	(32,436)

Recommended Construction Bid Format

- Broken down into 68 different Bid Items
- Waterline removal, estimated 15,000 LF by LF unit rate.
- Waterline Installation includes pipe, excavation, bedding, and backfill by pipe diameter (1.5", 2", 3", 4", 6", 8", 10", and 12" diamters) by LF.
- Items such as valves, Megalug mechanical joint restraints, etc by EACH.
- Possible variable items by LF, such as trenching 1-4 feet in rock, shoring
- Other items (see handout).

Other TO-22 Discussion Topics

- Well CS-9 Rehabilitation
- CATEX and SWPP Plan requirements.
- SCADA component design
- Items included in IWP covered by other contracts
- Other items (SOW)