CITY OF LOMPOC
DEPARTMENT OF UTILITIES
CALIFORNIA

Consultant Services Agreement
With
Lewis & Zimmerman Associates, Inc.

AGREEMENT NUMBER: _____

TITLE OF AGREEMENT: Value Engineering Services for the LRWRP Plant Upgrade Project Design

THIS AGREEMENT for Consultant Services is entered into on August 2, 2005, by and between the **City of Lompoc** a California municipal corporation, hereinafter called the "CITY" and **Lewis & Zimmerman Associates, Inc.,** hereinafter called the "CONSULTANT."

W I T N E S E T H :

WHEREAS, CITY desires to secure necessary Professional Consulting services relating to Value Engineering Services for the Lompoc Regional Wastewater Reclamation Plant Upgrade Project (herein called the “Project”) in accordance with the terms of this Agreement, and

WHEREAS, CONSULTANT represents that it is willing and able to provide such services,

NOW, THEREFORE, for good and valuable consideration CITY and CONSULTANT mutually agree as follows:

1. **CITY CONTRACT WITH CONSULTANT.** CITY hereby engages with CONSULTANT and CONSULTANT agrees to perform the following services described herein and in Exhibit “A,” "Proposal," and pay CONSULTANT in the manner and amounts set forth herein and in Exhibit “B,” "Fee Proposal."

2. **DESIGNATED REPRESENTATIVE.** Susan Halpin, Wastewater Superintendent, (805) 875-8405 (voice), (805) 875-8325 (fax), shalpin@ci.lompoc.ca.us is the representative of CITY and will administer this Agreement for and on behalf of CITY. David Hamilton, VE Team Leader, (253) 925-8741 (voice), (253) 925-8791 (fax) is the authorized representative for CONSULTANT. Changes in designated representative shall be made only after Official Notice to the other party.

Exhibit "A" – Proposal

CITY OF LOMPOC
WASTEWATER DIVISION
Lompoc, California

Lompoc Regional Wastewater Reclamation Plant Upgrade Project
Value Engineering Services Proposal

July 7, 2005

Lewis & Zimmerman Associates, Inc.
Taking the Chance out of Change
5216 Ridge Drive, NE
Tacoma, Washington 98422-1535
253.925.8741 • Fax: 253.925.8791
dahamilton@lza.com • www.lza.com

July 7, 2005

Ms. Susan L. Halpin
Wastewater Division Superintendent
City of Lompoc
City Hall
100 Civic Center Plaza
Lompoc, California 93438-8001

re: Lompoc Regional Wastewater Reclamation Plant (LRWRP) Upgrade Project
Value Engineering Study Proposal

Dear Ms. Halpin:

Lewis & Zimmerman Associates (LZA) is please to submit this proposal to provide value engineering (VE) services to the City of Lompoc for the upgrade of your wastewater treatment plant. For this assignment we have joined with Boyle Engineering to provide us with knowledgeable and experienced engineers to assess the current project documents. Each team member has more than 20 years experience in wastewater treatment plant design, renovation, and construction management. The Boyle team is well versed in the issues relating to the Lompoc Regional Wastewater Reclamation Plant, having competed for design of the project approximately one year ago.

LZA is a 23-year-old consulting firm that specializes in value engineering and its related practices. We have seven Certified Value Specialists (CVS) on our staff and have led more than 3,000 VE studies, approximately half of which have been performed on water and wastewater treatment, storage, and conveyance facilities.

The LZA/Boyle team is aware of the critical issues that affect capital outlays and long-term operating costs for large wastewater treatment plants and have identified several of the key issues that will be reviewed by the team during the VE study on your plant.

- **Foundation requirements.** The geotech report identifies liquefaction as a hazard. As a result, the cost of structures may increase by 10 or 20 percent. Are there alternative plant layouts where soil problems are not as problematic? If not, what are the best alternatives for reducing the liquefaction potential while minimizing costs? What level of risk is acceptable?

- **Sludge handling facilities.** Cost saving opportunities may exist. Lagoons as well as digesters and drying beds are planned.

- **Process.** Is submerged aeration to be used? This could provide the best long-term value. Is the process robust enough for future NPDES regulations? How sensitive is it to changes in costs for energy and chemicals? A cost sensitivity analysis may be useful as part of the VE analysis.

- **Effluent facilities.** Are there alternative disposal options where no NPDES permit is needed? Such options are being implemented in other Southern California basins.

- **Plant Design.** Will the plant be reliable and easy to operate? How will equipment be installed, replaced and overhauled?

- **Controls and Instrumentation.** Will the design include provisions (cables and conduits) for the next generation of equipment? Is the plant infrastructure designed to accommodate additions and modifications? Will the proposed instrumentation and communication systems adequately operate the system and protect critical equipment from damage?

- **Construction phasing.** How will plant operations be maintained in compliance with permits, as the upgrades are constructed? What are the risks? How can they be mitigated? How can the phasing be accomplished with less effort, disruption, and costs?

- **Risk Analysis.** The LZA team will perform a risk analysis on the project to identify operational, reliability, constructability, or permitting elements which may add cost or schedule duration to the project. Mitigation measures will be identified and included in the VE report.

- **Operating Cost.** Process decisions should be supported with 25-year life cycle analysis using standard present worth methodology. Costs for labor, energy, chemical, and equipment repair should be incorporated into the decision making process to ensure that future O&M costs are minimized.

The City's Request for Proposal and Lewis & Zimmerman Associates' proposal will become jointly part of the "Agreement for Professional Consultant Services" for the project when said Agreement is fully executed by Lewis & Zimmerman Associates and the City of Lompoc.

Lewis & Zimmerman Associates are proposed as Not-to-Exceed fees.

We include hourly rate schedules for Lewis & Zimmerman Associates and Boyle for invoicing progress payments and for extra work incurred that is not part of the rfp.

Lewis & Zimmerman Associates will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

These elements are a few areas that will be explored by the VE team, and offer an insight into our overall approach to your project. As you review the enclosed project approach, please feel free to contact Mary Ann Lewis at 301/984-9590 or David Hamilton at 253/925-8741 if you have any questions. On behalf of Lewis & Zimmerman Associates Inc. we appreciate your time and look forward to your favorable response.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.

David A. Hamilton, PE, CVS, CCE, LEED™ AP
Associate & VE Team Leader

Mary Ann W. Lewis, FSAVE
President

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VALUE ENGINEERING EXPERIENCE

VE is the focal point of our services

Lewis & Zimmerman Associates, Inc. (LZA) brings to our clients a full range of value services, including project studies on water and wastewater treatment, storage, and conveyance projects, highway and transit projects, airports, industrial plants, electrical power generation projects, buildings, correctional facilities, hospitals, educational facilities, and other construction projects. Members of our staff have analyzed more than 3,0 00 projects, ranging in size from $1 million to more than $3 billion in construction cost. The implemented savings to our clients averages more than $50 for each dollar spent on the value engineering effort. These savings are based on the implemented savings reported by the owner or the design engineer for each project.

LZA is recognized as a leader in the application of VE techniques in the construction industry. LZA wrote the U.S. Environmental Protection Agency's *Value Engineering Handbook* in 1984 to incorporate the techniques of life cycle cost and energy modeling. In 1990, Larry W. Zimmerman, PE, FSAVE and Howard B. Greenfield, PE, CVS conducted the EPA's federal lecture series on value engineering and total quality management. Mary Ann W. Lewis, FSAVE is the principal author of *ASTM E 1699, Standard Practice for Performing Value Analysis (VA) of Buildings and Building Systems*. Howard Greenfield co-authored *Value Engineering for Municipal Projects* (1998) for the Ministry of Municipal Affairs, British Columbia, Canada, a guide for obtaining and performing VE services. Howard Greenfield and Eric Mion co-authored the American Society of Civil Engineers' Chapter 25 – Value Engineering of the *Manual of Professional Practice, Quality in the Constructed Project, A Guideline for Owners, Designers and Constructors*.

Our project team is experienced not only in value engineering techniques but also in facility design, construction and operation. In each VE project study that LZA undertakes, the project team establishes a close relationship with the owner and the designer to ensure that the information relating to the project is correct and appropriate and that the results of the study are in the owner's best interest. This close coordination helps develop trust between the designer and the VE consultant, which increases the implemented savings to the owner. Our recommendations do not cheapen the project, but instead enhance the operational aspects of the project and improve its value.

Value engineering studies on construction projects are the focal point of our services. The results of these studies, as previously mentioned, save money and improve the performance and operability of the project. We ensure that the study results are compatible with the owner's needs.

Distinguishing Value Services

The framework of our value engineering services includes cost/benefit analysis, life cycle costing, energy modeling, cost estimating and control, risk analysis, and CPM scheduling. We briefly describe these specialized areas here for your consideration.

Benefit/Cost Analysis. Many owners, the federal government among them, routinely perform benefit-cost analyses on their programs to promote efficient resource allocation through well-informed decision making. LZA's program provides a checklist of components to determine whether the owner has considered and properly dealt with all of the elements for sound benefit-cost and cost-effectiveness analyses distributed over the life of the project.

Life Cycle Costing. The total cost of owning and operating a facility is a major concern to owners, especially as it reflects on the ultimate cost to the user. The application of life cycle costing techniques in the VE process is a useful tool for decision-making because: 1) it identifies the owning and operating costs; 2) it is used as a tool to judge the alternatives in terms of impact of initial expenditures versus operating costs; 3) it indicates the high cost areas of those facility operating costs; and 4) it gives the owner a full understanding of the cost and operating requirements they are likely to assume.

The LCC model is an advanced VE technique because it goes beyond the normal approach of accounting only for the high initial costs of construction. Our LCC analyses include the cost of construction, financing, administration, staffing and operating labor, transportation, materials management and disposal costs, taxes, energy costs and other miscellaneous costs.

Energy Modeling. Energy usage is a critical concern to the owner, who scrutinizes the processes, equipment and designs that are energy intensive; and in assessing power rate structures for demand charges. In our VE studies we successfully analyze energy by developing an energy model that provides an organized approach to identify high energy usage areas within the project.

LZA offers services in the analysis of energy consumption of facilities as part of our VE studies and as an independent energy assessment or audit of new or existing facilities. We have accumulated a checklist of energy saving ideas as a guide for our studies.

LEED Certification. LZA is a member of the U.S. Green Building Council. Several of our Certified Value Specialists have attended LEED certification workshops and we have performed value engineering studies on approximately 30 projects, to date, which seek LEED certification. We are experienced with requirements, materials, and energy considerations and adapt these within our VE process.

Cost Estimating and Control. Cost is the major frame of reference used to assess value. In the case of construction, cost is our principal measure of an investment in a project to achieve a required function. Because a value engineering study is

perhaps the only intensive analysis of a project for cost, accuracy weighs heavily on the analysis of alternatives. We have found that contractors generally have the best assessment of cost: however, they usually require completed plans before preparing an estimate. We routinely use specialists with practical construction experience to complete our teams and offer sound estimating input.

Risk Analysis. The development of all projects involves risk. No owner can afford a cost overrun on a construction project. Historically, little has been done to determine or reduce the amount of uncertainty in a construction project. Understanding the risks and providing solutions that mitigate the risk leads to successful execution. LZA employs state-of-the-art risk analysis techniques to identify where uncertainty exists in the cost of construction and ownership and quantitatively and qualitatively project the effect design decisions will have on those costs. This analysis produces information that owners can use to make decisions and provides direction for the VE team to begin brainstorming in project areas with high risk in order to generate ideas for risk reduction.

CPM Scheduling. In value analyzing a construction project, we frequently find that important savings occur in the analysis of the construction phasing and techniques. For this reason, we may prepare an independent CPM schedule using our computerized scheduling system, Primavera. The schedule sets contract duration and major milestones; and it indicates major tie-ins to existing facilities so there is no interference with the owner's operations. The schedule will also identify delivery of pre-purchased or long lead time materials and equipment. Information of this sort presents the owner and designer with facts and information so they can make informed decisions about the design itself.

Training Workshops and Seminars. Value engineering training is another part of our value services. In addition to covering the principles of value engineering, our seminars place special emphasis on managing a VE study; energy and life cycle cost models; and a checklist of ideas for implementation. Our staff also participates as guest speakers and educators on the subject of value engineering.

***WasteWater Training Program*© (*WWTP*™).** LZA has produced, through its Classrooms on CD Series™, an interactive computer-based training program that provides hands-on training for operators, supervisors, trainers, engineers, owners/decision makers. This program integrates a simulator, supervisory monitoring, and testing. Our WWTP™ benefits by providing on-site training, scheduling flexibility, a self-paced learning atmosphere, increased productivity, and maximized training dollars.

1942 - 2002
60 yrs of
ENGINEERING EXCELLENCE
BOYLE

Consistently in the Top 100 of *Engineering News-Record*'s Top 500 pure design firms, **Boyle** provides a full range of professional services to plan, design, and construct infrastructure projects. For more than 60 years, Boyle has enjoyed a reputation of being a leader in developing innovative solutions to meet the complex and ever-changing needs of its clients. Boyle knows how to include the needs of operators, engineers, and managers in the design of wastewater facilities. They have the resources available and experience

necessary to provide the requested services. Boyle has successfully provided quality engineering services for numerous wastewater utilities located in California and across the country, including the City of Lompoc. This type of service, coupled with their senior engineers' familiarity with the regions they serve, results in more than 85 percent of Boyle's business coming from repeat clients.

Besides wastewater conveyance and treatment, Boyle also offers a wide array of additional services including water treatment; water resources; drainage and flood control; roads and bridges; light- and heavy-rail systems and transit facilities; development; architecture; automated control and facilities management; SCADA; system integration; and GIS. Their scope of services encompasses planning; alternatives evaluation; preliminary design; plans, specifications, and cost estimates; and construction services.

Boyle and LZA have worked together on other value engineering studies over the years.

Hill Canyon Wastewater Plant

City of Thousand Oaks, CA

Lewis & Zimmerman Associates conducted two VE studies on the City of Thousand Oaks' Hill Canyon Wastewater Plant expansion, Phases II and III. The plant is being expanded from 10.8 mgd up to 14 mgd. Phase I includes yard piping modifications and concrete repair of a number of tanks. Phases II and III include a new bio-reactor process for nutrient removal, one secondary clarifier, expanded intermediate filter pump station, additional deep bed monomedia tertiary filters, backwash tank, UV disinfection, two new sludge belt filter presses, RAS/WAS pump station expansion, a new Operations Building, new Maintenance Building, standby generators, new blower building, flow equalization basins, instrumentation and control system, sludge thickening building and equipment, associated yard piping, site electrical, and splitter boxes. No expansions beyond the 14 mgd limit are anticipated. CH2M HILL is performing the design.

The VE team recommended several major alternatives to relocate all or a portion of the 14 mgd plant to the southern end of the site. Construction on an unobstructed site will save the City in both lower construction costs due to a lack of congestion for the contractor, and also in City staff requirements working around temporary shutdowns and piping modifications. A new plant on the south end of the site would also improve the reliability of the plant by eliminating the old equipment and process basins currently on the north end of the site.

Additional alternatives developed included outsourcing some of the lab testing, eliminating the dual feed substations and replacing them with single ended substations, considering an energy management system to control the high cost of current demand charges, and reorganizing the layout of the new Operations and Maintenance Buildings, yielding some reductions in the space program and major cost savings.

David A. Hamilton, PE, CVS led both studies.

Contact: Dean Morales
City of Thousand Oaks
2100 Thousand Oaks Boulevard
Thousand Oaks, California 91362-2903
Phone: 805-449-2462

Wastewater Treatment Facility Improvements

Upper Blackstone Water Pollution Abatement District, Millbury, MA

Metcalf & Eddy, Inc. (M&E) in association with Lewis & Zimmerman Associates, Inc. (LZA) conducted two value engineering studies for the Upper Blackstone Water Pollution Abatement District. The subjects of the studies were the preliminary design submittal and the design development (DD) submittal of the Wastewater Treatment Facility Improvements project, which is being designed by Camp Dresser & McKee, Inc.

To meet current and future potential ammonia nitrogen and phosphorus permit limits, the Upper Blackstone plant process must be upgraded from a conventional activated sludge process to a process with biological nutrient removal (BNR) such as the A2/O process. This conversion will require that the current aeration tanks be segmented into anerobic, anoxic, and aerobic zones with internal recycle and return activated sludge from the secondary clarifiers. Fine bubble diffusers will be added to the aeration tanks, and blower capacity increased to meet the oxygen demand for converting the ammonia to nitrogen.

Improvements in Phase I are driven largely by hydraulic considerations caused by the high peaking factor. A new headworks will be built, existing primary clarifiers will be re-built, two new primary clarifiers will be added, a plant bypass will be constructed, disinfection will be converted from gas chlorine to sodium hypochlorite and sodium bisulfate. Also included in Phase I is the removal of 19,000 CY of oily waste and 28,000 CY of old Imhoff structures and sludge. This remediation is estimated to cost $22 million, bringing the total cost for Phase I to $71.5 million.

The preliminary design VE study focused on the high cost of site remediation currently planned for Phase I and the very high peaking factor for a facility of this size—the concern is the ability of the blended effluent streams to meet permit requirements in the future. The majority of the VE recommendations focused on the new headworks, the soil remediation issue, phasing of new process tanks, and the type of instrumentation proposed for the plant.

The DD VE Study focused on the high cost of the odor control at the headworks using an in-ground biofilter system. Other headworks issued were also concerns to the owner; therefore, the majority of the VE recommendations focused on the new headworks building, flow split pipe and routing, and detailed electrical suggestions.

A third VE study on the project is planned for July 2005. David Hamilton will have led all three studies.

Contact: Mr. Thomas K. Walsh, PE
Engineer – Director – Treasurer
Upper Blackstone Water Pollution Abatement District
50 Route 20
Millbury, MA 01527-2199
Phone: 508-755-1286

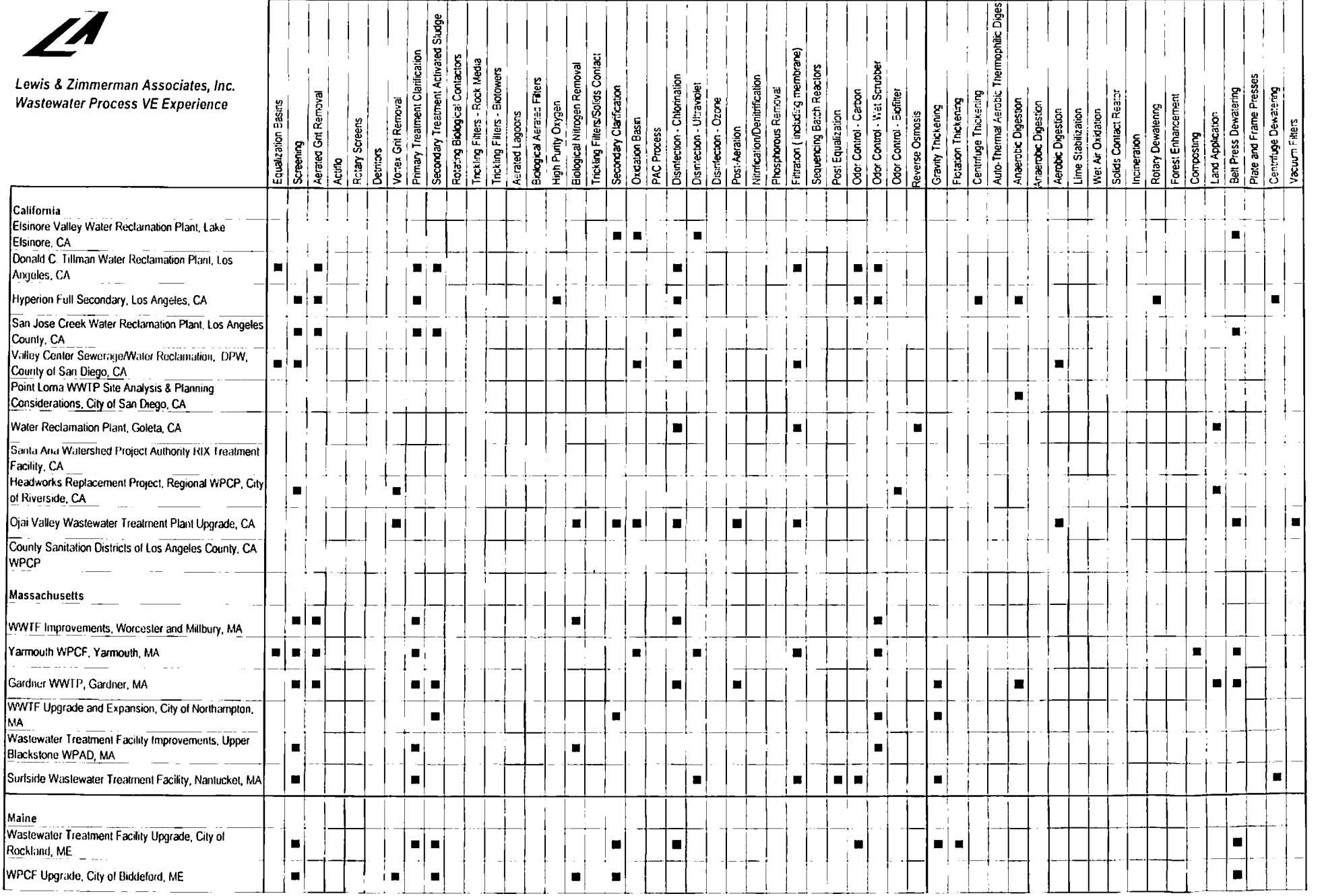
Wastewater Facilities Value Engineering Studies

PROJECT NAME/LOCATION	PROJECT SIZE	CONSTRUCTION COST	IMPLEMENTED LCC SAVINGS	RETURN ON INVESTMENT
Hill Canyon Wastewater Treatment Plant, City of Thousand Oaks, CA				
Study 1 - Phase II	3.2 mgd exp.	58,000,000	Not reported	
Study 2 - Phase III	2.0 mgd exp.	25,600,000		
Regional Wastewater Reclamation Facilities, Lake Elsinore, CA	2 mgd exp.to 16 mgd exp.	30,200,000	Not reported	
City of Riverside, CA Regional Water Quality Control Plant				
Headworks Replacement Project	40 mgd	8,527,851	Not reported	
Backup Power Source/Cogeneration Project	2.8 MW	12,913,645	Not reported	
South Bay Water Recycling Program, San Jose, CA	Various	140,000,000	4,000,000	18:1
Feasibility Review	N/A	N/A		
Santa Clara Pipeline	4 km	13,196,000		
Yerba Buena/Sylvandale & Evergreen Pipelines	11 km	9,000,000		
Design/Operational Standards	100 km	136,000,000		
Transmission Pump Station	104 mgd	6,800,000		
Golden Triangle & Coyote/Old Oakland Rd. Pipeline	14 km	18,000,000		
12th Street and Senter Road Pipelines	16 km	24,000,000		
Transmission and Milpitas Pipelines	21 km	16,900,000		
Distribution Reservoir and Pump Station	4 mgd	5,600,00		
Valley Center Sewerage/Water Reclamation, DPW, County of San Diego, CA				100:1
Study One - 15%	1.3 mgd	28,000,000	8,000,000	
Study Two - 30%	1.3 mgd	10,300,000	4,000,000	
Clean Water Program for Greater San Diego				
Point Loma WWTP Site Analysis & Planning Considerations, City of San Diego, CA	240 mgd	70,906,000	10,000,000	330:1
Mission Valley Water Reclamation Plant, Mission Valley Pipeline, East Mission Bay Pipeline, City of San Diego, CA		64,000,000	1,800,000	50:1
Penasquitos Interceptor Sewer, San Diego, CA	21,000 lf	39,900,000	Unknown	
Water Reclamation Plant, Goleta, CA	3 mgd	6,766,000	Unknown	
Santa Ana Watershed Project Authority RIX Treatment Facility	40 mgd	16,900,000	Unknown	
Donald C. Tillman Water Reclamation Plant, CA	80 mgd	46,000,000		
Study 1: Primary, Equalization, Aeration			2,383,000	57:1
Study 2: Electrical Power Distribution			2,349,400	52:1
Hyperion Full Secondary, CA	500 mgd	500,000,000		
Study 1: Primary Tank Battery D		70,000,000	3,600,000	68:1
Study 2: Primary Batteries Modification		52,843,000	472,000	10:1
Study 3: Inter. Pump Station		297,419,000	1,612,800	35:1
Study 4: Intermediate Pumping Station		45,675,000	1,542,000	37:1
Study 5: Control System, Sitework		239,000,000	1,373,000	30:1
Study 6: WAS Thickening Facility		99,063,000	760,620	19:1
Study 7: Technical Support Facility		153,663,000	2,778,900	77:1
Goleta Sanitary/Water District, CA				
Water Reclamation Plant Reclaimed Water Distribution System	3.3 mgd	6,780,000	Not reported	
Reverse Osmosis Plant	3.3 mgd	4,000,000	Not reported	
Ojai Valley Wastewater Treatment Plant Upgrade, Ojai, CA	3 mgd	20,700,000	Not reported	
(2 Studies at 25% and 60% Design Complete)				
San Jose Creek WWTP, Los Angeles County, CA	62.5 mgd	15,000,000	258,400	20:1
San Francisco West Side Pump Station, CA		26,000,000	1,600,000	64:1
Los Angeles Co. San. Dist. JWPCP, CA	300 mgd	15,000,000	440,000	22:1
Oro Loma Castro P.S. & Outfall, Oro Loma, CA		2,500,000	65,000	2:1
Wastewater Treatment Facility Upgrade& Expansion, Simsbury, CT	3.8 mgd	20,000,000	In progress	
Water Pollution Facility, Town of Litchfield, CT	1.99 mgd	4260000	Not reported	
Wastewater Treatment Facility Upgrade, Branford, CT	4.9 mgd	21,400,000	2,000,000	
Fairfield Water Pollution Control Facility, Fairfield, CT	10 mgd	40,000,000	Unknown	
Wastewater Treatment Facility Upgrade& Expansion, Town of New Canaan, CT	1.7 mgd	11,600,000	1,000,000	
Town of Farmington WPCP Expansion & Modifications, CT	5.85 mgd	15,275,000	Unknown	
Southington WWTP, CT	7.4 mgd	12,000,000	450,000	17:1
Massachusetts Water Resources Authority, Boston, MA				
Union Park Detention/Treatment Facility	CSO Control	27,721,000	Not reported	
East Boston Branch Sewer Relief Project	Sewer System Revisions	49,000,000	Not reported	
North Dorchester Bay & Reserved Channel Consolidation Conduits and Reserved Channel CSO Facility	18,462-ft. w/600 mgd pump sta.	178,600,000	Not reported	

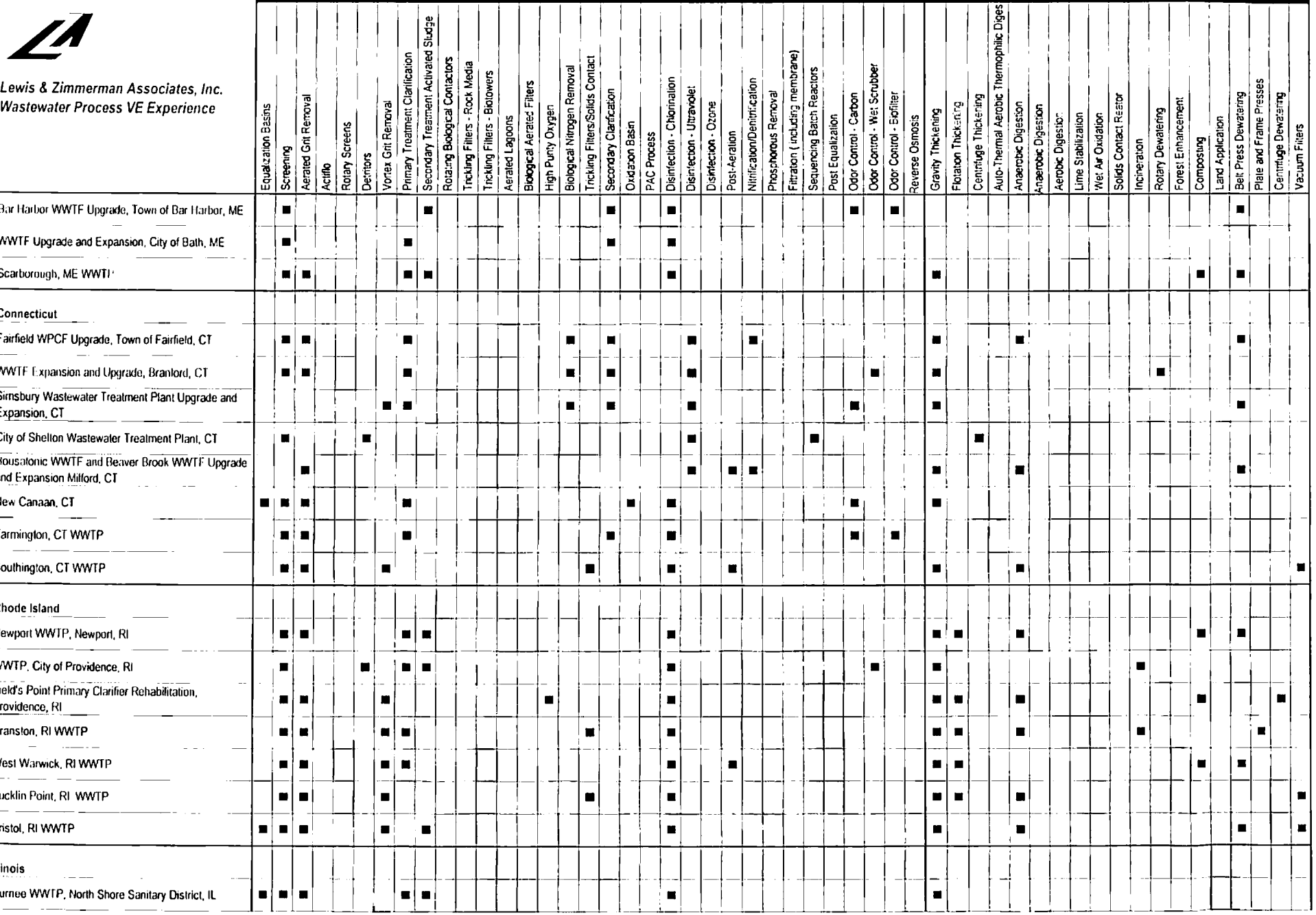
PROJECT NAME/LOCATION	PROJECT SIZE	CONSTRUCTION COST	IMPLEMENTED LCC SAVINGS	RETURN ON INVESTMENT
Chelsea Branch Sewer Relief Project	3 miles	20,076,000	Not reported	
Quincy Pumping Station	10.1 mgd	5,200,000	Not reported	
Deer Island Power and Pump Station	360 mgd	21,400,000	600,000	20:1
Squantum Pumping Station Replacement	2800 gpm	2,500,000	84,500	7:1
Braintree-Weymouth Replacement Pump Station	60 mgd	7,620,000	Unknown	
Boston Harbor Project, Deer Island Related Facilities	1270 mgd	3.4 Billion	N/A	
Technnical, Management, Financial, Audit				
Braintree-Weymouth Tunnel and Shafts, North Weymouth	15,700 ft.	60,300,000	Unknown	
New Neponset Valley Relief Sewer Project	8.5 Miles	22,263,800	Unknown	
Wellesley Extension Sewer	37,500 Ft.	32,993,000	Unknown	
Charlestown Pump Station	93 mgd	11,615,000	Unknown	
East Boston Pump Station, Winthrop Terminal	163 mgd	20,689,000	1,250,000	42:1
Chelsea Screenhouse				
Yarmouth WPCF, Yarmouth, MA	22.11 mgd	15,725,000		
Gardner, MA WWTP	4.37 mgd	12,360,000	1,400,000	28:1
Upper Blackstone Wastewater Treatment Facility Conversion to BNR, MA	56 mgd	135,800,000		
WWTF Upgrade and CSO Abatement Program, Rockland, ME	2.9 mgd	3,000,000	Unknown	
City of Biddeford Water Pollution Control Facility Upgrade, ME	2.64 mgd	14,000,000	Unknown	
Scarborough, ME WWTP	1.8 mgd	11,467,000	4,000,000	100:1
WWTF Upgrade and Expansion, City of Bath, ME	3.5 mgd	5,100,000	Not reported	
South Burlinton WWTP, VT	6 mgd	8,600,000	Not reported	
Rutland WWTP, VT	45 mgd	13,600,000	800,000	160:1
Airport Parkway WWTF, S. Burlington, VT	2.3 mgd	6,500,000	680,000	22:1
Advanced WWTP Expansion from 5.0 to 7.5 MGD, City of Warwick, RI	7.5 mgd	10,206,000	In progress	
Bucklin Point Wastewater Treatment Facility Expansion, Providence, RI	56 mgd exp.	43,000,000	In progress	
City of Providence, RI WWTP				
Study A - 25%	80 mgd	80,000,000	3,900,000	100:1
Study B - 65%	80 mgd	80,000,000	2,600,000	82:1
Field's Point Primary Clarifier Rehabilitation, Providence, RI	77 mgd	6,200,000	500,000	22:1
Cranston, RI WWTP				
Study A	23 mgd	28,800,000	841,000	28:1
Study B	23 mgd	28,800,000	260,000	10:1
Newport WWTP, RI	12 mgd	16,000,000	Unknown	
West Warwick, RI WWTP (Study A)	9.5 mgd	14,000,000	2,500,000	50:1
Bristol, RI WWTP	14.16 mgd	10,000,000	483,000	15:1
Bucklin Point, RI WWTP	31 mgd	2,140,000	770,000	26:1
Newtown Creek Water Pollution Control Plant Upgrade, New York, NY	310 mgd	161,933,000	In progress	
Tallman Island Water Pollution Control Plant, New York, NY				
Study 1	80 mgd	96,560,918	In progress	
Interim Plant Upgrade Project		168,452,610	In progress	
WPCP, Coney Island, NY	120 mgd	270,000,000	2,300,000	20:1
Woodstock STP, NY	0.2 mgd	10,700,000	4,700,000	90:1
Wallkill WWTP, Orange County, NY	3 mgd	10,600,000	2,400,000	70:1
Rockland County Sewer District No. 1, NY				
WWTP (Study A)	25 mgd	45,000,000	5,500,000	90:1
Pump Stations		22,000,000	800,000	20:1
P.S. & Compost Facilities		22,500,000	3,100,000	55:1
WWTP (Study B)	25 mgd	45,000,000	2,800,000	40:1
New York Disposal Project	City Wide	91,000,000	15,800,000	272:1
Bay Park WWTP, NY	70 mgd	56,000,000	Not reported	
Gloversville-Johnstown Joint WWTP Fulton County, NY	9.5 mgd	5,400,000	Not reported	
City of Fulton, NY WWTP	3.8 mgd	12,000,000	670,000	20:1
City of Jamestown, NY WWTP	8 mgd	18,000,000	1,800,000	45:1
Cedar Creek WWTP, NY	76 mgd	112,000,000	4,600,000	60:1
Hominy Creek Wastewater Mgm't Facility Upgrade & Expansion, Wilson, NC		12,000,000	Unknown	
Lincolnton, NC WWTP	9.0 mgd	13,858,900	Unknown	
Goldsboro, NC WWTP	14.2 mgd	21,500,000	800,000	20:1
Wastewater Treatment Plant Expansion, High Point, NC	26 mgd	38,700,000	Unknown	
Rocky Mount, NC WWTP	14 mgd	27,000,000	700,000	25:1
Concord, NC WWTP	24 mgd	30,000,000	960,000	27:1
Monroe WWTP Expansion, NC	12.5 mgd	12,481,000	Unknown	
South Brunswick Wastewater Treatment Plant, NC	2.0 mgd	13,472,052	Unknown	
Wet Weather Process Optimization Improvements, Racine, WI	123 mgd storm flow	56,876,000		
Fort Atkinson WWTP, WI	2.98 mgd		Unknown	
Northwest Side Relief Project, Milwaukee, WI	5 miles	Implementation Plan		
MMSD Central Metropolitan Interceptor System Improvements, Milwaukee	330 mgd	Implementation Plan		

PROJECT NAME/LOCATION	PROJECT SIZE	CONSTRUCTION COST	IMPLEMENTED LCC SAVINGS	RETURN ON INVESTMENT
Central MIS Conceptual Improvement Plan Project - Basin D Peer Review	330 mgd	Implementation Plan		
City of Waukesha WWTP Upgrade & Expansion, WI	14 mgd	43,437,000	Unknown	
Wastewater Treatment Plant Improvements, New Buffalo, MI	12.5 mgd peak	10,600,000	Unknown	
Wastewater Treatment Plant Expansion, Howell, MI	2.45 mgd	3,900,000	Unknown	
Grand Rapids WWTP Expansion, MI	18.7 mg	Phase I - 8.4M Phase II - 13.9 M	Unknown	
Kalamazoo, MI WWTP				
Study A	53 mgd	26,000,000	900,000	30:1
Study B	53 mgd	26,000,000	800,000	25:1
Waukegan WWTF, IL	2 mgd	22,000,000	550,000	14:1
Village of Wilmette, IL Facility				
Plan and Alternative A - Phase 1 Construction	N/A	65,360,000	Not reported	
Clavey Road WWTP, North Shore Sanitary District, IL				
Gurnee WWTP, North Shore Sanitary District, IL				
Study A	19.6 mgd	36,700,000	5,000,000	131:1
Study B	19.6 mgd	30,000,000	1,500,000	60:1
North Wastewater Treatment Plant Improvements, City of Sycamore, IL	41 mgd	12,244,524	Not reported	
Des Plaines River WWTF, County of Lake, IL	8.0 mgd	31,587,500	886,000	21:1
Fox Lake WWTP, Fox Lake, IL	12 mgd	24,000,000	1,300,000	42:1
Kankakee WWTP, IL				
Study A	16 mgd	28,600,000	1,650,000	54:1
Study B	16 mgd	27,600,000	155,000	6:1
City of Columbus, OH				
Big Walnut Sanitary Trunk Sewer Extension	5.1 miles	36,824,000	evised alignment	n/a
CIP 349, Southerly WWTP Sludge Dewatering & Miscellaneous Improvements	Upgrading WWTP	20,100,000	not reported	
Jackson Pike WWTP and Southerly WWTP Sludge Holding System Improvements	Various	18,200,000	In progress	
Jackson Pike WWTP Sludge Handling and Dewatering Improvements	Various	24,533,000	In progress	
Big Walnut Augmentation/Rickenbacker Interceptor	4 miles	122,000,000	5,500,000	110:1
Southerly and Jackson Pike WWTPs Instrumentation & Control System Upgrades	Various	26,005,000	6,347,300	120:1
Jackson Pike Wastewater Treatment Plant Electrical Upgrades and PCB Removal	Various	12,095,786	686,641	20:1
Southerly Wastewater Treatment Plant, Effluent Disinfection Improvements	50 mgd expansion	15,247,000	In progress	
Southerly Wastewater Treatment Plant, New Headworks	450 mgd	109,000,000	14,439,860	190:1
Southerly Wastewater Treatment Plant Digester Rehabilitation Project	8 digesters	30,800,000		
Southerly Wastewater Treatment Plant Sludge Dewatering and Miscellaneous Improv	Centrifuges	20,100,000		
Cleveland Easterly WWTP Cleveland, OH	3000 GPM	8,824,300	500,000	10:1
Findlay, OH WWTP	11.5 mgd	18,000,000	1,200,000	40:1
City of Toledo, OH WWTP				
Study A	100 mgd	36,000,000	1,800,000	35:1
Study B	100 mgd	36,000,000	2,800,000	50:1
City of Toledo, OH Combined Sewer Outfall Pipeline Storage				
Study No. 1 - Phases 1 & 2	N/A	53,000,000	12,000,000	300:1
Study No. 2 - Phases 3 & 4	4125 Ft.	13,260,000	Not reported	
Study No. 3 - Phase 5	5000 Ft.	10,000,00	Not reported	
Study No. 4 - Phase 6 & 7	5000 Ft.	12,000,000	Not reported	
City of Lakewood, OH				
Study A	18 mgd	15,000,000	3,000,000	100:1
Study B	18 mgd	12,000,000	2,000,000	50:1
Study C	53 mgd	39,000,000	14,000,000	350:1
Cleveland Easterly WWTP, Cleveland, OH				
Study A	155 mgd	16,000,000	1,662,000	
Study B	155 mgd	16,000,000	814,000	
Midway Wastewater Treatment Plant, Midway, KY	2.25 mgd	3,600,000	216,000	11:1
Harlan Regional WWTP, City of Harlan, KY	1.2 - 3.6 mgd	3,000,000	Unknown	
Bowling Green WWTP Upgrade Bowling Green, KY	10.6 mgd	5,183,000	Unknown	
West Hickman Creek, Lexington, KY WWTP	18.7 mgd	12,500,000	550,600	13:1
Phase II - New WWTP Improvements, Paducah, KY	5 mgd	3,274,135	159,000	5:1
City Pikeville, WWTP, Pikeville, KY	2.0 mgd	2,700,000	Not reported	
Bee Creek WTP Upgrade, City of Murray, Calloway County, KY	3.5 mgd	3,200,000	Not reported	
WWTP and Pump Station Louisville, KY		1,977,000	Not reported	
Louisville & Jefferson County Metropolitan Sewer District, Louisville, KY				
Central Maintenance Facility	300 mgd	7,400,000	700,000	
Billtown Road Pump Station, Force Main and Interceptor Sanitary Sewer Project	various	12,800,000	N/A	
Upper Dry Run Trunk Regional Storage Facility	15.4 & 11.8 mg basin	9,700,000	431,439	17:1

Lewis & Zimmerman Associates, Inc.
Wastewater Process VE Experience



Lewis & Zimmerman Associates, Inc.
Wastewater Process VE Experience



Lewis & Zimmerman Associates, Inc.
Wastewater Process VE Experience

Section	Process	Clavey Street WWTP, North Shore Sanitary District, IL	Kankakee WWTP, Kankakee, IL	Fox Lake WWTP, Fox Lake, IL	Waukegan WWTF, IL	North Wastewater Treatment Plant Improvements, City of Sycamore, IL	Des Plaines River WWTF County of Lake, IL	Wisconsin	City of Waukesha Wastewater Treatment Plant Upgrade and Expansion, WI	Fort Atkinson, WI Wastewater Treatment Plant	Wastewater Treatment Facility Upgrade, Heart of the Valley MSD, Kaukauna, WI	Indiana	Clarksville WWTP and Collection System, Clarksville, IN	Evansville WWTP Sludge Facilities, Evansville, IN	City of West Lafayette WWTP Upgrade & Expansion, IN	Iowa	Water Pollution Control Facility, City of Ames, IA	Wastewater Facility Improvements, City of Ankeny, IA	Des Moines ICA, Iowa	South Dakota	Watertown Wastewater Treatment Facility Additions and Alterations, Watertown, SD	Kentucky	Harlan Regional WWTP, City of Harlan, KY
LIQUID STREAM	Equalization Basins		■			■											■	■	■				
	Screening		■	■			■		■		■		■		■		■	■	■				■
	Aerated Grit Removal		■	■									■	■			■		■				
	Actiflo										■												
	Rotary Screens																						
	Detritors														■						■		
	Vortex Grit Removal						■		■	■	■								■				
	Primary Treatment Clarification		■	■					■	■			■	■	■		■	■			■		
	Secondary Treatment Activated Sludge		■	■		■	■							■	■		■				■		
	Rotating Biological Contactors																						
	Trickling Filters - Rock Media																		■		■		
	Trickling Filters - Biotowers												■				■						
	Aerated Lagoons																						■
	Biological Aerated Filters										■												
	High Purity Oxygen																						
	Biological Nitrogen Removal																						
	Trickling Filters/Solids Contact			■										■			■	■					
	Secondary Clarification						■		■	■					■			■	■		■		■
	Oxidation Basin																						
	PAC Process												■				■						
	Disinfection - Chlorination		■	■		■	■		■	■	■			■	■			■	■				
	Disinfection - Ultraviolet																				■		■
	Disinfection - Ozone												■				■						
	Post-Aeration						■								■								
	Nitrification/Denitrification								■	■													
	Phosphorous Removal																						
	Filtration (including membrane)			■		■			■					■									
	Sequencing Batch Reactors																						
	Post Equalization																						
	Odor Control - Carbon																						
	Odor Control - Wet Scrubber																						
	Odor Control - Biofilter																						
	Reverse Osmosis																						
SOLIDS HANDLING	Gravity Thickening									■			■		■			■	■		■		
	Flotation Thickening		■						■														
	Centrifuge Thickening																		■				
	Auto-Thermal Aerobic Thermophilic Diges										■												
	Anaerobic Digestion		■	■					■	■				■			■	■	■		■		
	Anaerobic Digestion																						
	Aerobic Digestion						■						■		■								
	Lime Stabilization																						
	Wet Air Oxidation																						
	Solids Contact Reator																						
	Incineration																						
	Rotary Dewatering																						
	Forest Enhancement																						
	Composting																						
	Land Application		■				■						■				■	■	■				
	Belt Press Dewatering		■	■		■	■		■				■	■					■				
	Plate and Frame Presses																						
	Centrifuge Dewatering																						
	Vacuum Filters																						

VALUE ENGINEERING PROJECT APPROACH

A VE study combines technical capability with the systematic approach of the VE job plan. VE is not something that every good designer would ordinarily perform on his projects. Rather, it is an in-depth cost study to achieve the owner's required functions at the lowest life cycle cost (LCC). VE focuses attention on the total life of the job, accounting for the future impacts of the cost of money and the escalating cost of labor, materials, fuels, power, etc.

Management of the VE study through the leadership of the Certified Value Specialist (CVS) is a major factor in project implementation. Application of the VE methodology and coordination of the VE study activities are the difference between a technical review and cost cutting. The VE methodology enables the VE team to produce alternatives that will result in implemented savings and improved performance of a facility.

Our experience shows that project studies that are not led by a CVS often resemble a design review in which the team may find errors in the plans but the cost savings and operational reliability may not be achieved.

The LZA approach includes capital cost, energy, and life cycle cost modeling, as appropriate, and Function Analysis Systems Technique (FAST) diagramming. Risk analysis is routinely performed to augment the function analysis in a VE effort. The study organization is based on three specific efforts:

- Preparation Effort
- Workshop Effort
- Post-workshop Effort

A task-flow diagram depicting the *VE Job Plan* is included on the following page.

Our approach encourages your involvement

This project approach has been used successfully on the value engineering of more than 3,000 projects studied to date by professionals in our firm. The organized approach, which we use both in preparation for and during the workshop, allows us to maintain a quick turn-around time for the project study and the submittal of a *Value Engineering Report*. The approach also ensures owner, user, designer and program manager participation during the study. LZA's VE approach takes advantage of past experience and urges the stakeholders' full involvement in the analysis of the project.

PREPARATION EFFORT

Coordination of the VE effort is vital to the study's success. The preparation effort's importance lies in developing a rapport with the owner and designer (the project team) who are integral to the effort. Every participant must understand and accept his/her responsibility in the VE effort and recognize that the main goal of the exercise is to produce the best project. Our aim is to enhance the project team's work in order to arrive at a better end product.

Because the study is an abbreviated effort, the VE consultant must become familiar with the project in a short timeframe. Therefore, the project data is collected and distributed for review prior to the formal workshop session. During the preparation effort the VE team members review the project data to understand its history and

Value Engineering Study Task Flow Diagram

Preparation Effort

Coordination Project
- Verify Schedule
- Suggest Format for Designer Presentation
- Outline Project Responsibilities
- Outline Needed Background Data
- Define *Project Value Objectives*
- Identify Project Constraints

→

Prepare for Workshop
- Collect Project Data
- Distribute Data to Team Members
- Team Members Become Familiar with Project

→

Construct Cost Models
- Construct Cost Models
- Construct Graphic Function Analysis
- Outline High Cost Areas

→

LCC Model
- Process Areas
- Staffing
- Chemicals
- Energy
- User Impact

Workshop Effort

Information Phase
- Introduction by VETL
- Project Description and Presentation by Designer
- Outline Owner Requirements
- Review Project Data
- Visit Project Site (Alt.)

→

Function Identification and Analysis Phase
- Analyze Project Costs and Energy Usage
- Perform Function Analysis and FAST Diagram
- Identify High Cost and Energy Areas
- Calculate Cost/Worth Ratios
- Identify Paradigms

List Ideas Generated During Function Analysis

→

Creative Phase
- Introduction by VETL
- Creative Idea Listing
  - Quantity of ideas
  - Association of Ideas
- Brainstorm
- Do Creative Thinking
  - Group Thinking
  - Individual Thinking
- Use Checklist for Ideas

→

Evaluation Phase
- Eliminate Impractical Ideas
- Rank Ideas with Advantages/ Disadvantages
- Evaluate Alternatives (Include Non Economic considerations: Safety, Reliability, Environment, Aesthetics, O&M, etc.)
- Select Best Ideas for Implementation

→

Development Phase
- Develop Proposed Alternatives
- Prepare Alternative Design Sketches
- Estimate Costs
- Perform Life Cycle Comparison
  - Initial Cost
  - Redesign Cost
  - O&M Cost
  - LCC Cost

→

Presentation Phase
- Summarize Findings
- Present VE Ideas to Owner/ User/Designer
- Oral Presentation

Post-Workshop Effort

VE Study Report
- Develop Implementation VE Report
- Designer Prepares Responses to VE Report
- Owner Evaluates Recommendations

→

Implementation Phase
- Participate in Implementation Meeting with Owner/User/Designer/ VE Team, as needed
- Prepare Final VE Report

→

Final Acceptance
- Redesign by Designer

define the issues. The advantage to this approach is that the VE team members become familiar with the documents and are able to develop relevant questions for discussion with the project team on the first day of the workshop, following the designer's presentation.

The Project Value Objectives© questionnaire enhances implementation!

To distinguish your program from others, it is imperative that the VE team understand what is important to the owner and user in completing the complex task of planning, designing and constructing your project. This is accomplished via dialogue with the City of Lompoc and members of the project team. We ask key members of the project team to complete our questionnaire entitled, *Project Value Objectives©*. Understanding your specific value perspective will give the VE team the tools to evaluate an idea for change so those ideas presented have a high probability of acceptance because they closely match your goals. We provide the results of the questionnaire to the VE team as they begin the evaluation process. The value engineering team leader (VETL) will review the procedure to be employed in the evaluation of the creative ideas generated by the VE team.

A description of the Preparation Phase activities is as follows:

- The VETL and the City meet to finalize the disciplines required for the VE effort and select the appropriate team members.
- The VETL arranges for the collection of project study material. (See *Sample Information Needed From the Designer*)
- The VETL coordinates the VE study schedule with the City and the Brown & Caldwell (B&C) design team (currently anticipated week of September 5, 2005) to best suit the overall project schedule.
- The VETL, the City, and other members of the project team discuss and complete the *Project Value Objectives©* questionnaire.
- The VETL develops project capital cost models. These models organize initial costs by system and trade to determine where high costs are being expended on the project.
- The design engineer then distributes background information on the project design to the team members in preparation for the study.
- The VETL prepares a sample format for the opening presentation by the designer.
- The VETL obtains information on project constraints from the City and the B&C design team.
- The VETL will arrange the study logistics for the VE team members.

Coordination is essential to an effective study

The primary concern in the preparation phase is that all parties are well coordinated regarding the progress of the project; that there is ample information available for the VE team; and that the designer is prepared for his description of the project on the first day of the workshop.

VALUE ENGINEERING WORKSHOP

Value engineering is a systematic approach for searching out high-cost areas in a design and arriving at the best balance among cost, performance, and reliability. The following agenda is a basic VE job plan followed in all VE studies. It requires the proper positive attitude and removal of roadblocks that thwart creative thinking.

A presentation by the project team giving the rationale for the design is beneficial in kicking-off the study. Thus, a brief presentation of the concept for each design discipline begins the VE effort. We expect to use this procedure and have established a format for the study based on the following agenda.

PROJECT STUDY AGENDA

Introduction

VETL introduces study participants

VETL explains project orientation

The design team presents the project

The B&C design team, the City, and the VETL outline the project constraints for the VE team

Team members ask questions

Information Phase. The VE team members familiarize themselves with the project documents in conjunction with the capital cost model. They determine factors that influence the cost. The worksheets used in this phase are the:

- Cost model
- Cost histogram

☞ *Function Analysis distinguishes VE from other management practices*

Function Identification and Analysis Phase. The VE team performs the function analysis of the project to justify each component and determine its functional requirements. For each project element, we will define its function and classify it as primary (required) or secondary (not necessarily required). The secondary functions will be further classified as critical or not critical to performing the primary functions. After analyzing the major project elements, the VE team will analyze each of the items that comprise that major element in the same manner. The VE team will use this information to assess the worth (or least cost) to perform the function, and identify high-cost/low-worth elements of the project.

The VETL will facilitate a FAST diagramming session to ensure that the project's stakeholders agree on the basic functions of this project.

The worksheet used in this phase is the:

- Function analysis worksheet

Creative Phase. The VE team begins listing their creative ideas. The aim is to obtain a large quantity and free association of ideas, eliminate roadblocks, and allow a free flow of ideas. It is also during this session that the VE team will consider risk factors to the project. They will brainstorm to identify, classify, assign, and creatively mitigate or eliminate the project risks. The worksheet used in this segment of the workshop is the:

- Creative/evaluation worksheet.

Evaluation Phase. The VE team will analyze the ideas listed in the creative phase and select the best ideas for further development. The worksheet used here is also the creative/evaluation worksheet. During this phase of the VE workshop, the team will refer to the criteria established by the owner and user to define the *Project Value Objectives*©, e.g., initial cost, life cycle cost, safety, maintainability, schedule, etc. The team will rate each idea on how well it meets those objectives.

Development Phase. The VE team members will prepare alternate designs for consideration with LCC comparisons of the original designs and proposed alternatives. Each alternative will be substantiated with written descriptions, sketches, basic design concepts, technical backup, discussion of the advantages and

disadvantages, and LCC summaries.

The worksheets used during the development phase are the:

- VE alternative worksheet
- LCC worksheet
- Operations and maintenance labor worksheet
- Cost estimate worksheet

Up to this point in the VE study, the primary emphasis is on the cost of each VE alternative. Using a weighted analysis, the VE team may analyze other pertinent factors including aesthetics, initial and operating costs, safety, maintainability, operational reliability, and other areas that are appropriate to the project.

The VE team works with the design team to produce the best project

Presentation Phases. The VE team will prepare a summary of findings to discuss with the owner, operations staff, and the designer, as appropriate. The alternatives recommended by the team will be summarized and the LCC savings presented. The VE team will present the rationale for each alternative, along with the background information used to form the idea. In addition, the VE team will work with the design team in accepting or rejecting alternatives in order to develop the best approach to the project design. The presentation of ideas is not intended to be a design critique, but rather sharing of information and an exchange of knowledge. Worksheets used include:

- Summary of potential cost savings
- Draft VE alternative worksheets

POST-WORKSHOP ACTIVITIES

Upon completing the workshop, the VETL will prepare the VE study report for submittal to the City and design team. The VE alternatives offered by the VE team will be complete and prepared in a timely manner so the design effort may continue uninterrupted. The report will include:

- Project goals and objectives
- Program/project description
- Scope of analysis
- VE methodology
- Summary of VE alternatives and associated cost savings described

Conscientious communication is key throughout the study

In addition, the VETL will be available to coordinate the implementation of the VE alternatives. The VETL is available to meet with the designer and the City to review the VE alternatives so savings are not lost due to a lack of communication.

INFORMATION NEEDED FROM THE DESIGNER

Complete and thorough data will help ensure technically-accurate and implementable alternatives

We provide a sample list of pertinent information that will be necessary for the VE studies. The VE team must depend on the City of Lompoc and the Brown & Caldwell design team for the completeness and organization of the material furnished. Effectively relating this information to the team will make its efforts more productive. Providing complete data will prevent the VE team from duplicating comparisons already made by the designer. The City and the designer should use their judgment in organizing the material. The following is a preliminary list of data required:

- Basis of design
- Design criteria
- Design calculations
- Facilities plan
- Alternates considered
- Technical memoranda
- Maintenance requirements
- Equipment data sheets
- Construction cost estimate (quantity take-off)
- Permit requirements
- Applicable codes
- Construction phasing
- Soil and geotechnical information
- Operations requirements
- Project schedules
- Pre-purchase and accelerated purchase documents
- Environmental impact studies

OUTLINE FOR VE PRESENTATION

What has influenced this project?

The City and the designer are actively involved in the planning and design of the project to be value engineered. To be sure, a great deal of time and effort has been spent in comparing alternatives. The design is frequently influenced by outside input resulting from public participation meetings, and from requests made by local governments and, possibly, other regulatory agencies. The VE team needs to know this data to understand the factors that have influenced the project. The object is to avoid duplicating efforts and to help the team become familiar with the project. To achieve this objective, the project team is asked to give a presentation at the beginning of the VE workshop session. To assist in this effort, we have outlined the information that, as a minimum, should be addressed:

- Scope of project team's effort
- Participating organizations
- Existing site conditions
- Basis of project
- Rationale/steps in development of project
- Planning concepts
- Operational constraints
- Information from public participation
- Constraints imposed by local governments, prior obligations
- Applicable codes
- Explanation of information provided by the project team
- Summary of cost estimate
- Construction phasing

This information is provided as an outline to aid the project team. The presentation is the project team's responsibility and the information may be delivered as they see fit.

VALUE ENGINEERING TEAM

The professionals who compose the VE team are critical to the effort's success. They meet for a few, very intense days to understand, analyze, and offer alternatives for change to the owner and the designer. They must have the practical planning, design, and construction experience that enables them to create ideas and develop the best of them into viable and technically-accurate alternatives. For these reasons we have assembled the following teams of engineers and construction specialists whose experience and talents can be applied to your important project as an objective analysis:

⇦ *VE professionals must produce viable and technically-accurate alternatives in an intense workshop.*

David Hamilton, PE, CVS	VE Team Leader	Lewis & Zimmerman Assoc.
Luis M. Venegas, PE, CVS	Asst. VE Team Leader	Lewis & Zimmerman Assoc.
David R. Refling, PE, DEE	Sanitary/Process	Boyle
Ronald G. Abraham, PE	Process/Operations	Boyle
David J. Scherschel, SE	Structural Engineer	Boyle
Allen J. Randall, PE	Electrical/I&C	Boyle
Stan Simmons	Cost/Constructibility	W.M. Lyles Company
Monica Steiner	Team Recorder	Lewis & Zimmerman Assoc.

Alternates:

Pars L. Topjian, PE	Electrical Engineer	Boyle

We include information about each team member for your review here. Resumes may be found on the following pages.

David Hamilton, PE, CVS, CCE, LEED™ AP – Lewis & Zimmerman Associates, Inc., VE Team Leader is a registered professional engineer, a Certified Value Specialists, a Certified Cost Engineer, and a LEED Accredited Professional. Dave has led more than 500 value engineering studies, approximately half of which have been performed on water and wastewater treatment, storage, and conveyance facilities. He has also performed relevant VE studies in California for owners such as the Orange County Sanitation District, the County of San Diego, the City of Bakersfield, the City of Thousand Oaks, and others.

Luis M. Venegas, PE, CVS, LEED™ AP - Lewis & Zimmerman Associates, Inc., Assistant VE Team Leader is a registered professional engineer, a Certified Value Specialists, and a LEED Accredited Professional. Luis has led more than 350 VE studies of water and wastewater treatment facilities. He has also performed relevant VE studies in California for owners such as the Orange County Sanitation District and the County of San Diego.

David Refling, PE – Process and Nutrient Removal Specialist - Boyle's National Director of Wastewater Treatment. Dave's expertise is process engineering, particularly nutrient removal. He has co-authored 14 articles on innovative wastewater treatment systems involving nutrient removal and reclamation/reuse, and has participated in numerous VE studies.

Ron Abraham, PE – Process/Operations - Ron has three years of experience as a tertiary treatment plant operator in addition to his 20 years of engineering design experience, specializing in wastewater and water treatment plants. Ron specializes in design of the mechanical processes. He also holds a Grade IV Water Treatment Operator Certification and has participated in several VE studies led by Dave Hamilton, the proposed VE team leader from Lewis & Zimmerman.

David Scherschel, PE, SE – Structural Engineer - Dave has more 40 years of structural design experience in California, more than 30 of which have been with Boyle. Registered in 14 states, Dave has worked on more than two dozen major wastewater plant upgrade projects.

Allen Randall, PE – Electrical Engineer - Allen Randall specializes in electrical and controls systems engineering, for water and wastewater facilities. He has more than 30 years experience, and is currently the manager of Boyle's electrical and instrumentation design group.

Stan Simmons, PE – Construction Manager - Stan is the Southern District Manager for W.M. Lyles, Co., a well-respected contractor that specializes in complex treatment plant upgrades and other complicated projects in operating process facilities. Mr. Simmons has more than 25 years of construction management experience.

VALUE ENGINEERING REFERENCES

Lewis & Zimmerman Associates' References

- **Wastewater Treatment Plant Improvements: Post-bid VE Study**

  Rahway Valley Sewerage Authority
  1050 East Hazelwood Avenue
  Rahway, New Jersey 07065

  Michael Brinker
  732/388-0868, ext. 237, michaelbrinker@rahwayvalleysa.com

  Total cost of project approximately $130 million; Completion date: 2005

  Dave Hamilton was Asst. VE Team Leader on the analysis of this project following receipt of bids. Due to the high cost of the bids compared to the engineer's estimate, the VE team was retained to offer: an opinion on the appropriateness of the bids; and VE alternatives to reduce the cost of the project so the Authority could move forward to meet court-ordered deadlines.

- **Eastside Combined Sewer Overflow Tunnel**

  City of Portland, Bureau of Environmental Services
  1120 SW 5th Avenue, Room 1000
  Portland, Oregon 97204-1972

  Christa Overby, PE, Tunnel Engineer, 503/823-7918
  503/823-7918, christao@bes.ci.portland.or.us

  Total cost of project: approximately $388 million; Completion date: 2004

  David Hamilton was the VE Team Leader of the VE review of the 30% design complete documents for this CSO tunnel. The VE Team performed value engineering and a cost estimate validation, and a schedule validation. The team incorporated risk analysis into the VE process.

Boyle Client/Reference	Construction Management Project	Status
Bert Rapp ***City of Fillmore*** *805/524-3701*	3 MGD Fillmore Recycling Facility Program Manager and Preliminary Design for DBO project	Continuing Client
Don Glover ***NORSD*** *661/399-6411*	NORSD Regional Wastewater Treatment Plant ($30 million)	Project Completed Continuing Client

Cliff Finley *City of Santa Paula* *805/933-4298*	5 MGD Santa Paula Water Recycling Facility Program Management and Technical Support	Continuing Client
Richard Harasick *Scott Brady* *LADWP* *Barnard* *Construction* *213/367-0910* *406/586-1995*	Owens Lake Shallow Flooding Irrigation Project ($75 million)	Project Complete Continuing Clients
Don Nelson *City of Thousand Oaks* *805/449-2100*	Unit W and F Wastewater Interceptor Reconstruction ($25+ million)	Project Complete Continuing Clients
Bob Wignot *Cachuma Operation and Maintenance Board* *805/687-4011*	SCC Reliability and Technical Studies	Continuing Client

VALUE ENGINEERING FEE PROPOSAL

The following breakdown of manhours and costs demonstrates the effort we anticipate for your value engineering study in September 2005. As requested, we propose this as a cost not-to-exceed proposal.

We typically invoice our clients following submittal of the value engineering study report, since the duration for the VE effort is very fast. We offer a breakdown of costs by phase as follows:

Pre-Workshop Preparation	$ 6,007.85
Value Engineering Workshop	59,244.10
Post-Workshop Effort	6,729.05
Total Not-to-Exceed Cost	$ 71,981.00

City of Lompoc Wastewater Division, California
Lompoc Regional Wastewater Reclamation Plant Upgrade Project
Lompoc, California

Value Engineering Services Proposal
July 7, 2005

Breakdown of Manhours

		Professional		Hours
Preparation Effort				
	Attend Coordination Meeting	D.A. Hamilton	LZA	12
	Review materials, prepare cost models; team member coordination	D.A. Hamilton	LZA	12
	Project management	M.A.W. Lewis	LZA	4
			Subtotal	28
Value Engineering Workshop (including 4 hours preparation time+ 32-hour workshop + 4 to 8 hours travel time)				
	VE Team Leader	D.A. Hamilton	LZA	36
	Asst. VE Team Leader	L.M. Venegas	LZA	44
	Sanitary/Process	D.R. Refling	Boyle	40
	Process/Operations	R.G. Abraham	Boyle	40
	Structural Engineer	D.J. Scherschel	Boyle	40
	Electrical/I&C	A.J. Randall	Boyle	40
	Cost/Constructibility Spec.	S. Simmons	WML	40
	VE Team Recorder	M. Steiner	LZA	40
			Subtotal	320
Final Report Preparation				
	Compile/review workshop materials; write report	D.A. Hamilton	LZA	24
	Participate in post-VE study review conference	D.A. Hamilton	LZA	0
	Word Proc./Comp. Apps.	L. Lamour	LZA	16
	Technical Editor	E.G. Mion	LZA	4
	Principal/PMO	M.A.W. Lewis	LZA	2
			Subtotal	46
			TOTAL HOURS	394

LZA Lewis & Zimmerman Associates, Inc.
Boyle Engineering
WML W. M. Lyles Company

City of Lompoc Wastewater Division, California
Lompoc Regional Wastewater Reclamation Plant Upgrade Project
Lompoc, California

Value Engineering Services Proposal
June 21, 2005

Breakdown of Costs

LABOR

Discipline	Name	Firm	Hourly Rate	Hours by Activity: Prep. Effort	Hours by Activity: VE Wrkshp	Hours by Activity: Post Wrkshp	Total Hours	Total Labor
VE Team Leader	D.A. Hamilton	LZA	$ 179.35	24	36	24	84	$ 15,065.74
Asst. VE Team Leader	L.M. Venegas	LZA	167.05		44		44	7,350.36
Sanitary/Process	D.R. Refling	Boyle	180.00		40		40	7,200.00
Process/Operations	R.G. Abraham	Boyle	166.00		40		40	6,640.00
Structural Engineer	D.J. Scherschel	Boyle	166.00		40		40	6,640.00
Electrical/I&C	A.J. Randall	Boyle	166.00		40		40	6,640.00
Cost/Constructibility Spec.	S. Simmons	WML	150.00		40		40	6,000.00
VE Team Recorder	M. Steiner	LZA	60.38		40		40	2,415.00
Principal/PMO	M.A.W. Lewis	LZA	247.71	4		2	6	1,486.29
Technical Editor	E.G. Mion	LZA	121.88			4	4	487.51
Word Proc./Comp. Apps.	L. Lamour	LZA	67.62			16	16	1,081.92
			Total Labor	28	320	46	394	$ 61,006.81

OTHER DIRECT COSTS

Category		Unit Cost	Quantity by Activity: Prep. Effort	Quantity by Activity: VE Wrkshp	Quantity by Activity: Post Wrkshp	Total Quantity	Total Cost
TRAVEL							
Airfare - Seattle/Lompoc		$ 650.00	1	1		2	$ 1,300.00
Atlanta/Lompoc		800.00		1		1	800.00
Washington DC/Lompoc		800.00		1		1	800.00
Local Travel - local mileage, airport parking, etc.		125.00	0.5	3		3.5	437.50
Travel + Non-labor Related Costs	Boyle					0	4,007.00
Car Rental		80.00	1	4.5		5.5	440.00
Per Diem (including tax)	LZA	210.00	1	12		13	2,730.00
PRODUCTION/ PRINTING							
Reports - hard copies	Draft	25.00		4		4	100.00
	Final	40.00			4	4	160.00
Miscellaneous copies, supplies		L.S.					50.00
COMMUNICATIONS							
Postage/Overnight/Courier		L.S.					150.00
Communications		L.S.					-
ON-SITE EXPENSES							
Meeting Room & Equipment - District		-		0		0	-
						TOTAL ODC	$ 10,974.50
						TOTAL NOT-TO-EXCEED FEE	$ 71,981.00

Lewis & Zimmerman Associates, Inc.
Taking the Chance out of Change

6110 Executive Boulevard, Suite 512
Rockville, Maryland 20852-3903
301-984-9590 • Fax: 301-984-1369
info@lza.com • www.lza.com

HOURLY RATE SCHEDULE BY LABOR CATEGORY – 2005

The following hourly rate schedule is part of Lewis & Zimmerman Associates' proposal and will be used in invoicing for progress payments and for extra work incurred that is not part of the RFP. These rates are accurate through December 31, 2005.

Name	Hourly Labor Rate
Officer/Principal	
M.A.W. Lewis	$ 247.71
Certified Value Specialist/Project Manager/VE Team Leader/Asst. VE Team Leader	
D.A. Hamilton	179.35
L.M. Venegas	167.05
Assistant Project Manager/Technical Editor	
E.G. Mion	121.88
Project Controls/Computer Applications/Team Recorders	
L. Lamour	67.62
M. Steiner	60.38
Accounting	
T. Landicho	62.79
R. Rehr	120.40

LEWIS & ZIMMERMAN ASSOCIATES, INC.

Mary Ann W. Lewis, FSAVE
President

Boyle Engineering Corporation (VT)
FEE SCHEDULE FOR PROFESSIONAL SERVICES
Effective January 1, 2005

Engineers, Planners, Architects, Scientists:

Student Assistant	$	64.00 per hour
Assistant I	$	76.00 per hour
Assistant II	$	88.00 per hour
Associate	$	107.00 per hour
Senior I	$	124.00 per hour
Senior II	$	140.00 per hour
Principal	$	166.00 per hour
Company Officer	$	180.00 per hour
Special Consultant	$	140.00 per hour

Construction Administration Personnel:

Resident Project Representative	$	86.00 per hour
Senior Resident Project Representative	$	103.00 per hour
Resident Engineer	$	120.00 per hour
Construction Services Manager	$	170.00 per hour

Technical Support Staff:

Clerical/General Office	$	56.00 per hour
Administrative Specialist	$	64.00 per hour
Drafter/CADD Technician	$	57.00 per hour
Assistant CADD Operator	$	67.00 per hour
Designer/CADD Operator	$	77.00 per hour
Senior Designer/Design CADD Operator	$	91.00 per hour
Design/CADD Supervisor	$	98.00 per hour

General Project Expenses [1/] 8.25% of Labor

Direct Project Expenses

Other Reproduction (8 1/2 x11/11x17 Color)	$1.15/1.50 per page
Plan Sheet Printing - In House Bond/Vellum/Mylar	$3.00/4.00/7.00 per sheet
Subcontracted Services/Reproduction	Cost + 15%
Subcontracted or Subconsultant Services	Cost + 15%
Auto Mileage for Construction Phase Services	$0.60 per mile
Travel & Subsistence (other than mileage)	Cost
Miscellaneous Materials	Cost + 15%

If authorized by the Client, an overtime premium multiplier of 1.5 may be applied to the billing rate of hourly personnel who work overtime in order to meet a deadline which cannot be met during normal hours.

Applicable sales tax, if any, will be added to these rates. Invoices will be rendered monthly. Payment is due upon presentation. A late payment finance charge of 1.5% per month (but not exceeding the maximum rate allowable by law) will be applied to any unpaid balance commencing 30 days after the date of the original invoice.

Fee schedule is subject to change.

[1/] Includes mail, telephone, fax, office photo copies, personal computers and mileage (except as noted).

DAVID A. HAMILTON, PE, CVS-Life, CCE, LEED™ AP

Associate

Value Engineering Team Leader

Education

Seattle University, Bachelor of Science in Civil Engineering, 1978

SAVE International-approved 40-hour MOD I VE Training Workshop, Georgia Institute of Technology, 1987

MOD II VE Training, 1990

Choosing By Advantages™ Training Workshop/2002

USGBC LEED™ Training/2002

Registrations

Professional Engineer: Washington #23471, 1986

Certified Value Specialist: #910506

Certified Cost Engineer: #1984, 2001

LEED™ Accredited Professional, 2002

Employment Record

Lewis & Zimmerman Associates, Inc., Associate, 1997-Present

U.S. Cost, Vice President, 1987-1997

Camp Dresser & McKee, Senior Engineer, 1984 – 1987

Thousand Trails, Inc., Chief Engineer, 1982 – 1984

Hammond, Collier & Wade – Livingston Associates, Project Engineer, 1980 – 1982

Associated Grocers, Inc., Cost/Pricing Analyst, Facilities/Civil Engineer, 1974 – 1980

Professional Affiliations

American Society of Civil Engineers

SUMMARY OF EXPERIENCE

Dave Hamilton is a registered professional civil engineer, Certified Value Specialist (CVS), Certified Cost Engineer (CCE), and a LEED™ Accredited Professional with more than 30 years experience in project management, design, construction inspection and value engineering (VE) of large complex civil and architectural engineering projects. In his career, he has been responsible for the design, cost control, coordination, and administration of engineering efforts on commercial, institutional, industrial, governmental, and municipal projects.

DETAILED EXPERIENCE RECORD - VALUE ENGINEERING

Dave Hamilton has organized and directed more than 500 VE activities on projects ranging in size from $2 million to $2 billion throughout North America and overseas. He has structured multidisciplinary teams of specialists to tackle a variety of projects such as wastewater and water treatment and conveyance systems, major transit systems, tunnels, buildings, health care facilities, communications systems, military bases, defense facilities, airports, bridges, piers, and highways. Dave Hamilton has been the VE Team Leader (VETL) or civil participant on the following studies:

Wastewater Treatment and Conveyance Projects:

- Orange County Sanitation District Plant No. 1 Expansion—Primary Clarifiers Nos. 16-31, Fountain Valley, CA. VE Team Leader (VETL) on the study of 30% design submittal to add 16 rectangular primary clarifiers and various additional facilities including pumping, piping, odor control, instrumentation and control, etc. to provide an additional 96 mgd of capacity. Estimated construction cost (ECC): $66.4 million.
- South Bay International Wastewater Treatment Plant, San Diego Clean Water Program ($143M), CA. Project Manager and VETL on three 40-hour VE studies of a 50 mgd (ADF), 100 mgd peak flow WWTP located on the U.S./Mexico border. This international project is being funded by the U.S. EPA, State of California, City of San Diego, and the Mexican government. Approximately $43M of savings was accepted from the VE study, representing a return on investment of approximately 580:1 for the owner.
- South Bay Reclamation Pump Station, City of San Diego, Metropolitan Water Department. The $12 million project included an 18 mgd four-plex pump station adjacent to Interstate 5; 13,854 lf of 30-in. force main from the pump station to the treatment plant; and in same trench 16,722 lf of 8-in. sludge force main to transport sludge from the SBWRP north to the existing South Metro Interceptor Sewer for treatment at the Point Loma WWTP.
- Engineering "Feasibility Study on Advanced Integrated Pond Systems" (A.I.P.S.) for the City of San Diego in conjunction with the EPA, and the State of California. Project Manager for the Feasibility study which included the assembling of nationally recognized experts in pond and

AACE International
SAVE International

Awards/Technical Papers
ASCE - Technical Paper "A Geotechnical Study on Alluvial Soils" - 1978
SAVE - Value World, "The Importance of Secondary Functions in Project Development" - 1991
WEF - "Sludge Compression in a Secondary Clarifier" - 1987
AACE - Cost Engineering, "Economic Analysis of the A.D. Edmonston Pumping Plant" - 2003
TBM Tunneling, "Value Engineering Revisited" - 2004

wetland treatment systems. The study evaluated the treatment performance of numerous A.I.P.S. pond systems designed by Dr. Oswald of the UC, Berkeley. The team found that a modified A.I.P.S. could produce effluents with 30mg/L BOD, and 45mg/L SS. A key element is the use of anaerobic sludge digesters at the plant influent. found A.I.P.S. systems very effective at "complexing" heavy metals coming from mixed domestic/industrial waste streams.

- Otay Valley Wastewater Reclamation Plant (7mgd), San Diego Metropolitan Wastewater Department. VETL on this 7mgd project which will treat secondary wastewater up to California Title #22 levels for distribution as reclaimed water. The concept would include additional aeration, addition of polymers, final sedimentation, tertiary filtration, ultraviolet disinfection, and pumping to storage and distribution facilities.
- Hill Canyon Wastewater Treatment Plant Expansion and Upgrade Project, Thousand Oaks, CA. VETL on study of 3.2 mgd expansion, including a new bio-reactor process for nutrient removal, one secondary clarifier, expanded intermediate filter pump station, additional deep bed monomedia tertiary filters, UV disinfection, and various support facilities, buildings and sitework. ECC: $58 million
- Regional Wastewater Reclamation Plant Expansion, Elsinore Valley Municipal Water District, CA. VETL and Civil Engineer on this process of expanding a plant from 4 mgd up to 6 mgd. This upgraded facility will allow for planned growth in the community and establish a new planned layout for future expansions up to 20 mgd. Total project ECC is $30,200,000.
- North of River WWTP Expansion and Detention Ponds, Bakersfield, CA; for Boyle Engineering. Project Manager for the VE study on this 12 mgd trickling filter plant. Effluent from the plant will be stored in effluent ponds prior to discharge to local farmers and used as reclaimed water for irrigation. The discharge limits for the plant are 40mg/L for both BOD5 and TSS. The project also included a 54-inch sewer.
- Industrial WWTP—Naval Air Weapons Station, China Lake, CA; for Boyle Engineering, Inc., and the Naval Facilities Engineering Command—WESTDIV. VETL for this Reverse Osmosis plant with biological oxidation. This plant handles all "energetic" (i.e. explosive) wastes from the testing of munitions.
- Wastewater Treatment Plant Expansion, City of Redmond, Oregon ($15M). VETL on this 3.4mgd Advanced Waste Treatment (AWT) plant which includes a new Orbal disc aeration system. Permit limits on the plant have been restricted to 10-10-5-1 to prevent possible pollutant build up in the spray irrigation fields. Solids treatment will include lime stabilized sludge with disposal to local farms.
- City of Portland, Oregon Wastewater Outfall. VE study project manager on this project for which alternatives were developed to create effluent holding basins to reduce peak flows and the resulting pipe size increase required to pass these higher diurnal and CSO flows.
- Real Time Control Strategy Improvement Plan, Milwaukee Metropolitan Sewerage District, Milwaukee, WI. VETL of study to evaluate the goals, assumptions, benefits, and value of a proposed real time control (RTC) system. The overall goal of the project was to maximize the use of

existing facilities while minimizing separate sewer overflows (SSO) and reducing the number of combined sewer overflows (CSO). The team offered alternatives that addressed all facets of the control plan including meteorological projection, system flow projections, and control logic, as well as the overall goal of maximizing the use of the ISS and MIS systems. During the study several items in the tunnel pumping facility and treatment of CSO flows were also noted and recommendations included in this report.

- New York City's Office of Management and Budget (OMB), New York, New York, Central Residuals Building (CRB) project located at the Newtown Creek Water Pollution Control Plant (WPCP), Brooklyn, New York. Assistant VETL on project to address a Consent Order requiring the Newtown Creek WPCP to achieve secondary wastewater treatment at levels that meet United States Environmental Protection Agency standards. The plant will rely on a wet stream process that consists of influent screens, grit tanks, step-feed aeration tanks, final sedimentation tanks, and chlorine contact tanks. ECC is $161.9 million.
- Stadium High School Sewer Interceptor Failure, Tacoma, WA. Performed VE/hydraulic analysis of the drainage basin to simulate flow conditions in a 1917 brick interceptor, which caused a major landslide on the eastern bluff above Puget Sound. Findings showed that the sewer was surcharged, flow escaped though an exposed hole left in the top of the pipe for future (1917) side sewers, causing excess pore pressure to build up the soil resulting in liquifaction.
- Upper Blackstone Water Pollution Abatement District, Wastewater Treatment Facility Improvements Project, Millbury, Massachusetts.
  - VE Team Leader on the Phase I design to upgrade the plant process. Upgrade will meet recent permit changes requiring the plant to move from a conventional activated sludge process to a process with biological nutrient removal (BNR). Team reviewed the 30% Preliminary Design Report; focus of their concerns was on the high cost of site remediation. The team made recommendations to address the new headworks, soil remediation issue, phasing of new process tanks, and the type of instrumentation proposed for the plant. ECC of Phase I $71.5 million; ECC of total project $135.8 million.
  - VETL on Phase I design development submittal. The key concerns of the VE team centered on the high cost of the odor control at the headworks using an in-ground biofilter system. The majority of the recommendations focussed on the new headworks building, flow split pipe and routing, and detailed electrical suggestions. ECC of Phase I $52.3 million.
- Galien River Sanitary District Authority, Wastewater Treatment Facility Improvements, New Buffalo, MI. VETL of study of improvements to wastewater facility that will accommodate expected new flows to the plant and address hydraulic considerations caused by a high peaking factor. The plant is designed for a peak instantaneous flow of 12.5 mgd. The team reviewed the 85% contract Plans and Specifications, focussing its efforts on phasing options, constructibility issues, and methods to control the high peaking factors without major modifications to the existing drawings. The team suggested adding an equalization basin to reduce the high peak loads, and to add additional basins in the future.

ECC is $10.6 million.

- Racine Water and Wastewater Utility, Wastewater Treatment Facility and Sewer Upgrade, Racine, WI. VETL of study of the Wet Weather Process Optimization Improvements (WWTF project phase) North Side Storage Facility and the North Side Relief Sewer project. The state permit for discharging effluent was contingent upon the submission of a compliance schedule for upgrading the sewerage facilities, including a Facilities Plan for the Year 2020, and submittal of plans and specifications. The study was done on the facilities plan, the on-site facilities upgrade, and expansion for wet weather process optimization improvements. Study was done at the 30% design completion stage. ECC for treatment plant improvement is $56.9 million; overall ECC of the project is $79 million.
- Advanced Wastewater Treatment Facilities Expansion, Warwick, RI. VETL on study of 2.7 mgd expansion, including the addition of a biological nutrient removal (BNR) system and de-chlorination facilities.
- Rocky River WWTP Upgrade, Water & Sewer Authority of Cabarrus County, Concord, NC. VETL on a study of this 10 mgd plant expansion. ECC $17.5 million.
- Bucklin Point Wastewater Treatment Facility Improvement Project, Narragansett Bay Commission, Providence, RI. VETL on study of 30% submittal to add four new primary clarifiers, new disinfection facilities, and a new plant pretreatment facility, including four new influent screw pumps, followed by four catenary screens. ECC: $43 million.
- North Bay and Reserved Channel Consolidation and Reserved Channel CSO Facility Project, Massachusetts Water Resources Authority. VETL on the team studying the 1) 600 mgd effluent pump station, dewatering pumps, fine screening facilities, disinfection of the CSO effluent, odor control and twin 10-foot-diameter, 300-foot long outfall pipes; and 2) Odor Control Facilities. Study performed at Preliminary Design Report stage. Total project ECC is $68,900,000.
- Wastewater Treatment Facility Upgrade and Combined Sewer Overflow Abatement Program, Rockland, ME ($3M), City of Rockland, ME. VETL on this project which analyzed the 30% design completion documents of the proposed upgrades to this 2.9 mgd facility aimed at reducing the CSOs that include waste from both municipal and industrial sources, thereby improving the water quality of the surrounding harbor.
- Industrial Wastewater Treatment Plant, Naval Public Works Center, Pearl Harbor, HI ($17M), Designer, CH2M Hill. Project Manager and VETL for this 10,000gpd facility which will treat all industrial wastes generated within the Pearl Harbor area. The project includes tanker unloading facilities, pH reaction tanks, sludge settling tanks, sludge dewatering, an administration/lab building, and a bulk reagent storage facility.
- Cedar Creek WWTP, Louisville-Jefferson Co. Metro. Sewer District. Designer: GRW Engineers, Inc. VETL with Khafra Engineering, Inc. for this plant expansion.
- Wastewater Treatment Plant Improvements, Ft. Kamehameha, Naval Public Works Center, Pearl Harbor, HI—Preliminary Engineering Report & VE. Project Manager for the Preliminary Engineering report for a plant expansion from 7.5mgd to 13mgd to meet increasing flows from Pearl Harbor. The VE team gathered plant data which revealed a marked

increase in BOD and TSS influent strength to the plant. This new influent strength created an overload condition in both the activated sludge basins, blowers, and the secondary clarifiers.

- Shelby County WWTP, NC. Project Manager for a VE study on this 7mgd activated sludge plant.
- RODI Plant Expansion (Reverse Osmosis Deionized Water System), Intel Corp., Phoenix, AZ. VETL for this ultra-pure water system used by Intel to rinse computer chips. The plant expanded from 100gpm to 200gpm.
- Sweetwater Creek WWTP; for the Douglas Co. Sewer Authority, GA. VETL for the Phase I of this new 12mgd activated sludge plant. The first phase included two "Carrousel" extended aeration basins plus sludge processing facilities. The discharge limits were 20/20, with nitrification.
- Sludge Drying and Processing Plant, City and County of Honolulu, HI ($5.8M). Team Leader on a cost reduction/VE study analyzing the constructibility of this privatized processing plant. Final product will be dried/bagged for retail sales.

LUIS M. VENEGAS, PE, CVS, LEED™ AP

Vice President

Assistant VE Team Leader

SUMMARY OF EXPERIENCE

Luis Venegas is a Value Engineering Team Leader (VETL), a VE training instructor, and an architectural or civil engineering team member on LZA's VE studies and workshops. As a registered professional engineer, a Certified Value Specialist (CVS) and a LEED Accredited Professional who has served as team leader on more than 350 VE studies for a variety of projects in both the private and public sectors. Prior to joining LZA Luis Venegas was the Program Director/Manager for both VE and A&E liability programs for the Naval Facilities Engineering Command, OICC TRIDENT Nuclear Submarine Base, Kings Bay, Georgia.

DETAILED EXPERIENCE RECORD - VALUE ENGINEERING

Wastewater Treatment and Conveyance Facilities

- Orange County Sanitation District, CA, Project No. P1-37 Primary Clarifier Nos. 16 - 31 and Related Facilities, OCSD Reclamation Plant No. 1, Fountain Valley, CA. VETL on study of 60% complete documents. ECC $66,402,030.
- Valley Center Sewerage & Water Reclamation Project - 60% Design Completion, County of San Diego, CA
- City of Shelton, Connecticut Water Pollution Control Authority, Wastewater Treatment Facility Expansion and Upgrade project. VE Team Leader on the design of this expansion. The design basis included an average daily flow of 4.0 million gallons per day (mgd), a maximum monthly flow of approximately 7.0 mgd, and a peak hourly flow of 12.0 mgd. The ECC was $16,101,000.
- Central Residuals Building (CRB) project, Newtown Creek Water Pollution Control Plant (WPCP), Borough of Brooklyn, New York. A Consent Order required the Newtown Creek WPCP to achieve secondary wastewater treatment at levels that meet United States EPA standards. Processes to be located within the new building are: secondary influent screens, waste sludge screens, grit cyclones, grit classifiers, skimmings concentrators, residuals container storage and loading areas, carbon absorber odor control systems, and Manhattan influent flow meters. Study was conducted at the 30% preliminary design level. ECC is $161.9 million.
- Tallman Island Water Pollution Control Plant, New York, New York. VETL of multidisciplinary team reviewing the design to upgrade this 17,400-acre facility that serves 400,000 residents of the Borough of Queens. $96.6 million ECC.
- Central Plant Upgrade, North Bergen Municipal Utilities Authority (NBMUA), North Bergen Township, NJ. VETL of upgrade of plant facilities that will consist of a 10 mgd activated sludge treatment plant with a peak flow capacity of 25 mgd. The activated sludge system will be able to meet expected changes in the New Jersey Effluent Limitations. The study focused on scheduling, constructibility, and reduced capital costs. ECC is $34.3 million.

Education

Bachelor of Science, Architectural Engineering, University of Miami, Coral Gables, Florida, 1972

Associate of Arts, Miami Dade Community College, Miami, Florida 1968

40-Hour Value Engineering Training Workshops—Mod I, 1982; Mod II, 1998

Partnering Facilitation Workshop, 1994

Choosing By Advantages™ Training Workshop/2003

USGBC LEED™ Training/2003

Registrations

Professional Engineer: Commonwealth of Virginia, 1979, No. 11559

Certified Value Specialist: 861001

LEED™ Accredited Professional, 2004

Professional Affiliations

National Society of Professional Engineers

Georgia Society of Professional Engineers

SAVE International, Chairman – Certification Board

Society of American Military Engineers

- Ocean County Municipal Utilities Authority, New Jersey, Center Water Pollution Control Facility Improvement Project, Bayville, New Jersey. Served as VETL and Architectural/Civil Engineer on 95% Design Completion Stage VE study on this treatment plant improvement project
- Hominy Creek Wastewater Management Facility (HCWWMF) Upgrade and Expansion, City of Wilson, North Carolina. VETL on study to address immediate need for sludge management improvements of 14 mgd capacity that had been deferred from Phase 2 of upgrade. Study addressed upgrade and expansion to a capacity of up to 20 mgd. Focus was also on capital costs and the development of a long-range master plan to identify the cost of future capacity enhancements. Budgeted ECC $12 mn.
- Big Walnut Sanitary Trunk Sewer Extension, Columbus, Ohio. VETL on project to extend the Big Walnut Sanitary Trunk Sewer from behind the Little Turtle subdivision in northern Franklin County to Duncan Run Creek in southern Delaware County. Total of 27,150 lineal feet (LF): 8,210 LF tunneled; 8,290 LF microtunneled; and 9,750 LF either microtunneled or open-cut construction. $36.8 million ECC. The sewer alignment was revised to use primarily conventional tunneling methods as result of the VE study.
- Big Walnut Outfall Augmentation Sewer and Rickenbacker Sewer, Columbus, Ohio. VETL on this project to construct a 168-inch diameter interceptor to: 1) service the ultimate planning and tributary areas; 2) serve as an augmentation/relief sewer for the existing 108-inch outfall sewer; 3) provide wet weather storage to minimize system raw sewage by-passing; and 4) decommission two existing pump stations. ECC $122,000,000.
- City of Columbus, OH, Department of Public Utilities, Division of Sewerage and Drainage, Under and open-ended VE services contract with H. R. Gray & Associates, Inc., Mr. Venegas performed the following studies:
  - Southerly Wastewater Treatment Plant, CIP 352 New Headworks Facilities. VE team Leader on study of new 450 mgd headworks facility. ECC $109 million.
  - Southerly Wastewater Treatment Plant, CIP 355 - Effluent Disinfection Improvements. VE team Leader on study to hydraulically expand the effluent segment of the plant's wet stream and perform major upgrade of chemical disinfection process. VE study was performed at 30% Design Stage. ECC $15,247,000.
  - Jackson Pike Wastewater Treatment Plant, CIPs 230 & 236 - Electrical Upgrade and PCB Removal. VETL on the detailed design study to upgrade electrical system and remove PCB-contaminated electrical equipment. ECC $12,096,000.
  - Jackson Pike and Southerly Wastewater Treatment Plants, CIP 348 Wastewater Treatment Facilities Instrumentation & Control (I&C) System Upgrade. VETL on this ECC $26,000,000 project.
  - Jackson Pike Wastewater Treatment Plant, CIP 246 - Sludge Handling and Dewatering Improvements. VETL on this project to replace the existing dewatering and thickening centrifuges with new high solids

centrifuges in three construction phases. ECC: $24,500,000.

- Jackson Pike and Southerly Wastewater Treatment Plants, CIP Nos. 243 and 356 - Sludge Holding System Improvements. VETL on this ECC $18,200,00 project.
- Southerly Wastewater Treatment Plant, CIP No. 650349 - Sludge Dewatering and Miscellaneous Improvements. VETL on this ECC $20,100,00 project.

- Midway Wastewater Treatment Plant, Midway, KY. VE team Leader on project to replace an existing treatment plant with a new $3.6 million plant.
- Sewage Treatment Plant, Meadville Area Sewer Authority, Pennsylvania. Led a VE team in reviewing plans to ensure this $12 million facility complies with current environmental standards.
- Back River Wastewater Treatment Plant, Baltimore, Maryland - Retrofit of Activated Sludge Facility consisting of new Nitrification/Denitrification Facility - Phase III
- Reidland Water-Sewer District, Paducah, Kentucky. VETL for Phase II New Wastewater Treatment Plant Improvements project.
- City of West Lafayette Wastewater Treatment Facilities, Indiana. Served as VETL on a 25% Design Completion VE on WWTP Upgrade
- Ponce Pump Station and Outfall Project, Puerto Rico Aqueduct and Sewer Authority, San Juan, Puerto Rico
- Alterations and Additions to the Watertown Wastewater Treatment Facility, City of Watertown, South Dakota
- Clavey Road Sewage Treatment Plant Improvements Project, North Shore Sanitary District, Gurnee, Illinois. VETL for review of this $21.5 million program.
- Gurnee Sewage Treatment Plant Improvements Project, North Shore Sanitary District, Gurnee, Illinois. VETL for review of this $30.9 million program.
- Clear Lake Sanitary District, Clear Lake, Iowa. VETL for Phase I Improvements to the Clear Lake Wastewater Treatment Plant.
- VETL for the Additional Aeration Facilities Project, Washington, D.C., Washington Area Sanitary Utility Authority (WASUA)
- Solids Facilities - Stage III, Contract LO3, Greater Vancouver Regional District. Mr. Venegas served as the Assistant VETL for report writing and technical editing for the $39 million Lulu Island Wastewater Treatment Plant expansion for secondary treatment
- OICC-TRIDENT, Naval Facilities Engineering Command, Kings Bay, Georgia:
  - Base Wastewater Treatment Plant Expansion
  - Base Area Water Treatment Plant Industrial Wastewater Treatment Plant

David R. Refling, PE, DEE

National Director of Wastewater Treatment

Education	BS/Physics University of Wisconsin, 1972 MS/Environmental Engineering Johns Hopkins University, 1975
Registration	Professional Engineer (1981)
Years of Experience	Joined Boyle 1996, with others 21 years
Professional Affiliations	Florida Water Environment Association (FWEA) Water Environment Federation (WEF) Diplomate, American Academy of Environmental Engineers (AAEE), National Society of Professional Engineers (NSPE), Florida Engineering Society (FES)

Related Experience

Mr. Refling's qualifications include extensive experience in the planning, design, and management of water, wastewater, stormwater, and reuse system projects. His broad experience covers water and wastewater treatment, distribution, and collection systems; effluent reuse and disposal; sludge treatment and disposal; facility master planning; and water quality. He holds special expertise in process design, including Biological Nutrient Removal (BNR) design and start-up assistance for the first Bardenpho wastewater treatment facility in the United States. He has co-authored 14 articles on innovative wastewater treatment systems involving BNR and water reclamation/reuse.

Related Experience

Altamonte Springs Water Reclamation Facility Annual Services, Altamonte Springs, FL.

Burnt Store Reverse Osmosis Water Treatment Plant Expansion, Punta Gorda, FL. Principal-in-charge responsible overall project direction.

Burnt Store WWTP Expansion Preliminary Design, Cape Coral, FL. Project manager.

Clermont East Side WRF Expansion, Clermont, FL. Principal In Charge

East Central Regional Wastewater Treatment Facility, Palm Beach County, FL. Process engineer for the design..

Related Experience—continued

Lehigh Acres Wastewater Treatment Facility Expansion, Fort Myers, FL. Principal-in-charge responsible for design development.

Orange County Northwest Water Reclamation Facility Re-Rating, Orlando, FL. Principal-in-charge for the preliminary and final design.

Orange County South Water Reclamation Facility, Orlando, FL. Principal-in-charge of construction phase services..

Orange County South Water Reclamation Facility Biosolids Handling Improvements, Orlando, FL. Principal-in-charge.

Orlando - Iron Bridge Regional Water Reclamation Facility Re-Rating, Orlando, FL. Principal-in-Charge and Project Manager for the design .

Peace River Option, Arcadia, FL. Technical advisor. This project included planning, design, and construction-phase services for a 6 mgd expansion of a surface water treatment plant to 18 mgd capacity.

Polk County Northeast Regional Wastewater Treatment Plant Improvements, Polk County, FL. Performed quality control for all aspects of the project..

Venice Eastside Wastewater Treatment Plant Expansion, Venice, FL. Principal-in-charge for final design of a WWTP expansion..

Winter Garden - Crest Avenue WWTP, Winter Garden, FL. Project manager responsible for the permitting, preliminary and final design phases.

West Regional Wastewater Treatment Plant, Indian River County, FL. Project Manager for the study and design of the West Regional Plant.

Wastewater Treatment Plant, City of Springdale, AR. Provided wastewater treatment plant operations assistance and designed modifications.

Citywide Wastewater and Reuse System, City of Ocoee, FL. Directed the development of a citywide Wastewater and Reuse System.

O& M Manuals and Operator Training, cities of Rogers and Springdale, AR. Prepared O&M manuals for the 6.7-mgd Bardenpho/Carrousel facility.

Ronald G. Abraham, PE

Principal Civil Engineer

Mr. Abraham specializes in wastewater treatment and water treatment.

Fields of Special Competence	Wastewater Treatment Planning and Design Water Treatment Planning and Design Disinfection Facility Design Chlorine Scrubber Design Pump Station Design
Education	BS/Civil Engineering South Dakota State University/1984 MS/Sanitary Engineering South Dakota State University/1987
Registration	Professional Civil Engineer/CA (1989), SD , IA Water Treatment Plant Operator, CA/Grade 4 (T4)
Years of Experience	Joined Boyle 1986 With Others 1 year 3 Years Tertiary Wastewater Treatment Plant Operator
Professional Affiliations	American Water Works Association American Society of Civil Engineers Water Environment Federation American Society of Military Engineers International Ultraviolet Association Association of State Drinking Water Administrators

Related Experience

As a project manager and process team leader, Mr. Abraham is experienced in many wastewater and water treatment plant projects.

Mr. Abraham is Boyle's Central Valley wastewater practice group leader. His experience as a project manager and design engineer includes planning, design and construction phase services for wastewater, water and industrial treatment facilities. Many of his projects include evaluation (audit) of surface water treatment and reclamation plants which have special project specific regulatory requirements. Ron has three years experience working as a tertiary wastewater treatment plant operator and laboratory technician and is certified as a Grade 4 water treatment plant operator in California. He also has experience with value engineering of projects and has completed a 40-hour Value Engineering Workshop.

Project manager and process team leader for the design of the **City of Bakersfield 28.5 MGD secondary wastewater treatment facility upgrade and expansion.** Responsibilities included design and design supervision of primary and secondary treatment, plant influent sewer and headworks structure corrosion rehabilitation, effluent irrigation pumping, conveyance and storage, sludge handling and disposal (drying beds), and cogeneration facilities. Processes include pretreatment screening, washing and conveyance and grit removal, primary and secondary sedimentation, scum removal, biofilters, plant influent and treated wastewater lift stations, biofilter recirculation pump station, primary and secondary sludge pump stations, existing digester upgrade, corrosion repair, and insulation, new digesters, pump mix and recirculation pumping for digesters, digester gas scrubbing for hydrogen sulfide and

Ronald G. Abraham, PE

Related Experience—continued

mercaptan removal, sludge heating facility modification and expansion, 800 KW cogeneration facility with heat recovery system for digesters. and Air Quality Management District (AQMD) compliance including digester gas scrubbing. Project responsibilities also included coordination with the client, value engineering consultant, the design team, and the funding and permitting agencies, and preparation and management of budgets and schedules. The treated effluent is used to irrigate cotton and alfalfa crops.

Project manager for **City of Madera, CA, 7.0 MGD Wastewater Treatment Plant Upgrade and Expansion Project.** Project includes wastewater treatment plant audit, sludge handling modifications incorporating a centrifuge for mechanical dewatering, and facility expansion improvements. including secondary process modification to meet new waste discharge requirements.

Project engineer for **North of River Sanitary District No. 1 6.0 MGD Wastewater Treatment Plant.** The facility consists of raw wastewater pumping, screening, grit removal, metering, primary clarification. plastic media biofiltration, secondary clarification. and anaerobic digestion utilizing gas mixing, digester gas fired boilers. countercurrent sludge heating, The facility also incorporates an odor scrubbing facility for the headworks and degritting facility. The treated effluent is used to irrigate cotton and alfalfa crops.

Project engineer for **Edwards Air Force Base 2.5 MGD Tertiary Wastewater Treatment Plant.** Th is facility includes raw wastewater screening, pumping. grit removal, septage receiving and pumping. metering. and "Carrousel" biological nitrification/denitrification extended aeration. activated sludge. secondary clarification, flocculation, filtration, disinfection, RAS/WAS sludge pumping, mechanical sludge dewatering utilizing belt filter presses, and aerated static pile composting the dewatered sludge utilizing shredded paper as the carbon source and amendment. Chemical feed systems included sodium hypochlorite (disinfection, alum (coagulation). polymers (coagulation and sludge dewatering). ferric chloride (odor control). and caustic soda (pH control). All the chemical storage facilities and chemical feed lines are provided with secondary containment piping and leak detection monitoring. The treated effluent will be used for landscape irrigation and groundwater recharge. Other responsibilities included sludge report. O&M manual, and Title 22 submittal review.

Publications

Abraham, R., Holderness, P., and Horn, B.. "Optimizing Operational Performance of a Diatomaceous Earth Filtration Plant with Particle Counting". Presented at the California-Nevada Sectional AWWA Fall Conference, October 15-18, 1996. Palm Springs, CA

Abraham, R.. Paxton C. Horn B. "Design and Operational Issues for converting Disinfection Facilities from Gas Chlorine to Sodium Hypochlorite". Presented at the AWWA Annual Conference and Exposition, June 16-20. 2002.New Orleans. LA.

David J. Scherschel, SE

Principal Structural Engineer

Fields of Special Competence	Structural Engineering Design Hydraulic Structures Public Works Facilities Bridges and Commercial Buildings
Education	BS/Civil, Structural Engineering Purdue University/1959
Registration	Professional Civil Engineer/California (1965) Registered Structural Engineer/California (1969), CO, WY, ND, SD, NV, AZ, OR, MD, FL, NB, WA, OR, UT
Years of Experience	Joined Boyle 1969 With Others 10 years
Professional Affiliations	American Society of Civil Engineers Structural Engineers Association of California American Public Works Association

Related Experience

Mr. Scherschel has more than 35 years of structural engineering experience. Experience ranges from conceptual design, feasibility studies, value engineering, cost estimating, design, and detailed specification writing to field construction resident engineering. Responsible for static and seismic evaluation, analysis, and design of bridges, reservoirs, water and wastewater treatment plants, and hydroelectric facilities; analysis of structures; transmission pipeline supports; naval piers; and commercial and military facilities.

- **Goleta Water District 32-mgd Renovation and Expansion for the Corona Del Mar Water Treatment Plant.** The project includes upgrade and expansion of the existing water treatment plant to comply with Interim Enhanced Surface Water Treatment Rule (IESWTR), Stage I Disinfectants/Disinfection Byproduct D/DBP Rule, and Department of Health Services Cryptosporidium Action (CAP) Plan.
- **Antelope Valley-East Kern Water Agency (AVEK) 65-mgd Quartz Hill Water Treatment Plant Expansion No. 3.**
- **Foothill Surface Water Treatment Plant 25-mgd Upgrade and Expansion,** Placer County Water Agency, California.
- **Rehabilitation of 17 Clarifiers.**
- **Disaster Preparedness Plan—Collection, Treatment, and Disposal Facilities.**
- **Olivenhein Water Treatment,** Olivenhein Municipal Water District, San Diego, California. One of the country's largest membrane *treatment plants.*
- **Sweetwater Authority Membrane Water Treatment Plant,** Sweetwater Authority, Chula Vista, California

Allen J. Randall, PE

Managing Engineer

Fields of Special Competence	Electrical Power Distribution Design Control Systems Design
Education	BS/Electrical Engineering Kansas State University/1970 MS/Electrical Engineering University of Pennsylvania/1971
Registration	Professional Engineer/CA (1977), AZ, CO, FL, IN, MD, NV, NM, ND, OK, SD, TX, UT, WA
Years of Experience	Joined Boyle 1979 With Others 8 years
Professional Affiliations	Institute of Electrical and Electronic Engineers National Society of Professional Engineers Association of Energy Engineers

Related Experience

Experienced in management and design of electrical systems for industrial and commercial facilities, including industrial and office lighting, site and roadway lighting, power transmission and distribution, control wiring diagrams, electrical estimating, telemetry systems, and instrument systems. Coordinates electrical engineers, designers, and drafting personnel in preparation of drawings and specifications.

Over 18 years of experience in electrical design and contract administration on reservoirs, water transmission main facilities, pumping stations, hydroelectric plants, and water treatment plants.

Over 80 water and wastewater pumping station designs and contract administration experience for municipalities and water districts.

Over 50 water pumping station designs and contract administration experience for municipalities and water districts.

Mr. Randall's extensive electrical design and contract administration experience includes pumping stations, reservoirs, distribution facilities, hydroelectric plants, and treatment plants. He has been involved in more than 80 pumping station designs and has contract administration experience for water districts and municipalities. His experience also includes the management and design of electrical systems for industrial and commercial facilities, including industrial and office lighting, power transmission and distribution, control wiring diagrams, electrical estimating, telemetry systems, and instrument systems. His electrical engineering expertise stems from such projects as:

- **Cambria Wastewater Treatment Plant**, Cambria Community Services District, California. Electrical power distribution and control and instrumentation.

Related Experience—continued

- **Point Loma Wastewater Treatment Plant Expansion**, City of San Diego, California. Project included primary and secondary electrical power distribution and control for plant expansion and modifications.
- **Southeasterly Wastewater Treatment Plant**, City of Orlando, Florida. Project included 34.5-kw primary distribution system, site and roadway lighting, private telephone system, fire alarm systems, computer systems, and electrical power and control systems.
- **Tehachapi Wastewater Treatment Plant**, City of Tehachapi, California. The 1.25-mgd extended aeration wastewater treatment plant includes a headworks designed for 7 mgd, "Carrousel" reactor basin, secondary clarifier, sludge handling facility, chlorination facility, and a plant control building. A 500-kw standby generator provides plant power during utility outages.
- **Wastewater Reclamation Plant Electrical Distribution System Expansion**, Los Alisos Water District, El Toro, California. Project included the replacement of 1,600-ampere utility service with a 4,000-ampere, 480-volt service, replacement of 74 corroded aerator starters around the lagoons with new starters in a new building with filtered air supply, and addition of a new 600-kw standby generator. Also included were variable frequency drives for existing pumping station, expansion of reclaimed water pumping station, and a new fuel station.
- **Wastewater Treatment Plant No. 2 Expansion**, City of Bakersfield, California. The plant expansion from 19 mgd to 28.5 mgd involved headworks modifications including mechanical screens, primary clarifiers, trickling filters, secondary clarifiers, anaerobic digesters, sour gas cleaning, digester gas handling facilities, and a cogeneration and heat recovery system. Two 400-kw generators with synchronizing switchgear were designed to provide electricity for the sewage treatment plant.
- **Edwards Air Force Base Wastewater Treatment Plant**, California. Project included a new wastewater treatment facility capable of treating 2.5 mgd to tertiary and advanced levels. Processes involved bar screens with screenings washing and compaction, raw sewage pumps with variable frequency drives, septage receiving facilities, grit removal, metering, secondary treatment reactors for biological nitrification/denitrification, circular clarifiers with RAS and WAS pumping station, filter belt press and tertiary treatment flocculation, filtration, and disinfection. Project also included a 600-kw diesel standby engine generator. Electrical work included a new 34.5-kv circuit breaker addition to existing switch station No. 4 to serve a new substation for the wastewater treatment plant and future facilities. The existing bus and isolation/bypass switch structure were also extended at switch station No. 4. The new substation consisted of a 2,500-kva, 34.5- to 12.47-kv transformer, and associated medium voltage switchgear. Monitoring and control functions of the switch station breaker and new substation were interfaced to the existing SCADA system.

Pars L. Topjian, PE

Principal Electrical Engineer

Fields of Special Competence	Power Distribution, Lighting, and Control
Education	BS/Electrical Engineering American University of Beirut/1972
Registration	Professional Engineer/CA (1988)
Years of Experience	Joined Boyle 1989 With Others 17 years
Professional Affiliations	Member, National Fire Protection Association (NFPA)

Related Experience

Specialized in electrical design, power distribution, lighting, and control for industrial facilities; water and wastewater treatment plants: water, storm water, and wastewater pumping stations; standby generation plants; water well pumping stations; highway interchanges: and commercial and institutional projects.

Project Electrical Engineer for:

- **Wastewater Treatment Plant No. 2 Expansion,** City of Bakersfield, California. The plant expansion from 19 mgd to 28.5 mgd involved headworks modifications including mechanical screens, primary clarifiers, trickling filters, secondary clarifiers, anaerobic digesters, sour gas cleaning, digester gas handling facilities, and a cogeneration and heat recovery system. .
- **Corona Del Mar Water Treatment Plant,** Goleta Water District, Goleta, California. Project included miscellaneous upgrades including electrical service switchboard, power distribution, motor control centers, lighting, and controls.
- **Water Treatment Plant Improvements,** City of Coalinga, California. Project included plant expansion and upgrading of the electrical and control system.
- **Penasquitos Canyon Interceptor Sewer,** City of San Diego Metropolitan Wastewater Department, San Diego, California. The project included a 32-mgd pump station utilizing 10 400-hp sewage pumps controlled by variable-frequency drives and solid-state starters.
- **ARAMCO Tertiary Treatment Plant,** Dhahran South, Saudi Arabia. Project included motor control centers, power distribution, telephone and paging systems, fire alarm system, lighting system, and control systems in 9-mgd plant.
- **Clarifier Rehabilitation, Plants 1 and 2,** County Sanitation Districts of Orange County, California. Project included improvement of electrical equipment associated with 17 clarifiers. Existing single-line and schematic diagrams were modified.

Stan Simmons

RESUME OF QUALIFICATIONS

EDUCATION: Bachelor of Science Degree-Construction Engineering
Iowa State University 1979

REGISTRATION: Registered Professional Engineer, Iowa. 1983. PE 10379

WORK EXPERIENCE:

W.M. Lyles Company (W.M. Lyles Group)
2002-Present

Position: District Manager
Job Description: Executive management of construction operations in Southern California. Responsibilities include estimating, project management, coordination of field activities and all associated activities.

Partial Project List:

Lytle Creek WWTP & Reclaimed Water System-Design/Build	$15.0M
Riverside Aeration-City of Riverside	$8.6M
Canyonside Pump Station-City of San Diego	$1.9M
Jurupa Water Treatment Plant-Jurupa Community Services District	$3.2M
Catalina Pump Station-City of San Diego	$3.6M
Morongo WWTP-Design Build	$5.0M
Scripps Poway Parkway Pump Stat.-Shea Homes (City of San Diego)	$1.2M
Corona Solids Drying Facility-Design Build	$1.2M

JW Contracting Corporation
1996-2002

Position: Executive Vice President
Job Description: Executive management of annual volume of $50-$60 million/year. Responsible for hands on involvement of all aspects of the construction company including Project Management, estimating, field work, Design/Build efforts, accounting, scheduling, dispute resolution, and capital expenditures.

Partial Project List:

EMWD-Temecula WWTP	$20.2M
Olivenhain WTP	$14.4M
Horton WWTP	$ 6.2M
Rialto Reservoir	$ 3.4M
Bayview Reservoir	$ 8.3M
OCSD-Solids Storage & Truck Loading Facility	$10.4M
29 Palms Fluoride Removal WTP	$ 3.0M
EMWD-Reach 4 Energy Dissipation	$ 1.2M
SDCWA-Pipeline 2A Pump Station	$ 2.3M
City of Corona-Zone 4 Reservoir (Design/Build)	$ 3.3M
EMWD-Secondary Upgrade WWTP Improvements	$ 5.2M
City of Fullerton-Highland Ave Grade Separation	$ 6.6M
City of Riverside-Back-up Power Cogeneration	$ 8.7M
Inland Empire-RP-1 Cogeneration	$ 2.9M

City of Victorville-Victor Valley WWTP Expansion	$12.1M
PalmdaleWater District-6MG Clearwell & Pump Station	$5.2M
Inland Empire-Aeration System Improvements	$3.3M
EMWD-Chlorination Upgrade	$5.7M
City of Pomona-Pomona Reservoir #3a	$2.4M
AWMA-Solids Handling Facility	$3.8M
Inland Empire-RP-1 Odor Control	$1.7M

Pascal & Ludwig Engineers
1992-1996

Position: Vice President
Job Description: Responsible for overall coordination of one half of P&L's $25 million/year annual volume including hands on involvement of estimating, coordination of Project Managers, scheduling, cost accounting and claims development.

Partial Project List:

Lakeside Pump Station	$0.8M
MWD-Joseph Jensen Chlorination Facility	$1.1M
LACSD-Palmdale WWTP Expansion	$8.0M
SDCWA-Otay 4/9 Flow Facility	$1.7M
Riverside Aeration Facility	$1.6M
Orange County Sanitation WWTP Modifications	$7.6M
UC Riverside-Thermal Energy Storage Tank System	$2.7M
City of Riverside-Van Buren Reservoir	$3.8M
Burbank Chlorination Facility	$2.8M
City of LA-Glendale Bar Screen Facility	$1.0M
Otay Water District-Copps Lane & Hillsdale Pump Station	$5.2M
City of Inglewood-Sanford Anderson Water Treatment Plant	$3.6M
City of Santa Paula-Well #12 Mangenese Filtration Plant Facility	$1.0M
MWD-Robert Diemer Filtration Plant Expansion	$2.4M
SDCWA-Pipeline 4 Expansion/Flow Control Facility	$1.5M

Kaweah Construction (W.M. Lyles Group)
1983-1992

Position: Assistant Division Manager 1990-1992
Job Description: Responsibilities include involvement in overall corporate Policy and capital expenditures, claims development, hiring and training of Project Managers, Estimators, Project Superintendents, and participation in all major bids, management of multiple projects with Project Managers on each jobsite.
Position: Project Manager 1985-1990
Job Description: Start to finish Project Management, bidding of projects, issue subcontracts and PO's, hiring of field personnel, supervision of multiple Project Engineers and Superintendent on individual projects.
Position: Superintendent 1983-1985
Job Description: Responsible for coordination of all project field activities

Partial Project List:

City of Pinole-WWTP	$3.0M
City of Ducor-Well Facility	$1.0M
Donner Summit PUD-WWTP	$3.5M
Bakersfield WWTP Digester Rehab	$1.5M
Visalia WWTP Digester #5	$1.5M

Hanford WWTP Expansion	$3.5M
AVEK-Quartz Hill WTP	$ 6.0M
AVEK-Acton WTP	$12.0M
MWD-Robert Diemer Filtration	$13.0M
LACSD-Saugus WWTP	$ 1.7M
Lake Arrowhead WTP	$ 1.3M
LACSD-Palmdale WWTP	$ 7.0M
LACSD-Lancaster WWTP	$ 4.1M

W.A. Klinger
1981-1983

Position: Project Manager
Job Description: Start to finish Design/Build project management Including managing in-house design staff, estimating, scheduling, and bottom line responsibility. Designed and implemented a cost-control/record keeping computerized system.

Partial Project List:

Catoosa Fertilizer Plant (Design/Build)	$ 1.0M
FMA Grain Handling Facility (Design/Build)	$ 1.4M
Souris River Grain Storage (Design/Build)	$ 1.1M
Union Coop Grain Handling Facility (Design/Build)	$ 1.3M
West Bend Grain Storage (Design/Build)	$ 0.6M
Boone Valley Power Plant (Design/Build)	$17.0M
IBP Power Plant	$ 1.5M

Guy F. Atkinson
1979-1981

Position: Office Engineer
Job Description: Responsible for cost reports, coordination of subcontractors, field problems, scheduling, coordination of draftsman, and pay estimates.

Partial Project List:

Lewis-Clark Bridge	$16.0M
Pacheco Tunnel	$50.0M

Exhibit "B" – Fee Proposal

VALUE ENGINEERING FEE PROPOSAL

The following breakdown of manhours and costs demonstrates the effort we anticipate for your value engineering study in September 2005. As requested, we propose this as a cost not-to-exceed proposal.

We typically invoice our clients following submittal of the value engineering study report, since the duration for the VE effort is very fast. We offer a breakdown of costs by phase as follows:

Pre-Workshop Preparation	$ 6,007.85
Value Engineering Workshop	59,244.10
Post-Workshop Effort	6,729.05
Total Not-to-Exceed Cost	$ 71,981.00

City of Lompoc Wastewater Division, California
Lompoc Regional Wastewater Reclamation Plant Upgrade Project
Lompoc, California

Value Engineering Services Proposal
July 7, 2005

Breakdown of Manhours

		Professional		Hours
Preparation Effort				
	Attend Coordination Meeting	D.A. Hamilton	LZA	12
	Review materials, prepare cost models; team member coordination	D.A. Hamilton	LZA	12
	Project management	M.A.W. Lewis	LZA	4
			Subtotal	28
Value Engineering Workshop (including 4 hours preparation time+ 32-hour workshop + 4 to 8 hours travel time)				
	VE Team Leader	D.A. Hamilton	LZA	36
	Asst. VE Team Leader	L.M. Venegas	LZA	44
	Sanitary/Process	D.R. Refling	Boyle	40
	Process/Operations	R.G. Abraham	Boyle	40
	Structural Engineer	D.J. Scherschel	Boyle	40
	Electrical/I&C	A.J. Randall	Boyle	40
	Cost/Constructibility Spec.	S. Simmons	WML	40
	VE Team Recorder	M. Steiner	LZA	40
			Subtotal	320
Final Report Preparation				
	Compile/review workshop materials; write report	D.A. Hamilton	LZA	24
	Participate in post-VE study review conference	D.A. Hamilton	LZA	0
	Word Proc./Comp. Apps.	L. Lamour	LZA	16
	Technical Editor	E.G. Mion	LZA	4
	Principal/PMO	M.A.W. Lewis	LZA	2
			Subtotal	46
			TOTAL HOURS	394

LZA	Lewis & Zimmerman Associates, Inc.
	Boyle Engineering
WML	W. M. Lyles Company

City of Lompoc Wastewater Division, California
Lompoc Regional Wastewater Reclamation Plant Upgrade Project
Lompoc, California

Value Engineering Services Proposal
June 21, 2005

Breakdown of Costs

LABOR

Discipline	Name	Firm	Hourly Rate	Hours by Activity: Prep. Effort	Hours by Activity: VE Wrkshp	Hours by Activity: Post Wrkshp	Total Hours	Total Labor
VE Team Leader	D.A. Hamilton	LZA	$ 179.35	24	36	24	84	$ 15,065.74
Asst. VE Team Leader	L.M. Venegas	LZA	167.05		44		44	7,350.36
Sanitary/Process	D.R. Refling	Boyle	180.00		40		40	7,200.00
Process/Operations	R.G. Abraham	Boyle	166.00		40		40	6,640.00
Structural Engineer	D.J. Scherschel	Boyle	166.00		40		40	6,640.00
Electrical/I&C	A.J. Randall	Boyle	166.00		40		40	6,640.00
Cost/Constructibility Spec.	S. Simmons	WML	150.00		40		40	6,000.00
VE Team Recorder	M. Steiner	LZA	60.38		40		40	2,415.00
Principal/PMO	M.A.W. Lewis	LZA	247.71	4		2	6	1,486.29
Technical Editor	E.G. Mion	LZA	121.88			4	4	487.51
Word Proc./Comp. Apps.	L. Lamour	LZA	67.62			16	16	1,081.92
			Total Labor	28	320	46	394	$ 61,006.81

OTHER DIRECT COSTS

Category		Unit Cost	Quantity by Activity: Prep. Effort	Quantity by Activity: VE Wrkshp	Quantity by Activity: Post Wrkshp	Total Quantity	Total Cost
TRAVEL							
Airfare - Seattle/Lompoc		$ 650.00	1	1		2	$ 1,300.00
Atlanta/Lompoc		800.00		1		1	800.00
Washington DC/Lompoc		800.00		1		1	800.00
Local Travel - local mileage, airport parking, etc.		125.00	0.5	3		3.5	437.50
Travel + Non-labor Related Costs	Boyle					0	4,007.00
Car Rental		80.00	1	4.5		5.5	440.00
Per Diem (including tax)	LZA	210.00	1	12		13	2,730.00
PRODUCTION/ PRINTING							
Reports - hard copies	Draft	25.00		4		4	100.00
	Final	40.00			4	4	160.00
Miscellaneous copies, supplies		L.S.					50.00
COMMUNICATIONS							
Postage/Overnight/Courier		L.S.					150.00
Communications		L.S.					-
ON-SITE EXPENSES							
Meeting Room & Equipment - District		-		0		0	-
						TOTAL ODC	$ 10,974.50
						TOTAL NOT-TO-EXCEED FEE	$ 71,981.00

Lewis & Zimmerman Associates, Inc.
Taking the Chance out of Change

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Rockville, Maryland 20852-3903
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info@lza.com • www.lza.com

HOURLY RATE SCHEDULE BY LABOR CATEGORY – 2005

The following hourly rate schedule is part of Lewis & Zimmerman Associates' proposal and will be used in invoicing for progress payments and for extra work incurred that is not part of the RFP. These rates are accurate through December 31, 2005.

Name	Hourly Labor Rate
Officer/Principal	
M.A.W. Lewis	$ 247.71
Certified Value Specialist/Project Manager/VE Team Leader/Asst. VE Team Leader	
D.A. Hamilton	179.35
L.M. Venegas	167.05
Assistant Project Manager/Technical Editor	
E.G. Mion	121.88
Project Controls/Computer Applications/Team Recorders	
L. Lamour	67.62
M. Steiner	60.38
Accounting	
T. Landicho	62.79
R. Rehr	120.40

LEWIS & ZIMMERMAN ASSOCIATES, INC.

Mary Ann W. Lewis, FSAVE
President

Boyle Engineering Corporation (VT)
FEE SCHEDULE FOR PROFESSIONAL SERVICES
Effective January 1, 2005

Engineers, Planners, Architects, Scientists:

Student Assistant	$	64.00 per hour
Assistant I	$	76.00 per hour
Assistant II	$	88.00 per hour
Associate	$	107.00 per hour
Senior I	$	124.00 per hour
Senior II	$	140.00 per hour
Principal	$	166.00 per hour
Company Officer	$	180.00 per hour
Special Consultant	$	140.00 per hour

Construction Administration Personnel:

Resident Project Representative	$	86.00 per hour
Senior Resident Project Representative	$	103.00 per hour
Resident Engineer	$	120.00 per hour
Construction Services Manager	$	170.00 per hour

Technical Support Staff:

Clerical/General Office	$	56.00 per hour
Administrative Specialist	$	64.00 per hour
Drafter/CADD Technician	$	57.00 per hour
Assistant CADD Operator	$	67.00 per hour
Designer/CADD Operator	$	77.00 per hour
Senior Designer/Design CADD Operator	$	91.00 per hour
Design/CADD Supervisor	$	98.00 per hour

General Project Expenses [1/] 8.25% of Labor

Direct Project Expenses

Other Reproduction (8 1/2 x11/11x17 Color)	$1.15/1.50 per page
Plan Sheet Printing - In House Bond/Vellum/Mylar	$3.00/4.00/7.00 per sheet
Subcontracted Services/Reproduction	Cost + 15%
Subcontracted or Subconsultant Services	Cost + 15%
Auto Mileage for Construction Phase Services	$0.60 per mile
Travel & Subsistence (other than mileage)	Cost
Miscellaneous Materials	Cost + 15%

If authorized by the Client, an overtime premium multiplier of 1.5 may be applied to the billing rate of hourly personnel who work overtime in order to meet a deadline which cannot be met during normal hours.

Applicable sales tax, if any, will be added to these rates. Invoices will be rendered monthly. Payment is due upon presentation. A late payment finance charge of 1.5% per month (but not exceeding the maximum rate allowable by law) will be applied to any unpaid balance commencing 30 days after the date of the original invoice.

Fee schedule is subject to change.

[1/] Includes mail, telephone, fax, office photo copies, personal computers and mileage (except as noted).

3. **OFFICIAL NOTICES.** Notices to either party shall be provided by personal delivery or by depositing them in the United States mail, first class postage prepaid, and addressed as identified on the signature page of this Agreement. Either party may give written notice of a change of mailing address for all purposes under this Agreement.

4. **STANDARDS OF PERFORMANCE.** CONSULTANT represents that it has the skills, expertise, and licenses/permits necessary to perform the services required under this Agreement. Accordingly, CONSULTANT shall perform all such services in the manner and according to the standards observed by a competent practitioner of the same profession in which CONSULTANT is engaged. All products of whatsoever nature which CONSULTANT delivers to CITY pursuant to this Agreement shall be prepared in a first class and workmanlike manner and shall conform to the standards of quality normally observed by a person practicing in CONSULTANT's profession. CONSULTANT shall correct or revise any errors or omissions, at CITY's request, without additional compensation. Permits and/or licenses shall be obtained and maintained by CONSULTANT without additional compensation.

5. **TAXES.** CITY shall not be responsible for paying any taxes on CONSULTANT's behalf, and should CITY be required to do so by state, federal, or local taxing agencies, CONSULTANT agrees to promptly reimburse CITY for the full value.

6. **RESPONSIBILITY OF CITY.** CITY shall provide all information reasonably necessary to CONSULTANT in performing the services required herein.

7. **CHANGES.** The Designated Representative must approve changes involving provisions for payment or changes in the Scope Of Services in writing.

8. **NOTICE OF NON-CONFORMANCE.** If CITY becomes aware of nonconformity of the Services with this Agreement, CITY shall give prompt written notice thereof to CONSULTANT who shall promptly conform such services to the requirements of this Agreement.

9. **COMPENSATION**

   a. For services performed per Exhibit A, "Proposal," CITY agrees to pay CONSULTANT a total fee that shall not exceed $71,981.00 (as provided herein and on Exhibit B, "Fee Proposal"). This amount does not include Extra Services as defined in Paragraph 11 of this Agreement. CONSULTANT shall be reimbursed for expenses, reasonably and necessarily incurred in the performance of required services, as are approved by the CITY. The compensation for all services pursuant to this Agreement, including all reimbursable expenses and all extra services, shall be paid at the time and in the manner set forth in said Exhibit "B."

   b. CONSULTANT shall submit itemized statements to request payment in a format approved by the Designated Representative. CONSULTANT shall keep records concerning payment items on a generally recognized accounting basis and such records shall be maintained for a **period of 3 years** following the completion of the Services assigned. CITY employees or independent agents shall make such records available for copying, inspection, or audit during reasonable business hours.

   c. Federal Acquisition Regulations in Title 48, CFR 31 are the governing factors regarding allowable elements of cost.

   d. Payment. Once each month, CITY will make payment to CONSULTANT based on an itemized statement, filled out, and signed by CONSULTANT, covering services performed during the period covered by the itemized statement and supported by such data as the Designated Representative may require.

10. **FINAL PAYMENT AND CLAIMS**

   a. The final payment shall be due and payable after acceptance of the Services by Designated Representative.

b. After acceptance by CITY, CITY will make a proposed final cost in writing of the total amount payable to CONSULTANT, including therein an itemization of said amount, segregated in conformance with the price breakdown in Exhibit “B”, "Fee Proposal." All prior estimates and payments shall be subject to correction in the proposed final cost. Within 30 days after said proposed final cost has been submitted to it, CONSULTANT shall submit to CITY its written approval of said proposed final cost or a written statement of all claims it has arising under or by virtue of this Agreement.

c. On CONSULTANT's approval, or if it files no claim within said period of 30 days, CITY will issue a final cost in writing in accordance with the proposed final cost submitted to CONSULTANT and within 30 days thereafter CITY will pay the entire sum so found to be due.

11. CHANGES

a. The Designated Representative must approve changes involving provisions for payment or minor changes in the Scope Of Services in writing. Major changes in the Scope Of Services shall require Contract amendment.

b. CHANGES FOR CONSULTANT’S CONVENIENCE. CONSULTANT may make minor additions, deletions and modifications ("Changes") to the Services which do not materially or adversely affect the Project or other CITY requirements. CONSULTANT shall provide immediate written notice to CITY of such Changes. CITY shall provide CONSULTANT with a written acceptance or dispute of such Changes within ten (10) calendar days after receipt thereof. Unless approved by CITY and CONSULTANT, no such changes shall be authorized which increase this Agreement price, completion date, or alter the payment schedule or scope of services. Errors or omissions by CONSULTANT shall not result in a Change under this paragraph and in the case of such errors or omissions, this Agreement price, completion date, and payment schedule shall not be adjusted without CITY's consent. CONSULTANT shall be solely responsible for correcting CONSULTANT's errors or omissions.

c. CHANGES FOR CITY'S CONVENIENCE. CITY may make Changes that neither increase CONSULTANT's costs nor adversely affect CONSULTANT's ability to meet the completion date, nor deprive CONSULTANT of the benefits of the payment schedule, or the Agreement price. CITY may also make changes affecting the completion date, payment schedule or Agreement price, provided that CITY agrees to such modifications of the completion date, payment schedule and Agreement price as the case may be, as are established by CONSULTANT. CITY shall provide written notice to CONSULTANT of all changes. CONSULTANT shall provide CITY with a written acceptance or dispute of such changes (and provide proposed modifications of the completion date, payment schedule or Agreement price for changes affecting the same) within thirty (30) calendar days after receipt thereof.

d. CHANGES CAUSED BY FORCE MAJEURE EVENTS. If an event of Force Majeure affects CONSULTANT's costs under this Agreement or CONSULTANT's ability to meet a milestone or completion date, CONSULTANT shall propose in writing an equitable adjustment to this Agreement price, payment schedule and completion date as the case may be, and CITY shall accept or dispute such proposal in writing within thirty (30) calendar days.

e. PERFORMANCE PENDING RESOLUTION OF DISPUTES. Notwithstanding any pending resolution of any dispute under this agreement, CONSULTANT shall proceed with the performance of any Changes, the total value of which are subject to a good-faith disparity of less than five percent (5%) in the parties' claimed effect on this Agreement price. Pending resolution by agreement, or litigation, if any, and subject to subsequent adjustment to conform to any final agreement or judgment, reimbursement to CONSULTANT shall be adjusted by revising this Agreement price in an amount equal to that claimed by CITY plus one-half (½) the difference between the amount of said claim and the amount claimed by CONSULTANT. The respective payment schedule shall be adjusted accordingly. CONSULTANT shall not be required to proceed with Services related to any Changes pending resolution of disputes regarding the adjustment of the affected payment schedule and completion date where the total value of such Changes are subject to a good faith disparity of more than five percent (5%) in the parties' claimed effect on this Agreement price.

f. SUPPORTING DOCUMENTATION. Claims by CONSULTANT for adjustments to this Agreement price, completion date, and payment schedule shall be supported by documentation such as invoices from vendors and sub-consultants and CONSULTANT's man-hour breakdowns.

13. CITY CAUSED DELAYS. If an act or omission of CITY affects CONSULTANT's costs or ability to meet a milestone or completion date, CONSULTANT shall propose in writing an equitable adjustment to the respective Agreement price, payment schedule and completion date, as the case may be, and CITY shall accept or dispute such proposal in writing within thirty (30) calendar days.

14. AUTHORIZATION TO PROCEED. Prior to starting any of the services under this Agreement, CONSULTANT shall be in receipt of a written Authorization to Proceed issued by the Designated Representative that identifies the specific services authorized to proceed.

15. TIME OF BEGINNING AND COMPLETION. Time is of essence of this Contract.

a. CONSULTANT shall commence Work as described in Exhibit "A," "Proposal," upon receipt of written Authorization to Proceed. CONSULTANT agrees to coordinate with CITY as to scheduling and mutually satisfactory completion of the services set forth in Exhibit "A."

b. CONSULTANT shall adhere to schedules and deadlines agreed to by CITY and CONSULTANT. CONSULTANT's failure to complete the Services within the time specified, due to avoidable delays, may at the CITY's discretion be considered a material breach of this Agreement. No extension of time to complete any portion of the services called for in this Agreement shall be allowed except upon the express, written approval of the Designated Representative. Consultant shall request, in writing, a time extension for approval by CITY, promptly upon the occurrence of any action causing delay in CONSULTANT's prosecution of the services. The nature of the delay, the corrective actions taken, and the impacts on the project schedule shall be described in each request for time extension.

16. OWNERSHIP OF DOCUMENTS. All documents, computer programs, plans, designs and other intellectual property prepared by CONSULTANT pursuant to this Agreement shall become the property of CITY upon full and complete compensation to CONSULTANT for services performed herein. CONSULTANT will take such steps as are necessary to perfect or to protect the ownership interest of the CITY in such property. CONSULTANT may retain copies of said original documents for CONSULTANT's file.

17. ASSIGNMENT OF AGREEMENT. CONSULTANT shall not assign, transfer, subcontract, or delegate any right, privilege or interest in this Agreement, or any part thereof, without prior written consent of CITY. Unless otherwise stated in the written consent to an assignment, no assignment will release or discharge the CONSULTANT from any obligation under this Agreement. Nothing contained in this paragraph shall prevent CONSULTANT from employing independent consultants, associates, and sub-consultants to assist in the performance of the Services.

18. THIRD PARTY RIGHTS. Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than CITY and CONSULTANT.

19. INDEMNITIES. CONSULTANT shall perform all services hereunder in a careful, diligent and professional manner and shall indemnify, defend, and hold harmless the CITY, its officials, officers, employees, and volunteers from and against all claims, damages, losses, and expenses including attorney fees arising out of the performance of the Services described herein, caused in whole or in part by willful misconduct or negligent act or omission of the CONSULTANT, anyone directly or indirectly employed by the CONSULTANT or anyone for whose acts CONSULTANT may be liable, except where caused by the active negligence, or willful misconduct of the CITY.

20. INSURANCE REQUIREMENTS. As part of the consideration of this Agreement, CONSULTANT agrees to obtain and maintain at its sole cost and expense during the life of this Agreement the following insurance with an insurer or insurers satisfactory to the CITY:

a. Insurance against claims for injuries to persons or damage to property that may arise from or in connection with the performance of the Services hereunder by the CONSULTANT, its agents, representatives, employees, and sub-consultants.

b. Coverage shall be at least as broad as:

Insurance Services Office Commercial General Liability coverage (occurrence from CG 0001).

Insurance Services Office Business Auto Coverage form number CA 0001, code 1 (any auto)
Worker's Compensation insurance as required by the State of California and Employer's Liability Insurance.

CONSULTANT shall maintain limits not less than:

General Liability: $1,000,000 per occurrence for bodily injury, personal injury, and property damage. If Commercial Liability Insurance or other form with a general aggregate limit is used, either the general aggregate shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.

Automobile Liability: $1,000,000 per accident for bodily injury and property damage.

Employer's Liability: $1,000,000 per accident for bodily injury or disease.

Any deductibles or self-insured retentions must be declared to and approved by the CITY. At the option of the CITY, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the CITY, its officials, officers, employees and volunteers; or the CONSULTANT shall provide a financial guarantee satisfactory to the CITY guaranteeing payment of losses and related investigations, claim administration and defense expenses.

The general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

The City, its officers, officials, employees and volunteers are to be covered as additional insureds as respects: liability arising out of work or operations performed by or on behalf of the Consultant; or automobiles owned, leased, hired or borrowed by the Consultant.

For any claims related to this project, the CONSULTANT's insurance coverage shall be primary insurance as respects the CITY, its officials, officers, employees, and volunteers. Any insurance or self-insurance maintained by the CITY, its officials, officers, employees, or volunteers shall be excess of the CONSULTANT's insurance and shall not contribute with it.

Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled by either party, except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the CITY.

Insurance shall be placed with insurers with a current A.M. Bests rating of no less than A:VII.

Professional Liability "errors and omissions" insurance shall be placed with insurer or insurers satisfactory to the CITY, with limits of liability not less than one million ($1,000,000.00) dollars, to cover all insurable claims for professional services rendered by CONSULTANT pursuant to this Agreement.

CONSULTANT shall furnish the CITY with original certificates and amendatory endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the CITY before Consulting Services commence. The CITY reserves the right to require at anytime complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications.

CONSULTANT shall include all sub-consultants as insured under its policies or shall furnish separate certificates and endorsements for each sub-consultant. All coverage and limits for sub-consultants shall be subject to all the requirements stated herein.

ENDORSEMENT ON PS&E/OTHER DATA. The responsible CONSULTANT/engineer shall sign all plans, specifications, estimates (PS&E) and engineering data furnished by him/her and where appropriate, indicate his/her registration number.

NONDISCRIMINATION. During the performance of this Agreement, CONSULTANT shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age (over 40), gender and actual or perceived sexual orientation. CONSULTANT shall insure that the evaluation and treatment of its employees and applicants for employment are free of such discrimination. CONSULTANT shall include the nondiscrimination and compliance provisions of this clause in all lower-tier subcontracts to perform services under this Agreement.

WARRANTY AGAINST CONTINGENT FEES. CONSULTANT warrants that it has not employed or retained any company or person, other than a bona fide employee working for the CONSULTANT, to solicit or secure this Agreement, and that it has not paid or agreed to pay any company or person, other than a bona fide employee, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or formation of this Agreement. For breach or violation of this warranty, the CITY shall have the right to annul this Agreement without liability, or at its discretion to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift, or contingent fee.

COMPLIANCE WITH LAW. CONSULTANT shall, at its sole cost and expense, comply with all CITY, County, State and Federal ordinances and statutes now in force or which may hereafter be in force with regard to this Agreement. The judgment of any court of competent jurisdiction, or the admission of CONSULTANT in any action or proceeding against CONSULTANT, whether CITY be a party thereto or not, that CONSULTANT has violated any such ordinance or statute, shall be conclusive of that fact as between CONSULTANT and CITY.

CALIFORNIA LAW. This Agreement shall be governed by the laws of the State of California. Any litigation regarding this Agreement or its contents shall be filed in the County of Santa Barbara, if in State court, regardless of where else venue may lie.

TERMINATION OF THIS AGREEMENT. This Agreement may be terminated by ether party upon written notice to the other party in the event of a substantial failure of performance by such other party; or if CITY should decide to abandon or indefinitely postpone the Project; or if CONSULTANT becomes insolvent, makes a general assignment for the benefit of creditors, suffers or permits the appointment of receiver for its business or assets, files for relief from creditors under any bankruptcy or insolvency law whether domestic or foreign, or has wound up or liquidated, voluntarily or otherwise. If such termination occurs, CITY shall pay CONSULTANT for Services completed.

In the event of such termination, CITY shall pay CONSULTANT for all services performed to the date of receipt of Notice of Termination. An itemized statement of the Services performed to the date of termination shall be submitted to CITY. In ascertaining the services actually rendered hereunder up to the date of termination of this Agreement, consideration shall be given to both completed Services and Services in process of completion and to completion of the incomplete drawings and other documents whether delivered to CITY or in the possession of CONSULTANT. All documents, original tracings, and specifications shall be the property of CITY and may be reused by CITY without additional compensation to CONSULTANT.

RELATIONSHIP BETWEEN CONSULTANT AND CITY. It is expressly understood between the parties to this Agreement that no employee/employer relationship is intended; the relationship of CONSULTANT to CITY being that of an independent contractor.

CONFLICT OF INTEREST. While this Agreement is in force and effect, CONSULTANT shall accept no Services or perform any services that would constitute a conflict of interest with CITY. CONSULTANT agrees to promptly notify CITY whenever CONSULTANT or a client of CONSULTANT has an interest that may constitute such a conflict of interest with CITY.

ATTORNEY FEES. If it becomes necessary to proceed with litigation to enforce any rights created by this Agreement, the prevailing party shall be entitled to reimbursement by the losing party for all costs of such litigation. Such costs shall include reasonable attorney fees.

AUTHORITY. All parties to this Agreement warrant and represent that they have the power and authority to enter into this Agreement in the names, titles and capacities herein stated and on behalf of any entities, persons, or firms represented or purported to be represented by such entity(ies), person(s), or firm(s) and that all formal requirements necessary or required by any state and or/federal law in order to enter into this Agreement have been fully complied with. Furthermore, by entering into this Agreement, CONSULTANT hereby warrants that it shall not have breached the terms or conditions of any other contract or agreement to which CONSULTANT is obligated, which breach would have a material effect hereon.

PRECEDENCE. In the event of conflict between the provisions contained in the numbered sections of this Agreement and the provisions contained in the Exhibits, the provisions in the Exhibits shall prevail over those in the numbered sections.

EXHIBITS. The Exhibits listed below are incorporated by reference in this Agreement:

Exhibit "A" - Proposal
Exhibit "B" - Fee Proposal

INTEGRATION. This Agreement represents the entire agreement between the parties. It supersedes all prior or extemporaneous communications, representations, or agreements, whether oral or written, relating to the subject matter of this Agreement. No amendment or modification of this Agreement shall be valid unless evidenced in writing and executed by the parties hereto.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement to be executed and entered into this _____ day of _____ 2005.

CITY OF LOMPOC
a California municipal corporation
P.O. Box 8001
Lompoc, California 93438-8001

_____
Dick DeWees
Mayor

ATTEST:

_____
Donna Terrones
City clerk

APPROVED AS TO FORM

_____
Sharon D. Stuart
City Attorney

CONSULTANT
Lewis & Zimmerman Associates, Inc.
5216 Ridge Drive, NE
Tacoma, Washington 98422-1535

_____
By:

Title:_____

Exhibit “A” – Proposal

Exhibit “B” – Fee Proposal