Agenda Item Executive Summary

Title: Willow Road STADI Project Cost Evaluation and Value Engineering Services

Presenter: Steven M. Saunders, Director of Public Works/Village Engineer

Agenda Date: 06/02/2015

Consent: ☐ YES ☑ NO

☐ Ordinance
☐ Resolution
☑ Bid Authorization/Award
☐ Policy Direction
☐ Informational Only

Item History:

On April 28, 2015, and again on May 12, 2015, the Village Council discussed a project update for the Willow Road Stormwater Tunnel and Area Drainage Improvements (STADI) project prepared by MWH, the Village's consulting engineering firm for the project. The Council reviewed the design process undertaken over the last nine months. Due to the significant increase in estimated cost, the Council discussed obtaining an independent, third-party engineering review of the project.

Executive Summary:

Based on the Council's discussions, staff issued a Request for Proposals (RFP) outlining the scope of a third-party cost and value engineering review. The RFP was issued to two firms that have expertise in both tunneling and large open cut infrastructure design and construction projects, as well as value engineering processes and procedures. The two firms are Black & Veatch, and a joint venture of V3 Companies/Hatch, Mott, MacDonald/Strategic Value Solutions. Both firms responded to the Village's RFP with full proposals. The RFP seeks work to be completed in two sequential phases: 1) Complete a detailed, thorough review of the current project cost estimate, and 2) Lead a value-engineering process.

Both teams identified similar work breakdown structures for the project, and both firms have demonstrated successful cost estimating on numerous projects. V3, however, has demonstrated superior experience and success in Value Engineering engagements due to their partnership with Strategic Value Solutions, a leading value consulting firm.

Recommendation:

Staff recommends that the Council consider awarding a contract to V3 Companies for Cost Evaluation and Value Engineering Services for the Willow Road STADI project for a fee not to exceed $33,708 for Phase I Cost Review and $88,296 for Phase II Value Engineering (if directed to proceed) pursuant to their proposal dated May 22, 2015.

Attachments:

- Agenda Report
- Attachment #1: Village Request For Proposals
- Attachment #2: Black & Veatch Response
- Attachment #3: V3 Companies Response

Agenda Report

Subject: **Willow Road STADI Project Cost Evaluation and Value Engineering Services**

Prepared By: Steven M. Saunders, Director of Public Works/Village Engineer

Date: May 27, 2015

Background

On April 28, 2015, and again on May 12, 2015, the Village Council discussed a project update for the Willow Road Stormwater Tunnel and Area Drainage Improvements (STADI) project prepared by MWH, the Village's consulting engineering firm for the project. The Council reviewed the design process undertaken over the last nine months, and then Joe Johnson, with MWH, recapped the findings of Review Point #1, which occurred in June, 2014, including: the STADI project is viable to reduce severe flooding; western discharge options are not feasible given the amount of storage required; water quality management objectives are a high priority and need to be addressed early in the process; and the preliminary design tasks serve as a reasonable basis to provide project detail required for permit submittal.

The preliminary design tasks (site-specific data collection, 30% design, preliminary opinion of probable construction cost, and draft permit applications) were each individually reviewed. MWH performed field investigations throughout the Village, gathering information about soil conditions and existing utility structures. Mr. Johnson described the detailed stormwater quality monitoring program and also illustrated the numerous water quality parameters and stringent standards that MWH employed in their evaluation. Levels for 11 pollutants/bacteria exceeded current Lake Michigan standards; however, stormwater quality in Winnetka is generally consistent with runoff in other suburban areas. Mr. Johnson reviewed some of the potential pollutant sources the Village will be able to review and address.

Next, Mr. Johnson focused on the STADI project concept, detailing several design constraints which have impacted the development of plans, including conflicts with very deep interceptors that are part of the Metropolitan Water Reclamation District (MWRD) system, significant construction disruption along Willow Road and neighboring streets, as well as capacity and functionality of a Tunnel outfall treatment structure at Lake Michigan. MWH's STADI water quality management strategy is equipped with four key components: source control, distributed treatment, flow management, and discharge management. Mr. Johnson described the various approaches within each area, and also showed in more depth the amount of runoff that would be treated by the proposed outfall structure.

The Village's cost estimates for the STADI project originated in 2011/2012, based on conceptual design, broad field data, and typical unit construction costs. Mr. Johnson explained that MWH's work has further detailed the Tunnel's initial design and therefore allowed for an updated preliminary opinion of probable construction cost (OPCC). MWH used additional information about quantities of materials, site-specific considerations, as well as utility and field data to update the cost estimate. The previous OPPC, prepared in 2012, was $34.6 million. MWH's current OPPC, is $58.5 million. In addition to the more detailed data at MWH's disposal, he explained that cost increases were also driven by a greater length of deep sewer tunnel, increased underground construction costs, and outfall/water quality management requirements.

Due to the significant increase in estimated cost, the Council discussed obtaining an independent, third-party engineering review of the project. The third-party project review would focus on two project aspects: 1) the accuracy and reliability of the OPCC and 2) whether there are other more cost effective ways to design and implement the project. There are significant benefits to this review. The cost review will provide the community with an additional level of certainty and confidence in MWH's OPCC, to inform future decision-making on the project. The value engineering process will creatively evaluate the STADI project and identify potential changes to the project that might better accomplish the desired level of structural flood risk-reduction at a lower capital cost, while providing better overall value and confidence in the effectiveness of the design.

Request for Proposals

Based on the Council's discussions, staff issued a Request for Proposals (RFP) outlining the scope of a third-party cost and value engineering review. The RFP was issued to two firms that have expertise in both tunneling and large open cut infrastructure design and construction projects, as well as value engineering processes and procedures. The two firms are Black & Veatch, and a joint venture of V3 Companies/Hatch, Mott, MacDonald/Strategic Value Solutions. Both firms responded to the Village's RFP with full proposals.

The RFP seeks work to be completed in two sequential phases as follows:

Phase I: Complete a detailed, thorough review of the current project cost estimate consisting of the following activities:

1. Review initial flood risk reduction studies to develop an understanding of and to become familiar with the work studies that were completed and which formed the starting point for MWH's contractual scope of work.

2. Review MWH's data, assumptions, methods, calculations, designs, drawings, estimates, and conclusions, including surveying and geotechnical information, plan sheets, and other details used to develop and prepare the Opinion of Probable Construction Cost.

3. Prepare a written, detailed, independent review of the estimate of probable construction cost, based on the current project design, draft reports and underlying detailed data, documenting all assumptions, calculations, productivity rates, material prices, labor rates, etc. with the final cost estimate.

Phase II: Lead a value-engineering process consisting of the following activities:

1. Organize an independent value engineering team consisting of experts in stormwater management, hydraulics/hydrology, storm sewer design/construction, tunnel design/construction, and cost estimating, to evaluate the project.

2. Review all relevant preliminary and design documents to thoroughly understand the Village's goals and previous work.

3. Conduct a value engineering process to identify an alternate strategy or strategies to achieve significant risk reduction against structure flooding for five drainage areas, for a 100-year design event. The workshop will use a process consistent with practices and principles employed by the U.S. EPA, US Army Corps of Engineers, and Society of American Value Engineers International. The workshop will include these five phases: Function Analysis, Creative, Evaluation, Development, and Presentation.

4. Compile outcomes and evaluate the individual value proposals. Submit a report in electronic and hard copy format that documents the entire value engineering study, including the value recommendations and evaluations.

A copy of the RFP is shown in Attachment #1.

Proposal Response and Evaluation

The table on the following page summarizes the two proposal responses in a side-by-side format:

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Item	Black & Veatch (Attachment #2)	V3 Companies (Attachment #3)
Company Description	A global engineering, consulting, and construction firm with over 100 offices worldwide including Chicago. They have extensive experience in design and construction of tunneled and open cut water-resources projects.	- V3 is a full-service engineering, project management, and construction firm - Hatch Mott MacDonald (HMM) is a worldwide multidisciplinary engineering firm with a specialization in the planning, design, construction, and operation of tunnels and underground facilities. - Strategic Value Services (SVS) is a value consulting firm with over 25 years of experience in providing value-improvement services such as value engineering, value analysis and value planning to large and complex projects.
Project Staffing Office	Chicago, IL with support from Kansas City, MO.	Chicago, IL (V3) Chicago, IL with support from Cleveland, OH (Hatch Mott) Independence, MO (SVS)
Project Manager	Cary Hirner, P.E. 20 years of experience	Greg Wolterstorff, P.E. 20 years of experience
Cost Evaluation Staff Hours	Project Principal – 6 hrs. Tunneling Specialist – 20 hrs. Cost Estimator – 56 hrs. Staff Engineer – 16 hrs.	Project Manager – 25 hrs. Admin. Asst. – 8 hrs. Water Resources Expert – 28 hrs. Project Engineer – 36 hrs. Cost estimator – 56 hrs. CADD tech. – 8 hrs. Tunnel design expert – 9 hrs. Tunnel/sewer cost est. – 68 hrs.
Cost Evaluation Fees	98 staff hours $16,930 labor cost $500 direct costs $17,430 total	238 staff hours $32,708 labor cost $1,000 direct costs $33,708 total
Cost Evaluation Schedule	Notice to Proceed June 3, 2015 20 calendar days duration	Notice to Proceed June 3, 2015 Complete by June 26, 2015
Value Engineering Staff Hours	VE Team Leader – 58 hrs. Tunneling Specialist – 82 hrs. Trench/Trenchless Specialist – 58 hrs. Hydraulic Engr. – 58 hrs. Cost Estimator – 76 hrs. Staff Engineer – 66 hrs.	V.E. Team Lead – 102 hrs. Project Manager – 70 hrs. Cost estimator – 54 hrs. Tunnel design expert – 62 hrs. Tunnel/sewer cost est. – 54 hrs. VE Team Admin. Asst. – 96 hrs.
Value Engineering Hours & Fees	340 staff hours $43,280 labor cost $11,800 direct costs $55,080 total	438 staff hours $75,296 labor cost $13,000 direct costs $88,296 total
Value Engineering Schedule	Notice to Proceed – TBD Duration 50 days	Notice to Proceed – TBD Duration 52 days
Total Project Staff Hours & Fees	340 staff hours $60,210 labor cost $12,300 direct costs $72,510 total	676 staff hours $108,004 labor cost $14,000 direct costs $122,004 total

Both firms proposed similar scopes of work for the project, which are summarized below:

Cost Evaluation

Both teams identified similar work breakdown structures for the Phase I Cost Evaluation, dividing their work into two basic tasks: 1) Review of project work to date and 2) Cost estimate analysis and conclusions. Both firms have completed numerous design and cost estimating engagements for large subsurface infrastructure projects. Further, both firms also provide construction services, which means they have bid, constructed, and managed construction for these types of projects as well. As a result, both firms are well qualified to perform this portion of the Village's engagement.

There are, however, a couple of differences in the two proposals which should be noted. First, Black & Veatch has included a cost reconciliation session with the Village and designers to identify differences between their cost estimate and the OPCC developed by MWH.

Second, there is a slight difference between the firms in their approach to building the tunnel cost estimates. Black & Veatch states that

> "For planning level studies, we use tunnel cost curves that we have developed and are based on both tunnel length and diameter of bid and constructed tunnel projects. Because the majority of initial tunneling costs are associated with a TBM, overall tunneling cost is not always proportional to the length of a tunnel. That is to say that differential cost estimates for changes in size and length of tunnels (or tunneling alternatives), should be based using tunnel cost curves rather than a unit price per length."

Hatch Mott MacDonald (HMM), V3's tunnel expert, approaches tunnel cost estimating in the following way:

> "HMM has developed TED (Tunnel Estimating Database), which is a tunnel and shaft construction cost estimating system and is unique to HMM. TED has an excellent track record of producing estimates close to the winning bid on many projects. TED runs on MS-Access 2000, and adopts similar estimating methods to those used by tunneling contractors. It uses a bottom up approach by deriving the costs from labor rates, number of workers, equipment and productivity rates. By maintaining records of advance rates, labor, equipment, and material requirements for particular sizes and types of tunnels, and applying appropriate local unit rates and adjustments for favorable or unfavorable ground conditions, the system models the estimating process applied by contractors during the tendering process. In order to achieve accurate estimates, all elements of the tunnel construction process are modeled. For instance in the case of a sewer tunnel lined with a cast-in-place concrete secondary liner and driven in soft ground using a tunnel boring machine, separate TED runs would be undertaken for TBM set-up, tunnel boring and primary lining erection, TBM maintenance, TBM removal,

tunnel clean-up and removal of services, and installation of the cast in place secondary liner.

"By adopting this estimating process, the TED system increases the possibility of achieving accurate estimates. To-date, TED has been used to produce over 500 estimates and in cases where the system has been subjected to 'real life' testing where bids are compared with an Engineer's estimate undertaken in advance, the results have been quite impressive. The system is maintained by experienced tunneling engineers with accurate knowledge of tunnel construction processes and the associated labor, equipment, and material requirements. Each new estimate enhances the database of information, and provides the system with greater flexibility and efficiency for the production of future estimates. All estimates produced on TED, are available to our Clients in the form of summary sheets which list labor, equipment, consumables, materials, unit rates, advance rates, and the associated cost of each element of work. These summaries are available in electronic format and can be e-mailed to clients whenever requested. TED's overall flexibility makes it an ideal estimating tool for tunnel planning and option comparison as well as the production of detailed Engineer's estimates in advance of the bid process. Typical tunnel cost estimating outputs from the TED system are included in the table below, which shows that, using this system, we have a remarkable track record of construction cost estimates that are typically within 4 percent of the actual low bid."

Both firms have demonstrated a successful track record with their tunnel estimating approaches, so it is not necessarily a question of which approach is best or most correct. However, HMM's process more closely parallels the estimating approach used by MWH to develop the current cost estimate. Since the purpose of the cost review is to evaluate and ascertain the accuracy of MWH's estimates, a similarly detailed "ground up" approach may prove to be more helpful to the Village in accomplishing this task.

Value Engineering

Again, each team organized the Phase 2 Value Engineering using a similar work breakdown structure: 1) Pre-workshop activities; 2) 40-hour value engineering workshop; 3) Post-workshop activities; and 4) Summary analysis and conclusions. This structure very closely matches the project format recommended by S.A.V.E. International (Society of American Value Engineers).

Pre-workshop activities consist of assembling the Value Engineering team, preparing for the workshop, reviewing project document and work to date, and understanding project goals and objectives.

The Value Engineering workshop consists of a 5-day, 40-hour meeting of subject matter experts, Village staff, and a value team lead where the project is examined from all angles to creatively identify alternate, more cost-effective means of accomplishing the project goals.

Post-workshop activities consist of evaluating all of the ideas developed and determining which, if any, value recommendations should be incorporated into the project.

The major difference between the two firms lies not in the approach but in the expertise. V3 has partnered with Strategic Value Solutions (SVS), a leading value consulting firm. John Robinson of SVS will serve as the Value Engineering Lead for the V3 team. Mr. Robinson and SVS have completed numerous Value Engineering engagements on a variety of large and small infrastructure projects. Mr. Robinson has served as the President of S.A.V.E. International and is Chairman of the S.A.V.E. International Certification Board. SVS's experience and expertise will provide significant added value for the Village in the Value Engineering portion of the study.

Recommendation

The two firms have proposed similar project approaches; however, the V3 team has proposed a more intense level of effort for the project.

Item	Black & Veatch	V3
Cost Review	98 hours $17,430	238 hours $33,708
Value Engineering	340 hours $55,080	438 hours $88,296
Total	438 hours $72,510	676 hours $122,004

This additional level of effort results in a higher fee for the project; however, I believe that this higher fee will produce a significantly increased value for the Village due to the depth and breadth of project experience, and, in particular, value engineering experience.

Staff recommends that the Council consider awarding a contract to V3 Companies for Cost Evaluation and Value Engineering Services for the Willow Road STADI project for a fee not to exceed $33,708 for Phase I Cost Review and $88,296 for Phase II Value Engineering (if directed to proceed) pursuant to their proposal dated May 22, 2015.

Attachments:

1. Request For Proposals
2. Black & Veatch Response
3. V3 Companies Response

ATTACHMENT #1

VILLAGE REQUEST FOR PROPOSALS

REQUEST FOR PROPOSALS

VILLAGE OF WINNETKA

INDEPENDENT COST AND VALUE ENGINEERING REVIEW OF STORMWATER IMPROVEMENT PROGRAM WILLOW ROAD STORMWATER TUNNEL AND AREA DRAINAGE IMPROVEMENT PROJECT

ISSUED: May 13, 2015

RESPONSES DUE: May 22, 2015

PREPARED BY:
Steven M. Saunders, Director of Public Works
Village of Winnetka
1390 Willow Road
Winnetka, IL 60093
Telephone: 847-716-3534
ssaunders@winnetka.org

I. INTRODUCTION

On January 21, 2014, the Village awarded a contract to MWH Americas, Inc. to provide engineering services for the proposed Willow Road Stormwater Tunnel and Area Drainage Improvements (STADI) project. When MWH's contract was awarded, the project was at the preliminary, conceptual engineering stage, and a significant amount of engineering was required to bring the project to the stage where construction contracts can be executed. Importantly, there were and are also many questions about the project to be answered, permits to be acquired, and decisions to be made by the Village, before construction contracts can be awarded. MWH has completed the scope of work associated with preliminary design and produced a 2-volume Preliminary Design Report. The current project cost estimate is at $58,500,000, which is significantly higher than the preliminary conceptual estimate of $34,597,000, prepared in September of 2012. The Village desires to design and implement a cost-effective and feasible flood-risk reduction project for drainage areas susceptible to flooding, and is seeking qualified engineering firm(s) to provide an independent detailed review of the project cost estimate, and a detailed value-engineering review of the project methodology, assumptions, designs, estimates, and conclusions prepared by MWH to determine if there are other designs or approaches that could meet the project objectives at a lower cost.

II. PROJECT DESCRIPTION

The Willow Road STADI project would combine improvements for 5 drainage areas into a single project, providing benefits to the North Willow Road, South Willow Road, Provident Avenue, Cherry Street Outlet, and the Winnetka Avenue Underpass Study areas for the 100-year design storm event. The proposed improvement consists of an 8-foot diameter storm sewer underneath Willow Road running from approximately Glendale Avenue to Lake Michigan. The project includes construction of additional storm sewers connected to the tunnel to provide relief to 5 drainage basins affected by frequent and/or severe stormwater flooding, and construction of a below ground outlet structure to manage water quality, control water velocity and prevent erosion. The project concept also includes possible implementation of distributed water quality measures in the form of structural and non-structural Best Management Practices (BMPs) such as rain gardens, bio-swales, permeable pavements, catch basin inserts, oil & grit separators, etc. to control water quality impairments as close to their sources as possible.

MWH's contract was structured so that at the completion of preliminary engineering activities, MWH was to provide a Preliminary Design Report that documents the results of their activities and allows the Village to discuss the project at a further level of detail not previously developed.
Structuring the contract in this way allowed the Village to advance the project on a step-by-step basis, with intermediate review points for Council approval before advancing to the next phase. Review Point #1 occurred in June, 2014, upon completion of Concept Review, Permit Plan, and Hydrologic/Hydraulic Model Verification. At Review Point #1, MWH focused on four key points: 1) the project is viable and models have been verified;

2) other options were considered, but they do not provide 100-year flood protection; 3) protection of natural assets and water quality management; and 4) next steps required to further 30% engineering design and permit applications. MWH confirmed that the Village's flood protection criterion is 100-year level protection and that modeling demonstrated that the Tunnel is a reasonable approach, and is also the only option available to meet this level of performance. An overview of alternatives was provided that addressed the constraints the Village faces in terms of storing, conveying, and discharging stormwater runoff. MWH reviewed an analysis of "westward" options which revealed that none of these choices offers sufficient storage capacity, even with the use of aggressive green infrastructure. MWH determined that a multi-tiered process will be necessary to manage water quality, including source control (local Best Management Practices and public education), low flow management (existing infrastructure and flow diversions), distributed treatment, and discharge management at the Lake Michigan outfall. MWH has confirmed the Tunnel will require a combination of green and grey infrastructure to manage both the flow and quality of water for the Village.

In conclusion, MWH stated the Willow Road STADI project can achieve the desired flood risk reduction. The Council authorized MWH to proceed with the preliminary engineering and permitting tasks in Phase 1 as outlined in the original scope of services. In addition, the Council authorized MWH to proceed with development and implementation of a supplemental water quality sampling and analysis.

Subsequent to this direction from the Council, MWH initiated the scope of work associated with Preliminary Engineering, including Phase I field investigations, a water quality monitoring program, completion of design plans and documents to the 30% stage, preparation of draft regulatory permit applications, and an updated Opinion of Probable Construction Cost (OPCC).

- *Phase 1 Field Investigations*. MWH obtained supplemental data needed to support critical permitting and preliminary engineering activities, including field surveys required to document conditions and locate critical utilities along the proposed sewer alignments and geotechnical investigations required to provide subsurface and soil data for the evaluation of construction methods for individual sewer segments. Specific work activities included field planimentric and utility survey; creating base mapping sheets; performing shallow and deep soil borings, with standard boring logs; collecting soil samples for environmental screening; and preparing a generalized geotechnical profile along the proposed tunnel and open cut sewer alignments.
- *Water Quality Monitoring Program*. MWH implemented a program to gather flow and water quality data at four locations in the Village's separate storm sewer system. Results from the water quality monitoring program are being used to develop a water quality management plan for the project. Specific activities included procuring and installing automated water sampling equipment, temporary flow monitoring equipment, and rain gauges needed to gather water quality at four locations in the Village; obtaining wet-weather and dry-weather sample sets during September, October and November of 2014; obtaining grab-

samples during Spring 2015 to analyze the effect of snowmelt on stormwater quality; contracting with a testing laboratory to perform analysis of the samples and provide written results; and compiling sampling results to document water quality.

- *Preliminary (30%) Design*. MWH prepared preliminary design drawings for the proposed outfall and storm sewer improvements to advance critical permitting activities and provide a refined basis for overall planning of design and construction activities associated with the proposed stormwater tunnel and area drainage improvements. Specific activities included preparation of a set of 30% preliminary design drawings and a list of special provisions expected to be required in the final bidding packages for the projects; Preparation of preliminary plan and profile drawings showing the proposed configuration and horizontal and vertical alignment of the proposed storm sewer improvements; conducting a hydraulic design analysis of the proposed outfall structure and major junction/diversion structures using Computational Fluid Dynamics (CFD) modeling to analyze flow rates and velocities through the structure; development of basic structural design criteria and preliminary type, size, and location layouts for the proposed outfall structure and major junction or diversion structures; preparing a Class 4 Opinion of Probable Construction Costs (OPCC) using the preliminary drawing set as the basis for the preparation of an Association for the Advancement of Cost Engineering (AACE) Class 4 OPCC.
- *Permitting*. MWH has advanced permitting efforts to the point of preparing draft permit applications for several agencies:
    - Joint Permit Application to the Illinois Environmental Protection Agency (IEPA), Illinois Department of Natural Resources (IDNR), and US Army Corps of Engineers (USACOE) for the proposed new stormwater outfall to Lake Michigan. Steps involved in this process are as follows:
        - Compile, document and review available water quality data for stormwater discharges from Winnetka and for Lake Michigan. The IEPA 401 Water Quality Certification will be a key regulatory hurdle in the permit process;
        - Prepare the initial Joint Permit Application to IEPA, IDNR, and USACOE for the construction of a new stormwater outfall to Lake Michigan;
        - Prepare a Water Quality Management Plan to document the measures that Village will incorporate into its stormwater system to meet the water quality standards and anti-degradation criteria that will apply to the new discharge;
        - Estimate pollutant loadings at the existing discharge points from the project area for specific design storm events and use the results to project peak and average loadings under current conditions;
        - Document the likely water quality discharge standards for both the Lake Michigan and the Skokie River;
        - Assess available technologies for meeting the discharge standards;
        - Develop a water quality management strategy for the project that includes consideration of private stormwater best management

practices (BMPs), BMPs or stormwater treatment facilities constructed at distributed locations within the storm sewer system and within the public right-of-way, and/or end-of-pipe treatment measures;
        - Estimate pollutant loadings at existing and proposed discharge points within the proposed new storm sewer system with and without consideration of the water quality management measures proposed;
        - Document the estimated impact of the proposed storm sewer improvements on pollutant loadings to Lake Michigan with and without the proposed water quality management measures;
        - Compile results from the analyses into a project-specific Water Quality Management Plan for submittal with the Joint Permit Application.
    - Initial application to the Metropolitan Water Reclamation District (MWRDGC) requesting approval for the proposed new stormwater outfall to Lake Michigan. It is assumed that the materials contained in the Joint Permit Application will be suitable for submittal to the MWRDGC with minimal modification;
    - Initial application to the Union Pacific Railroad (UPRR) for the construction of a 96-inch diameter storm sewer across the railroad right-of-way at Willow Road. The application to the railroad will consist of the completed forms and preliminary (30%) design drawings for the portion of the new sewer crossing the railroad right-of-way.

Documents Available for Review

The selected Consultant shall provide professional design review services to evaluate previously completed work studies prepared by MWH Americas, Inc. The following documents are provided for use by the Consultant in performing the cost estimate and value engineering reviews. These documents are available on the Village's stormwater management website at http://winnetkastormwaterplan.com/stormwater-management-program/work-studies-completed/

- Winnetka Flood Risk Reduction Study for 25-, 50-, and 100-year Flood Protection, by Christopher B. Burke Engineering, Ltd., October, 2011
- Willow Road Tunnel Feasibility Study Report, by Village of Winnetka, September, 2012
- MWH Contract Willow Road STADI Project, January, 2014
- Concept Review and Permitting Plan, by MWH Americas, Inc., June, 2014
    - Summary Memo
    - Concept Review Memo
    - Alternative Sizing Memo
    - Permitting Action Plan
    - Water Quality Sampling Plan
- MWH Contract Change Order #1, August, 2014
- Preliminary Design Report, vol. 1, by MWH Americas, Inc., April, 2015

    - Preliminary Design Report
    - Hydraulic Basis of Design
    - 2014 Water Quality Monitoring Report
    - Phase I Field Investigation Summary
    - Water Quality Management Plant
- Preliminary Design Report, vol. 2, by MWH Americas, Inc., April, 2015
    - Draft Joint Permit Application to Army Corps, EPA, and Dept. of Natural Resources
    - Draft MWRD Watershed Management Ordinance Permit Application
    - Draft Union Pacific Railroad Crossing Permit Application
    - Preliminary Design Drawings
    - Water Quality Sampling Results
- Supplemental Technical Memoranda, by MWH Americas, Inc., April, 2015
    - Cost Estimate Comparison
    - Peak Shaving
    - Alternate design to 50-year standard

III. SCOPE OF WORK

PHASE I Cost Review: Tasks to be Performed by Consultant

Phase I consists of a thorough, detailed, independent review of the project cost estimates to provide the Village with additional understanding and certainty concerning the current and prior cost estimates.

Task 1: Review of Previous Engineering and Supporting Data (Items #1, 2 & 4)

The Consultant shall review the initial Flood Risk Reduction Study, prepared by Christopher B. Burke Engineering, and the Willow Road Tunnel Feasibility Study Report, prepared by Village staff, to develop an understanding of and to become familiar with the work studies that were completed and which formed the starting point for MWH's contractual scope of work. The Consultant shall also review all documents in Item #4, to develop an understanding of MWH's current project approach.

Task 2: Review of Preliminary Design Report and Technical Memoranda (Items #6, 7 & 8)

The Consultant shall review all documents in Item #6, #7, and #8, including the data, assumptions, methods, calculations, designs, drawings, estimates, and conclusions, to understand MWH's current project approach as well as the level surveying and geotechnical information, plan sheets, and other details available for use in the current cost estimates. Particular attention shall be given to methods, assumptions, and calculations used to develop and prepare the Opinion of Probable Construction Cost contained in Item #6.

Task 3: Cost Estimate, Analysis, and Conclusions

The Consultant shall prepare a written, detailed, independent review of the estimate of probable construction cost, based on the current project design, draft reports and

underlying detailed data. The Consultant shall document all assumptions, calculations, productivity rates, material prices, labor rates, etc. with the final cost estimate. The Consultant shall comment on the need for refinement of data, study or design assumptions, or other factors that would bear on the development, design, and cost of the STADI Project.

PHASE II Value Engineering Study: Tasks to be Performed by Consultant

Phase II consists of a Value Engineering study and workshop. The purpose of this Value Engineering study and workshop is to creatively evaluate the STADI project and identify potential changes to the project that would provide the desired level of structural flood risk-reduction at a lower capital. This study also aims to identify potential changes to the project that might better accomplish the STADI project goals while providing better overall value and improve confidence in the effectiveness of the design.

Task 1: Pre-Workshop Activities

The CONSULTANT shall organize an independent Value Engineering (VE) Team to review the Preliminary Engineering Report and/or Design of the project components. The Consultant will provide the study team members identified below:

Name/Discipline	Qualifications (to be provided)
Team Leader	
Team Administrative Assistant	
Trenched/trenchless sewer design/construction expert	
Hydrology/hydraulic expert	
Tunnel design/construction expert	
Cost Estimator	

All other team members will be provided by the Village, at no cost to the Consultant. The Consultant will communicate directly with all study team members as needed relative to scheduling, pre-workshop, workshop and post-workshop activities.

The Consultant will perform pre-workshop activities to include those tasks which must be accomplished in order for the study team to be able to efficiently and effectively perform in the workshop, such as scheduling study tasks, scheduling and coordination with study team members, assisting the Village with scheduling study participants, and coordination of the necessary documentation on the project for distribution by the Village to the study team members.

The Village will distribute the project documents and materials to be studied to the study team members at least five working days prior to the workshop start. Documents to be reviewed are listed in Item #4. All team members except the cost estimator are expected to spend at least 10-12 hours reviewing the project documents and materials prior to the start of the workshop. The cost is expected to spend 20-24 hours reviewing the documents and validating the cost estimate provided by the Village. The study team

members shall perform the necessary review of the documents provided to develop an understanding of and to become familiar with the work and studies that were completed. The review shall include all of the data, assumptions, methods, calculations, and conclusions. **It may be necessary that the review exceed the timeframes listed above.**

Task 2: Value Engineering Workshop

After reviewing all of the above information, the Consultant shall endeavor to identify an alternate strategy or strategies to achieve the project mission, namely to provide significant risk reduction against structure flooding for five drainage areas in the Village, for a 100-year design event. The Consultant will conduct a 5-day value engineering workshop using a job plan that is generally consistent with value engineering practices and principles employed by the U.S. EPA, US Army Corps of Engineers, and S.A.V.E. International. The workshop will include an Information Phase, a Function Analysis Phase, a Creative Phase, an Evaluation Phase, a Development Phase, and a Presentation Phase.

The workshop will be initiated by presentations from the Village, who will describe the objectives of the Assignment and any constraints that will be placed on the study team. The designers will explain specifically how the design accomplishes the Village's objectives and the details of that design. The workshop will include a detailed function analysis of the major project elements. The team will generate a list of ideas for project improvement followed by an evaluation of those ideas. This evaluation will include input from key Village decision makers before proceeding with development of recommendations. On the last day of the workshop, a presentation of the recommendations will be provided to the Village decision makers and key representatives of the design team.

The cost of providing the workshop refreshments and all other costs associated with the meeting facilities, including data, telephone, photocopying, etc. will be borne by the Consultant. To ensure that the study team has complete information about the project criteria, the Village will provide at a minimum, the Village Assignment Manager and appropriate key members of the design team for the first day and last day presentations as well as the mid-point review meeting.

Task 3: Post-Workshop

The Consultant will conduct a four-hour post-workshop study Decision/Implementation Meeting area following receipt by the study team leader of the written designer responses to the Preliminary Report. The purpose of this Decision/Implementation Meeting is to assist the Village in making decisions regarding acceptance or rejection of the individual value proposals. Attendees will consist of key Village staff, key designer staff and the study team leader.

Task 4: Summary Value Engineering Analysis and Conclusions

The Consultant shall:

- Submit a preliminary value report in electronic and hard copy format, consisting of the workshop work products within fourteen (14) days of the completion of the value workshop;
- Review the design team written responses to the preliminary value report, consult with the value team members as necessary, and prepare for a decision-making meeting;
- Attend the decision-making meeting and provide information to the decision-makers at the meeting relative to the pros and cons of each value recommendation. Respond to the concerns raised by the design team and others, and assist the designer, design project manager and the Village project manager in reaching decisions about whether to incorporate each value recommendation into the project design;
- Prepare a draft final report within fourteen (14) days following the decision-making meeting that documents the entire VE study, including the decisions made;
- Make appropriate revisions to the draft final report based on comments from the Village project manager, and provide an electronic and 10 hard copies within fourteen (14) days following receipt of comments from the Village project manager.

Deliverables

The Consultant shall produce and provide the following deliverables:

PHASE I

- Detailed Estimate of Cost
- Hard copies of any newly developed data and work prepared by the Consultant
- Digital data/electronic copies to be provided on DVD, including source files. Include the final Detailed Estimate of Costs report in PDF format.

PHASE II

- Preliminary Value Engineering report in electronic and hard copy format, consisting of the workshop work products;
- Draft final report that documents the entire VE study, including the decisions made;
- Make appropriate revisions to the draft final report based on comments from the Village project manager, and provide an electronic and 10 hard copies within fourteen (14) days following receipt of comments from the Village project manager.
- Hard copies of any newly developed data and work prepared by the Consultant
- Digital data/electronic copies to be provided on DVD, including source files. Include the final Value Engineering Report in PDF format.

Schedule

The schedule outlined below represents the desired duration of Phase I and shall begin after the Village has awarded a contract and issued a Notice to Proceed (NTP).

CONTRACT SCHEDULE FOR PHASE I

Description	Calendar Days
Task 1: Review of Previous Engineering and Supporting Data	5
Task 2: Review of Preliminary Design Report and Technical Memoranda	5
Task 3: Cost Estimate, Analysis, Conclusions, and Report	10
Total Contract Duration (days)	**20**

The schedule outlined below represents the desired duration of Phase II and shall begin after completion of the Phase I cost review and after the Village authorizes the Consultant to proceed with Phase II.

CONTRACT SCHEDULE FOR PHASE II

Description	Calendar Days
Task 1: Pre-workshop activities	10
Task 2: Value Engineering workshop	10
Task 3: Post Workshop Activities	10
Task 4: Summary Value Engineering Analysis and Conclusions	20
Total Contract Duration (days)	**50**

IV. SUBMITTAL REQUIREMENTS

The deadline for submittals is **4:00 p.m. on May 22, 2015**. One (1) paper copy and one (1) electronic copy of the submittal should be delivered to:

Nicholas Mostardo, Financial Services Coordinator
Village of Winnetka
510 Green Bay Road
Winnetka, IL 60093
(847) 716-3504
(847) 446-1139 (fax)
nmostardo@winnetka.org

To be considered for this project, the Consultant must submit an informative statement of interest to the Village, which also includes the following information, organized in the following manner to facilitate review:

A. Consultant Information

1. Company offices from which the project will be staffed.

2. Identify the staff members who will be assigned to this project, the roles they will fill, and the qualifications of each individual, including resumes.

3. Related experience of project personnel.

4. List similar projects completed within the last five years, by the staff members that will be assigned to this project. Include a project description, date of project completion, and the name and telephone number of a representative of the contracting jurisdiction.

5. A completed compliance affidavit (Attachment 1)

B. Approach to Project

The Consultant will propose a scope of work based upon the preliminary scope contained herein, and describe its approach in performing the proposed scope.

C. Schedule

A preliminary schedule for completing the project is required. This schedule should address all work and meetings recommended by the Consultant and which clearly corresponds to the Consultant's approach to the project.

D. Budget

An itemized, not-to-exceed budget to complete all outlined work items is required. The budget should include the hourly rates of the staff members assigned to the project, any direct costs, and a breakdown of project hours by task to complete the project. **The budget shall be submitted in a separate, sealed envelope clearly marked "Project Budget".**

V. QUALFICATION EVALUATION

Statements of qualifications will be evaluated by the Village according to the following criteria:

Proposals will be evaluated based on the following criteria:

- Project understanding. Understanding of the purpose and goals of the project, critical success factors and potential obstacles to success.

- Project approach. Technical approach, management approach, innovative approaches to stormwater management and regulatory understanding, and the ability to present technical data in a user-friendly format with appropriate use of graphics.

- Firm experience and workload. Experience of the firm in similar stormwater management planning and regulatory work and record of successful results of that work, the firm's ability to take on additional work, demonstration that the firm's organizational structure has sufficient depth for its present workload, and firm's ability to offer the breadth and quality of services required for the project.

- Project team structure and personnel experience. Project team member's individual experience and qualifications, project manager's experience, sub-consultant's individual experience and qualifications. Proposals will be evaluated primarily on the demonstrated ability of the project team members who will actually perform substantial amounts of the work on this project.

- Schedule. Proposed schedule for performing the work for the project and how the firm proposes to achieve the project's time goals. Once a contract is awarded, the selected firm must be in a position to begin work immediately and move promptly towards completion.

- Fee. The Village of Winnetka will consider cost in overall evaluation of the proposals. This project will not necessarily be awarded to the firm with the lowest prices, but cost is one criterion and will be considered among the other factors.

Each submittal will be evaluated upon a scale of 1 to 10 for each of the above factors. The Village President and Board of Trustees reserve the right to reject any and all submittals.

VI. INDEMNIFICATION

Respondents to this RFP shall understand that the successful proposer shall indemnify and hold harmless the Village of Winnetka, its agents, and its employees against any and all lawsuits, claims, demands, liabilities, losses or expenses, including court costs, and attorney's fees, for or on account of any injury to any person or any death at any time resulting from such injury, or any damaged property, which may be alleged to have arisen out of the negligent acts, errors, or omissions of the Consultant. It is further understood that this indemnification shall not be construed to cover the negligent acts or omissions of the Village of Winnetka, its agents, or its employees. It is additionally understood that this indemnification shall not be construed to cover the negligent acts or omissions of parties unrelated to this contract.

VII. ATTACHMENTS

1) Compliance Affidavit

ATTACHMENT 1

COMPLIANCE AFFIDAVIT

As a condition of entering into a contract with the Village of Winnetka, and under oath and penalty of perjury and possible termination of contract rights and debarment, the undersigned deposes and states that he has the authority to make any certifications required by this Affidavit on behalf of the bidder, and that all information contained in this Affidavit is true and correct in both substance and fact.

Section 1: BID RIGGING AND ROTATING

1. This bid is not made in the interest of, or on behalf of an undisclosed person, partnership, company, association, organization or corporation;

2. The bidder has not in any manner directly or indirectly sought by communication, consultation or agreement with anyone to fix the bid price of any bidder, or to fix any overhead profit or cost element of their bid price or that of any other bidder, or to secure any advantage against the Village of Winnetka or anyone interested in the proper contract;

3. This bid is genuine and not collusive or sham;

4. The prices, breakdowns of prices and all the contents quoted in this bid have not knowingly been disclosed by the bidder directly or indirectly to any other bidder or any competitor prior to the bid opening;

5. All statements contained in this bid are true;

6. No attempt has been or will be made by the bidder to induce any other person or firm to submit a false or sham bid;

7. No attempt has been or will be made by the bidder to induce any other person or firm to submit or not submit a bid for the purpose of restricting competition;

8. The undersigned on behalf of the entity making this proposal or bid certifies the bidder has never been convicted for a violation of State laws prohibiting bid rigging or rotating.

Section 2: TAX COMPLIANCE

1. The undersigned on behalf of the entity making this proposal or bid certifies that neither the undersigned nor the entity is barred from contracting with the Village of Winnetka because of any delinquency in the payment of any tax administered by the State of Illinois, Department of Revenue, unless the undersigned or the entity is contesting, in accordance with the procedures established by the appropriate revenue

act, liability of the tax or the amount of tax;

2. The undersigned or the entity making this proposal or bid understands that making a false statement regarding delinquency of taxes is a Class A Misdemeanor and in addition voids the contract and allows the municipality to recover all amounts paid to the entity under the contract in civil action.

Section 3: EQUAL EMPLOYMENT OPPORTUNITY

This EQUAL OPPORTUNITY CLAUSE is required by the Illinois Human Rights Act, 775 ILCS 5/101 et seq.

In the event of the contractor's non-compliance with any provision of the Equal Employment Opportunity Clause, the Illinois Human Rights Act, or the Rules and Regulations for Public Contracts of the Department of Human Rights, the contractor may be declared non-responsive and therefore ineligible for future contractor subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be canceled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies involved as provided by statute or regulations.

During the performance of this contract, the contractor agrees:

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or woman are underutilized and will take appropriate action to rectify any such underutilization;

2. That, if it hires additional employees in order to perform this contract, or any portion hereof, it will determine the availability (in accordance with the Department's Rules and Regulations for Public Contract's) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized;

3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other such agreement or understanding, a notice advising such labor organization or representative of the contractor's obligation under the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contract. If any such labor organization or representative fails or refuses to cooperate with the contractor in its efforts to comply with such Act and Rules and Regulations, the contractor will promptly so notify the Department and

contracting agency will recruit employees from other sources when needed to fulfill its obligation hereunder.

5. That it will submit reports as required by the Department's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Department or contracting agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contracts.

6. That it will permit access to all relevant books, records, accounts, and work sites by personnel of the contracting agency and the Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Departments Rules and Regulations for Public Contracts.

7. That it will include verbatim or by reference the provisions of this Equal Opportunity Clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so such provisions will be binding upon such subcontractor. In the same manner as the other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the contractor will not utilize any subcontractor declared by the Illinois Human Rights Department to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

Section 4: ILLINOIS DRUG FREE WORK PLACE ACT

The undersigned will publish a statement:

1. Notifying employees that the unlawful manufacture, distribution, dispensation, possession, or a use of a controlled substance is prohibited in the work place;

2. Specifying the actions that will be taken against employees for violating this provision;

3. Notifying the employees that, as a condition of their employment to do work under the contract with the Village of Winnetka, the employee will:

    A. Abide by the terms of the statement;

    B. Notify the undersigned of any criminal drug statute conviction for a violation occurring in the work place not later than five (5) days after such a conviction.

4. Establishing a drug free awareness program to inform employees about:

    A. The dangers of drug abuse in the work place;

B. The policy of maintaining a drug-free work place;

C. Any available drug counseling, rehabilitation or employee assistance programs;

D. The penalties that may be imposed upon an employee for drug violations.

5. The undersigned shall provide a copy of the required statement to each employee engaged in the performance of the contract with the Village of Winnetka, and shall post the statement in a prominent place in the work place.

6. The undersigned will notify the Village of Winnetka within ten (10) days of receiving notice of an employee's conviction.

7. Make a good faith effort to maintain a drug free work place through the implementation of these policies.

8. The undersigned further affirms that within thirty (30) days after receiving notice of a conviction of a violation of the criminal drug statute occurring in the work place he shall:

A. Take appropriate action against such employee up to and including termination; or

B. Require the employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.

Section 5: SEXUAL HARRASSMENT POLICY

The undersigned on behalf of the entity making this proposal or bid certifies that a written sexual harassment policy is in place pursuant to Public Act 87-1257, effective July 1, 1993, 775 ILCS 5/2-105 (A).

This Act has been amended to provide that every party to a public contract must have written sexual harassment policies that include, at a minimum, the following information:

1. The illegality of sexual harassment;

2. The definition of sexual harassment under State law;

3. A description of sexual harassment, utilizing examples;

4. The vendor's internal complaint process, including penalties;

5. The legal recourse, investigative and complaint process available through the Department of Human Rights, and the Human Rights Commission;

6. Directions on how to contact the Department and Commission;

7. Protection against retaliation as provided by 6-101 of the Act.

Section 6: VENDOR INFORMATION

1. Is the bidder a publicly traded company? (yes or no) _____
If the answer is yes, state the number of outstanding shares in each class of stock. Provide the name of the market or exchange on which the company's stock is traded.

_____

_____

_____

_____

2. Is the bidder 50% or more owned by a publicly traded company? (yes or no) _____

If the answer to the above question is yes, name the publicly traded company or companies owning 50% or more of your stock, state the number of outstanding shares in each class of stock and provide the name of the market or exchange on which the stock of such company or companies is traded.

_____

_____

_____

_____

IT IS EXPRESSLY UNDERSTOOD THAT THE FOREGOING STATEMENTS AND REPRESENTATIONS AND PROMISES ARE MADE AS A CONDITION TO THE RIGHT OF THE BIDDER TO RECEIVE PAYMENT UNDER ANY AWARD MADE UNDER THE TERMS AND PROVISIONS OF THIS BID.

SIGNATURE:_____

NAME:_____ TITLE: _____
(print or type)

Subscribed and sworn to me this _____day of_____, 2012, A.D.

By:
(Notary Public)

-Seal-

ATTACHMENT #2

BLACK & VEATCH RESPONSE

BLACK & VEATCH
Building a world of difference.

FARUK OKSUZ, PE
Vice President, B&V Water
101 N. WACKER DR. SUITE 1100 CHICAGO, IL 60606 USA
+1 312-683-7850 | OKSUZF@BV.COM

May 22, 2015

Village of Winnetka
510 Green Bay Road
Winnetka, IL 60093

STADI Project Review
835722.1200

Attention: Mr. Nicholas Mostardo
Financial Services Coordinator

Re: Proposal for Independent Cost and Value Engineering Review of Stormwater Improvement Program – Willow Road Tunnel and Area Drainage Improvement Project

Dear Mr. Mostardo,

Black & Veatch Corporation (B&V) is pleased to submit this proposal in response to the Village of Winnetka's (Village)'s Request for Proposal (RFP) for an Independent Cost Review and Value Engineering (VE) Study for the proposed Willow Road Stormwater Tunnel and Area Drainage Improvement (STADI) Project.

We look forward to assisting the Village on this important assignment. As requested, our proposal provides the Village with a project understanding and approach, and the experience and availability of the proposed team members. We can accomplish the work within the time frame provided in the RFP and we will proceed immediately after the contract award and issuance of the notice to proceed (NTP) by the Village.

We understand that the Phase I Cost Review Tasks will be completed prior to authorization and proceeding with the Phase II VE Study. An itemized budget for Phase I and II activities is submitted in a separate sealed envelope per the RFP.

Resumes of the proposed team members are presented in Attachment A. Representative experience is provided in Attachment B. The signed compliance affidavit is included in Attachment C. We have also included our standard services agreement for your review and consideration.

PROPOSED REVIEW TEAM QUALIFICATIONS

Our team is comprised of experienced and dedicated tunneling, trenched/trenchless pipeline hydraulics and civil engineers and a cost estimator. The key team members have an average of 20 years of experience and bring extensive knowledge of regional stormwater and other water tunnel and pipeline experience relevant to STADI project.

The project team will be led by Faruk Oksuz, PE, Project Principal, and Cary Hirner, Senior Project Manager and Tunneling Practice Lead for B&V. Faruk and Cary have worked together over the past 15 years designing, estimating and constructing soft ground and rock tunnels, shafts and pipelines in the Chicago area and around the nation. They will be fully accessible to the Village for this assignment.

We propose the following B&V review team members for your consideration:

- **Faruk Oksuz, P.E.** – Vice President and Project Principal. Faruk will assist in the project kickoff with the B&V staff and the Village's engineering team, and also facilitate the VE Study.
- **Cary Hirner, P.E.** – Senior Project Manager and Tunneling Practice Leader. Cary will lead the B&V efforts and project team, and he will also be the primary tunneling and outfall components design and construction review leader.
- **Frank Means, P.E.** - Senior Hydraulic Engineer. Frank will review the system hydraulics design elements and attend the VE Study.
- **Gary Schnettgoeke, P.E.** – Senior Civil Engineer. Gary will review the trenched/trenchless pipeline components and attend the VE Study.
- **Nitesh Poloida** - Senior Cost Estimator. Nitesh is a dedicated heavy civil and tunneling projects cost estimator with B&V. He will perform the initial cost estimate review work working with Faruk and Cary, and he will also work with the VE Study team to develop estimates and cost savings of the alternatives identified.
- **Ish Mohammad** - Staff Engineer. Ish will be the project engineer supporting the VE Study team and gather the deliverables and reports for the cost review as well as the VE Study.

The proposed review team will be primarily staffed from B&V Chicago office resources. We will be engaging specialty team members on cost estimating and hydraulics from our Kansas City Headquarters office as necessary. The related experience of project personnel and resumes are presented in Attachment A. Attachment B includes our representative prior experience

We are committed to working with the Village to expeditiously execute this assignment and to deliver high quality services and deliverables on time and within budget.

INDEPENDENT REVIEW APPROACH FOR STADI

The Village provided extensive information on the background and objectives of this project and assignment in the RFP. We clearly understand that your ultimate flood management goal is to accomplish 100-year flood protection in the most cost effective manner while maximizing beneficial opportunities in water quality, including incorporation of green infrastructure and stormwater Best Management Practices. The Willow Road Stormwater Tunnel appears to be the key component of the STADI Project and it was noted the most recent construction cost estimate provided with the preliminary design report is significantly higher than the 2012 preliminary conceptual estimate in the feasibility study report.

The following sections describe our approach to deliver the Phases I and II of this assignment consistent with the RFP.

PHASE I – COST ESTIMATES REVIEW

To make sound decisions for project alternatives and associated construction, the Village will need reliable cost estimates. Tunneling construction costs are affected by factors that are somewhat unique to the industry such as tunneling method, availability of tunnel boring machines and site conditions, and unit prices are not uniform from one project to another. B&V has extensive regional tunneling experience on both designed and constructed tunneling projects and a dedicated cost estimating center for heavy civil projects. We will assign a senior cost estimator who understands the type of construction, local market conditions, and trends in materials and construction costs. The cost estimator will be supported by a senior team of experts with related tunnels and interceptor experience.

Phase I of the work will include the tasks as outlined in the RFP.

Task 1 and Task 2 – Document Review

An independent review of the preliminary conceptual estimate in the feasibility study report as well as a review of the probable opinion of costs presented with the preliminary design report will be performed.

Task 3 – Cost Estimate Analysis and Conclusions

B&V will review the available design information and will provide the Village with an independent and complete assessment of project costs in support of your decision analysis. We will use comparative analysis of unit costs and total costs using data from other regional interceptor and tunneling projects, including bid tabulations. Our extensive tunneling cost database includes all of the constructed TARP tunnel project costs as well as pricing from recent tunnels bid in the Great Lakes/Midwest region in

geology similar to Chicago. Questions developed from the review of the cost estimates and provided documentation will be discussed and evaluated with the Village.

A pragmatic bid form and sequence of construction will be formulated by the team to comprehensively canvas all components of construction and the construction process itself. If available, a preliminary schedule of construction activities will be reviewed with respect to job specific elements such as expected equipment (tunnel boring machine, etc.), lead times, timeline for tunneling, known environmental constraints and mitigations, site specific factors, and seasonal windows that dictate working conditions. The planned construction timeline will be critical to the cost estimate analysis.

The available preliminary project drawings depicting the general arrangement of the project will be used by B&V as a starting point for defining work activities and staging processes by construction type. A series of construction sequence illustrations may be prepared to explain the basic construction steps of the project and to define whether they will be staggered or conducted in parallel. The description of the work and the cost estimating assumptions will be documented for inclusions in the Independent Cost Estimate Review deliverable. Complete documentation will be provided for how the unit prices are obtained for each activity or cost item.

The Independent Cost Estimate Review deliverable will include at a minimum:

- Detailed description of the work and work schedule
- Construction methodologies
- Cost basis (e.g., vendor quotes, unit pricing, engineering judgment)
- Constructability factors
- Allowances and contingencies
- Assumptions and Exceptions
- Indirect costs
- Similar component benchmarking and a parametric sensitivity analysis

As part of the independent cost review, a cost escalation analysis will also be performed between 2012 and 2015 estimates. The cost escalation analysis will be based on historical cost indices based on the type of work and materials associated with the project to establish a project escalation index to forecast future project costs.

Forecast escalation rates are to be presented by the percentage change from one year to the next, prepared by considering the percentage of specific materials utilized across the project, utilizing different sources of data.

Where available, the results of the cost escalation analysis will include supporting documentation (tables, graphs, etc.) by major work type and/or material type, including sources used. It will also describe the process used to develop the project escalation index along with adequate supporting narrative for justifying conclusions reached.

Cost Estimate Reconciliation

Following review of the cost estimates, we would anticipate to engage in a reconciliation session with the Village and designers. Differences will be identified and an agreement will be reached on the changes to develop a final estimate for the Village. As necessary, we can provide a variance analysis for post reconciliation that would also include various assumptions, risks and cost factors and how they are applied to the estimating process.

We will ensure that the Village staff and their residents receive most accurate and reliable cost information and are able to evaluate and differentiate between original planning concepts and current design alternatives.

Deliverable for Phase I Cost Estimate review will be a draft and final report as per the RFP.

Miscellaneous Tunneling Cost Estimating Considerations

Tunneling is a linear construction method, and as such, productivity and advance rates are critical for an efficient cost and schedule. Therefore, tunnel cost estimators and schedulers should be cognizant of ground conditions, initial support requirements, groundwater intrusion, excavation stability, spoil material handling, numbers and sizes of headings, and other factors that impact the excavation advance rates. B&V has significant experience with the design and construction of tunnels nationally as well as extensive tunneling experience in Chicago and will compare these costs to this project to ensure accurate pricing.

B&V's cost estimating experience encompasses conceptual design, preliminary design, detailed design, program management, construction management at risk, and design-build projects. We have developed a significant understanding and appreciation for cost estimating associated with tunnel construction, coupled with local market conditions and the contracting industry.

B&V developed a project approach that is consistent with the RFP and general guidelines for independent cost estimating and the independent cost review practices

engaged by agencies. We are confident that we will meet your expectations in decision support for alternative analysis for the STADI Project.

For planning level studies, we use tunnel cost curves that we have developed and are based on both tunnel length and diameter of bid and constructed tunnel projects. Because the majority of initial tunneling costs are associated with a TBM, overall tunneling cost is not always proportional to the length of a tunnel. That is to say that differential cost estimates for changes in size and length of tunnels (or tunneling alternatives), should be based using tunnel cost curves rather than a unit price per length. Shaft cost estimating will be based on shaft diameter, construction purposes and minimum ground support requirements in soils and rock. For planning level estimates, we often establish a parametric study and provide a cost reliability and sensitivity analysis to account for unknowns at the time or variable parameters such as ground conditions, easements, and utility conflicts, etc.

The B&V Team uses a parametric cost estimating strategy that employs contractor estimating tools (e.g., Heavybid by Heavy Construction Systems Specialists, Inc.) and procedures. The team has the capability and cost estimating data bases available to perform parametric estimating based on historic data, as well as, detailed estimating based on a "bottom-up" approach. A "bottom-up" line item estimate is developed based on costs for labor, permanent and temporary construction materials, construction equipment, indirect costs and margin, plus any additional subcontractor costs, enables objective assessment of the accuracy of the estimate. We don't just apply unit rates to measured quantities. Our cost estimators build the project on paper within the cost estimate linking every construction activity to the resources required to undertake that activity and to the cost estimate. These activities include mobilization, construction sequence, etc. Durations and costs are reviewed; their 'reasonability' reconsidered and upper and lower bounds on cost and schedule items are established. The purpose of replacing discrete cost and schedule estimates with ranges is the same as for identifying possible outcomes for specific activities lays the groundwork for the STADI Project.

The development of this detailed estimate, breaking down each line item into labor, materials, and equipment facilitates a thorough estimate validation and provides the basis for a detailed risk analysis that will enable the project team to identify and manage uncertain events with the potential to unfavorably impact a project's cost or schedule and to identify opportunities to increase the confidence level that the project can be delivered on time and within budget.

PHASE II – VALUE ENGINEERING STUDY

Task 1 – Pre-Workshop Activities

B&V will organize an independent VE Team to review the preliminary engineering reports and design of the project components. The VE Team will be comprised of technical disciplines required for hydraulics, tunnels, open-cut and trenched excavations and miscellaneous outfall and connections (e.g., structural, civil, etc.), and a cost estimator or cost engineer. The representatives are well versed in design and construction of tunnels, trenched and trenchless conduits and connections.

We have identified our proposed cost review and VE Study team members in the preceding section. However, we understand that the Village will have to review and approve the VE Study. Upon request from the Village or due to conflicts on the VE Study schedule proposed, B&V will provide additional experts for consideration and approval by the Village.

The VE Team will consist of six (6) members:

- Team Leader
- Tunnel Design and Construction Expert
- Trenched/Trenchless Sewer Design and Construction Expert
- Hydrology/Hydraulics Expert
- Cost Estimator
- Team Administrative Assistant

In addition, B&V will perform tasks as necessary which must be accomplished in order for the participants in the VE Workshop to be able to efficiently and effectively perform in the workshop. These activities will consist of:

- Scheduling VE tasks and coordination with VE Team members
- Assisting Village with scheduling VE Workshop participants and assist in identifying additional candidates for the VE Workshop
- Coordination of the necessary documentation on the project for distribution by the Village to the participants of the VE Workshop
- Compiling project data into a cost model
- Document reviews and revisions

B&V will work cooperatively with the Village to make the final selection of individuals to fulfill the desired discipline roles for the VE Workshop. B&V will communicate

directly with all participants relative to scheduling, pre-workshop, workshop and post workshop activities.

Cost Models

If the cost estimate and other appropriate information is provided prior to the VE Workshop, B&V will develop a cost model which will convey to the team members which project elements or features or functions are driving the cost of the project. These models will be used during the VE Workshop to help focus the participants on those aspects of the project which consume the greatest share of the total project cost.

Document Review

The Village will distribute the project documents to be studied to the VE Team. These documents will be distributed a minimum of one (1) week prior to the workshop start. B&V VE Team Members will be allowed to spend up to twelve (12) hours each reviewing these documents in advance of the workshop. The B&V VE Team cost estimator will be allowed to spend up to twenty four (24) hours reviewing and validating project costs in advance of the workshop.

Task 2 – Value Engineering Workshop

B&V will participate in a VE Workshop of the Project. It is anticipated that the VE Workshop will consist of one uninterrupted 40 hour (5 day) week. The VE Workshop will utilize a job plan that is generally consistent with the value engineering requirements and procedures employed by the United States Environmental Protection Agency (USEPA), US Army Corps of Engineers, and S.A.V.E. International Value Methodology Standard. The workshop will include an Information Phase, a Function Analysis Phase, a Creative Phase, an Evaluation Phase, a Development Phase, and a Presentation Phase.

Presentations

The workshop will be initiated by presentations from the Village who will describe the objectives of this project and any constraints that will be placed on the VE Study. The project design team will explain specifically how the design accomplishes the Village's objectives and the details of that design. The workshop will include a complete function analysis of the major project elements. The team will generate a list of ideas for project improvement followed by an evaluation of those ideas. This evaluation will include input from key Village decision makers before proceeding with development of recommendations.

On the last day of the workshop, a presentation of the recommendations will be provided to the Village decision makers and additional design team members as desired.

To make sure the VE Workshop has complete information about the project criteria, The Village will provide at a minimum, the Village Project Managers and appropriate members of the design team for the first day and last day of presentations.

The VE Workshop will encompass the documents listed in the RFP and will aim to identify any cost savings opportunities and alternatives that will help to reduce project risks and/or delays. The VE Workshop will cover all components of the project to help identify areas of cost savings during design, construction and long term operation. The VE Workshop will provide the environment conducive for the systematic application of analytical, creative and evaluation techniques in a multi-disciplinary team setting where the focus is on achieving the required functions, performance and quality while maximizing value.

B&V will furnish the services of selected employees to prepare documentation for the VE Workshop and to provide space for meetings for the VE Workshop, including refreshments, and all other costs associated with the meeting facilities, including internet access, telephone access, photocopying, etc.

Site Visit

A site visit will be conducted on the afternoon of the first day of the workshop. This site visit will be attended by the VE Team and Village representatives.

Preliminary VE Report

A preliminary VE Report will be prepared by B&V and submitted to Village for comments directly following the study. The Preliminary VE Report will be a compilation of the handwritten products developed in the VE Workshop. This report will include all of the VE recommendations and design suggestions developed during the VE Workshop.

Deliverables:

Electronic copy of Preliminary VE Report

Task 3 – Post-Workshop

B&V will conduct a four (4) hour post-workshop Decision and Implementation Meeting following review of comments to the preliminary VE Report by the Village. The Village will provide B&V with written responses documenting the reasons for acceptance or rejection for all VE recommendations discussed in the VE Workshop. The purpose of this meeting is to assist the Village in making decisions regarding acceptance or rejection of the Value Engineering proposals. B&V will assist in providing advantages and disadvantages of each Value Engineering proposal. B&V will respond to any concerns raised by the Village and assist the Village in reaching

decisions on whether to carry forward each value recommendation. This meeting will be held using an online (internet based) meeting service.

Task 4 – Summary of Value Engineering Analysis and Conclusions

Draft VE Report

A Draft VE Report will be prepared by B&V which documents the VE Study and the decisions made at the Decision and Implementation Meeting. For those VE proposals that are rejected, the Village's justification for rejection will be included in the Draft VE Report. Rejection may be based on cost effectiveness, reliability, project delay, unusual operating and/or maintenance problems, environmental impact, or other pertinent considerations.

The draft VE Report will be submitted to the Village for comments. The purpose of this draft report is to give the Village and other appropriate reviewers the opportunity to provide input to the final report. This document will be, in the opinion of B&V, equivalent to the Final VE Report. The Village will provide written comments in compliance with the schedule listed below. If comments are not received by the specified due date, B&V will proceed with preparation and submittal of the final report, unless otherwise directed by the Village.

Deliverables:

Electronic copy of Draft VE Report

Final VE Report

Prior to the preparation of the Final VE Report by B&V, B&V will consider commentary from the Village and request clarification to non-concurrence issues. The Final VE Report is the final documentation of the VE Workshop. The report is a finalized version of the Draft VE Report including the incorporation of Village's comments. The cover of the report will clearly indicate the project title, that it is the Final VE Report, and the date of the report. The submittal of this report concludes the VE Workshop and Study effort. B&V will submit the final VE Report to the Village.

Deliverables:

Electronic and Ten (10) hard copies of the Final VE Report

SCHEDULE

The Phase I Cost Estimate Review tasks will be completed within 20 calendar days from the contract award and NTP for this assignment. We are also confident that we can complete the Phase II VE Study within 50 calendar days of the authorization of the work. The Preliminary VE Report will be submitted within one (1) week of completion of the VE Workshop. The Draft VE Report will be submitted within one (1) week after Decision and Implementation Meeting.

The Final VE Report will be submitted within one (1) week after receipt of the Village's comments to the Draft VE Report. A tentative schedule of activities for the VE Study is as follows:

Activity	**Date**
Notice to Proceed (NTP)	TBD
Kickoff Conference Call	Within 1 week following NTP
Village to Distribute Documents, B&V Review of Documents and Other Pre-Workshop Activities by B&V	1 week prior to Start of VE Workshop
VE Workshop (5 Days)	TBD
Submit Preliminary VE Report	1 week following VE Workshop
Village Comments to VE Report	1 week following Preliminary VE Report
Decision and Implementation Meeting	After receipt of Village Comments to Preliminary VE Report
Submit Draft VE Report	1 week following Decision and Implementation Meeting
Village Comments to Draft VE Report	1 week following Draft VE Report
Submit Final VE Report	1 week after receipt of Village Comments to Draft VE Report

BUDGET

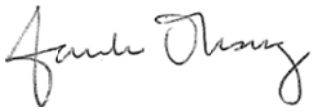
As requested, our budget estimate is submitted in a separate envelope per the RFP including the hourly rates and the level of effort.

B&V will be fully aligned with you at all times in performance of the work. The objective of the independent review of the STADI Project preliminary design documents along with construction cost estimates will hopefully lead toward identifying lower cost alternatives that would meet your flood management objectives.

B&V has not been involved in the STADI project in the past. However, our proposed team has a very extensive background in the region with projects involving flood control, interceptors, and tunneling.

If you have any questions, please call or email me at the contact information above.

Very truly yours,
BLACK & VEATCH



Faruk Oksuz, PE
Vice President

cc: Dave Koch (B&V)
Cary Hirner (B&V)

Attachment A

Proposed Review Team Member Resumes

Faruk Oksuz, P.E.

B&V Water Heavy Civil Infrastructure

Mr. Faruk Oksuz is a Vice President and the business and technology leader B&V Water Heavy Civil Infrastructure practice. His experience and responsibilities cover a wide range of water supply, water and wastewater conveyance, storage, flood control, irrigation, and hydropower infrastructure systems with large tunnels, dams, reservoirs, penstocks, pipelines, pump stations, and gates. He is also experienced in physics and transit tunnels, metallic and non-metallic surface and underground mines exploration and operations.

His program/project management and technical direction expertise includes nearly all aspects planning, engineering, procurement, cost/ schedule control and construction of heavy civil work projects with extensive risk management strategies. Mr. Oksuz has successfully managed and delivered projects with a constructed value over $5 billion. He provides senior leadership and technical direction to project teams for technology, innovation, and execution.

Most recent and significant assignment includes design and construction of deep tunnels and connections for the Chicago's Tunnel and Reservoir Plan (TARP), City of Austin's Jollyville Transmission Main, Cincinnati MSD's Lower Mill Creek, Milwaukee's Northwest Side tunnels including TBM and large diameter drill-blast tunnels, concrete and steel linings, tunnel bifurcations, connections to tunnels in service, sealing, grouting, and abandonment of existing tunnels with temporary and permanent plugs, high head gates, valves and pumping systems.

PROJECT EXPERIENCE

U.S. Army Corps of Engineers and Metropolitan Water Reclamation District of Greater Chicago | McCook Reservoir, Main Tunnel System; Chicago, IL | 2009-11

Project Principal and **Technical Director** for feasibility, design, and construction services for critical components of TARP McCook Reservoir for flood and CSO control, Facilities included 33-ft dia. drill-blast SEM tunnel, 82-dia and 300 ft deep gate shaft with 15x30-ft high head wheel gates, live connections to existing 33-ft dia Mainstream tunnel, approximately 13,000 linear ft and 400-ft deep grout curtain as part of design, construction and commissioning of a 10 billion gallon storage reservoir in rock. McCook Main Tunnel is a $300M component of the $700M facility.

Metropolitan Sewerage District of Greater Cincinnati | Lower Mill Creek Tunnel; Cincinnati, OH | 2010-11

Technical Director, leading the QA/QC team for design of a 2 mile long, 30-ft dia. CSO tunnel and ancillary deep pump station and high rate treatment systems for nearly $240 million.

VICE PRESIDENT

Specialization:
Heavy Civil Infrastructure

Office Location
Chicago, Illinois

Education
- M.S., Mechanical Engineering & Energy Processes, Southern Illinois University, Carbondale, Illinois, 1989
- B.S., Mining Engineering, Istanbul Technical University, Turkey, 1986

Professional Registration
PE - 1999, Illinois
PE - 2001, Wisconsin
PE - 2005, Ohio

Professional Associations
- SME/UCE
- SAME
- USSD
- ASDSO
- Water Environmental Federation
- SAME

Year Career Started
1986

Year Started with B&V
1999

Professional Awards
- Northwest Side Relief Sewer, APWA National Project of the Year, 2006.
- McCook Reservoir Grout Test Program, ACEC-IL Special Merit Award, Water Resources Category, 2004.
- Elmhurst Quarry Project, Outstanding Project Achievement, ASCE Illinois Section, 1996.

Specialty Training
- Project Management (Woodward-Clyde, 1989 Parsons 1998, and Black & Veatch, 2000)
- OSHA 10-hour safety
- MSHA Certified Safety Instructor

City of Austin | Jollyville Transmission Main; Austin, TX | 2009-11

Technical Director for design and construction phase of 6.5 miles long, 10-ft dia. tunnel and pressure pipeline, and deep connection shafts for treated water transmission in highly sensitive environmental setting. Transmission main is a $100M component of the $560M capital program.

Metropolitan Water Reclamation District of Greater Chicago | Thornton Composite Reservoir; Chicago, IL | 2008-11

Project Director and **Principal,** preliminary and final designs and construction phase services for flood control/CSO reservoir preparations as part of Chicago's TARP, including 22-ft dia tunnel connections, sealing portion of existing tunnel under 300-ft of hydraulic head using concrete plugs, gates and valve controls, energy dissipating structures, and a perimeter grout curtain. Project value is estimated at $200M.

San Diego County Water Authority | San Vicente Dam Raise; San Diego, CA | 2009-11

Technical Advisor, supporting the CM team, including constructability and risk management reviews for a 337-ft high roller-compacted concrete (RCC) dam raise, and 250,00 acre-feet water supply reservoir project in a high risk seismic zone with an estimated constructed value of $550M.

EnerjiSA | Alpaslan II Dam and Hydropower; Turkey | 2011

Project Principal and **Technical Director** for design and constructability review of a 330-ft high earth embankment dam, large diversion tunnels and hydro works for a 280MW, $720M hydropower generation facility.

Rockriver Water Reclamation District | Page Park Flood Control Dam; Rockford, IL | 2009

Consultant. Feasibility study for evaluation of a pipeline crossing of an earthen dam using microtunneling alternatives.

Detroit Water and Sewer Department | Detroit River Outfall No.2 (DRO 2) Tunnel Rescue, Michigan | 2005-07

Tunneling and Forensics Specialist for feasibility study, alternatives screening and recommendations for the rescue of a 21-ft dia, 6,200 ft long rock tunnel and river outfall system at 320 ft depth that was abandoned due to gassy and high groundwater inflow conditions.

Rochester Gas & Electric | Station 5 Hydropower Facility; Rochester, NY |2006-07

Senior Advisor, review and design of rehabilitation alternatives for 2,600 ft long, 700-ft deep, and 21-ft diameter penstock tunnel, for a 36MW run-on-river hydropower facility tunnel on Genesee River.

Cary Hirner, P.E.

Mr. Hirner has 20 years of experience in heavy civil, tunnel, and geotechnical engineering. His focus has been on planning, design and providing construction phase services on intake/outfall and tunneling projects. He has consulted on over 100 miles of soft ground and rock physics, water, wastewater, storm water, and CSO tunnels. He is accomplished at preparing predesign reports and decision documents, technical memoranda, drawings, specifications, Geotechnical Baseline Reports and contract documents.

TUNNEL PRACTICE LEAD – AMERICAS

Specialization:
Tunnels, Geotechnical and Environmental Engineering

Office Location
Kansas City, MO

Education
- BS, Geological Engineering, University of Missouri-Rolla, 1994

Professional Registration
PE – 1999, KS, 15599

Specialization Certification
- 10-hour Competent Person for Construction Safety
- Competent Person for Excavation
- Tunnel Safety Training
- Confined Space Entry

Year Career Started
1995

Year Started with B&V
1995

PROJECT EXPERIENCE

EWS Marine Works | BHP Billiton, Antofagasta, Chile

Tunnel Engineer. Responsible for leading the design of three 6-ft finished diameter subsea intake tunnels to support a desalination plant. Work included detailed design of large land based and marine shafts, more than 1 mile of microtunneling, and tunnel boring machine recovery in the Pacific Ocean at depths over 100 feet. Design included geotechnical investigations and preparing plans, specifications, Geotechnical Data Report, and Geotechnical Baseline Report.

El Dorado Irrigation District | Folsom Lake Microtunnels; Folsom, CA

Geotechnical Engineer. Reviewed lake temperature control device (TCD) alternatives and provided technical direction on the feasibility of constructing a multiple lake tap TCD, 150-foot deep in-lake tower, and multiple lake-bottom inclined pipes. The lake tap alternative included five 54-inch diameter microtunnels with a total footage of 2,400 feet.

Mill Creek Regional WWTP Effluent Tunnel, Johnson County Wastewater, Shawnee, Kansas

Tunnel Engineer. Responsible for leading the design and construction phase services of an 8-foot diameter, 2 mile long treated effluent tunnel that connects the treatment plant to an existing outfall diffuser in the Kansas River. The tunnel excavation is up to 180 feet deep in a shale formation that contains methane requiring additional ventilation requirements in the tunnel and an intrinsically-safe tunnel boring machine. Design included geotechnical investigations and preparing plans, specifications, Geotechnical Data Report, and Geotechnical Baseline Report.

Metropolitan Water Reclamation District of Greater Chicago| Thorn Creek Tunnel; Chicago, IL

Project Manager. Responsible for leading the planning, design and construction phase services of a 20-foot diameter storm water tunnel to convey 6,200 cfs to the Thornton Composite Reservoir. In addition to a 1,000-foot long rock tunnel, the design included tapping into a live wet tunnel, decommissioning the existing tunnel and reservoir, converting the tunnel into a drainage adit, an innovative drop shaft configuration, hydraulic modeling, updating the system operational

plan, flow and level monitoring, access shaft and tunnel with dewatering pump station and cantilevered reservoir overlook.

Metropolitan Water Reclamation District of Greater Chicago| Des Plaines Inflow Tunnel; Chicago, IL

Project Manager. Responsible for leading the design of a 1 mile long 20-ft diameter rock tunnel and two large diameter 300 ft deep shafts. The design includes two high head 16-ft x 20-ft wheel gates, energy dissipation structures, and a live tap into an existing 33-ft diameter wet tunnel.

Metropolitan Water Reclamation District of Greater Chicago | Thornton Reservoir Groundwater Protection System; Chicago, IL

Project Manager/Engineering Manager. Responsible for leading the planning, design and construction phase services of a groundwater protection system for a 7.9 billion gallon CSO storage reservoir under construction in a 300-foot deep limestone quarry. This reservoir will be connected to the Calumet System of TARP. Tasks include conducting a large geotechnical program with inclined borings to depths of 550 feet, groundwater modeling, evaluating the effectiveness of extraction wells and a full perimeter grout curtain in containing reservoir CSO to prevent degradation of groundwater resources, and designing the groundwater protection system, likely a two row 500-foot deep grout curtain around the 6,730 linear foot reservoir perimeter. Responsibilities also included supporting the District in regulatory negotiations.

WaterOne of Johnson County | Kansas River Tunnel; Bonner Springs, KS

Tunnel Engineer. Responsible for design of a 1,400-foot long, 5-foot finished diameter rock tunnel to convey treated water under the Kansas River. Design included geotechnical investigations and preparing plans, specifications, Geotechnical Data Report, and Geotechnical Baseline Report. Preliminary design activities included evaluating technical and cost factors for multiple trenchless technologies to cross the river.

U.S. Army Corps of Engineers, Chicago District | Cady Marsh Drainage Ditch Tunnel; Griffith, IN

Project Engineer. Responsible for leading the design and construction phase services of a 10-foot diameter, 6,440-foot long urban storm water conveyance tunnel. The project included preparing plans, specifications, and geotechnical data and baseline reports for the soft ground tunnel. During construction responsibilities included coordinating the full-time construction management support provided to the USACE and completing the Project Foundation Report to document all aspects of construction.

Frank W. Means, P.E.

His experience in water resources planning and design includes master planning, feasibility studies, inundation mapping, open channel design, design studies, and hydraulic analyses. Hydraulic designs have been performed for open channels, spillways, canals, bridged waterway structures, vortex drop shaft, rectangular drop shafts, stilling basins pipeline crossings and other hydraulic control structures.

Mr. Means has also focused on flood plain management studies. He has performed extensive work with FEMA and the U.S. Army Corps of Engineers in conjunction with these flood studies, and other hydraulic modeling analysis. Mr. Means also has experience modeling storm water conveyance systems. He has concentrated on the use of the USEPA Storm Water Management Model (SWMM) and XP-SWMM for this purpose, and his project work has ranged from city storm water master plans, to combined sewer overflow systems, and university storm water master plans. With experience using HEC-1, HEC-2, HEC-RAS, HEC-HMS, DAMBREAK, BOSS DAMBRK, SWMM, XP-SWMM, ArcMap and developed hydrologic and hydraulic spreadsheets, he is capable of performing all types of surface water modeling.

Mr. Means has participated in some Value Engineering (VE) studies. In this case, a fast pace assessment of the situation is performed. Multiple solutions are investigated, along with costs associated with those solutions. Cost-benefit analysis is completed and recommendations are made to the client.

WATER RESOURCES ENGINEER

Specialization:
Civil Engineer Experienced in Hydrology and Hydraulics, Specializes in Water Resources

Office Location
Kansas City, Missouri

Education
B.S., Civil Engineering, Pennsylvania State University, 1988
M.S., Civil Engineering, Pennsylvania State University, 1991

Professional Registration
PE – 1995, Missouri, Civil Engineering

Professional Associations
Tau Beta Pi, Chi Epsilon

Year Career Started
1991

Year Started with B&V
1991

PROJECT EXPERIENCE

Xcel Energy | FHRR Flood Studies for Prairie Island Nuclear Generating Plant; Prairie Island, MN | 2014

Water Resources Specialist. Evaluated the impact of the Probable Maximum Precipitation, snowmelt, and the Probable Maximum Flood with and without a dam breach simulation of over 100 dams upstream of PINGP, and the seismic dam breach evaluation during a “sunny day” event. Used HEC-RAS 4.1 and GIS to model an unsteady state flood wave routed through the Mississippi River as it passes the PINGP site. These flood events were the basis for the Flood Hazard Reevaluation Report prepared in response to the Nuclear Regulatory Commission Near-Term Task Force Recommendation 2.1.

Xcel Energy | FHRR Flood Studies for Monticello Nuclear Generating Plant; Monticello, MN |2014

Water Resources Specialist. Evaluated the impact of the Probable Maximum Precipitation, snowmelt, and the Probable Maximum Flood with and without a dam breach simulation of over 100 dams upstream of MNGP, and the seismic dam breach evaluation during a “sunny day” event. Used HEC-RAS 4.1 and GIS to model an unsteady state flood wave routed through the Mississippi River as it passes the MNGP site. These flood events were the basis for the Flood

Hazard Reevaluation Report prepared in response to the Nuclear Regulatory Commission Near-Term Task Force Recommendation 2.1.

Dam Hazard Classification for the Lowell Power Plant Spillway and the Riverton Bypass; Riverton, KS | 2013

Performed a dam hazard classification for a spillway and bypass separated by an earthen embankment. Per Kansas regulations, analyzed a 100-year storm event with a dam breach analysis. Determined flood inundation levels for the with and without breach conditions. These levels provide results for inundation mapping and justification for termination of the modeled area. Used HEC-RAS and HEC-GeoRAS for the unsteady state hydraulic analysis along with ArcGIS for inundation mapping. Produced inundation maps of the flooding that were used for determining a hazard class and can be used in the inundation zone of an Emergency Action Plan.

Puerto Rico Electric and Power Authority | Dam Failure Study at Guajataca Dam; Puerto Rico | 2012

Provided technical support, assistance, and review for the Dam Failure Study of Guajataca Dam in Puerto Rico. This included the development of a PMF for the Site. Constructing a HEC-HMS model for the PMP to be applied to and routing through the reservoir. Developed spillway rating curves for the dam and incorporated them into the HEC-HMS model. Determined maximum water surface elevations for the different dam breach scenarios. Developed HEC-RAS models for unsteady state conditions for the PMF with and without a dam breach failure. Utilized ArcMAP and other GIS tools along with HEC-GeoRAS to construct the HEC-RAS model. Produced inundation maps of the flooding that can be used to create an Emergency Action Plan.

City of Spotsylvania | Dam Failure Study Hunting Run Dam; Spotsylvania, VA | 2012

Provided technical support, assistance, and review for the Dam Failure Study of Hunting Run Dam in Spotsylvania, Virginia. The PMF was supplied with this project, therefore focus on routing through the dam, development of a spillway rating curve, breaching of the dam, routing the flood wave and producing inundation maps to be used in an Emergency Action Plan. Determined maximum water surface elevations for the different dam breach scenarios. Developed HEC-RAS models for unsteady state conditions for the PMF with and without a dam breach failure, as well as a sunny day failure. Utilized ArcMAP and other GIS tools along with HEC-GeoRAS to construct the HEC-RAS model.

Gary J. Schnettgoecke, P.E.

Mr. Schnettgoecke has more than 30 years of experience in the design and rehabilitation of wastewater treatment facilities and water transmission projects, studies, and construction phase services as well as hazardous waste management and remedial design/remedial action (RD/RA) projects.

CIVIL ENGINEER

Specialization:
Wastewater Facilities/Rehabilitation, Construction Management, Environmental Remediation

Office Location
Kansas City, MO

Education
- BS, Civil Engineering, University of Missouri-Rolla, 1983

Professional Registration
PE – 1990, MO, 024262

Specialization Certification
- Sub Part P Excavation, Trenching and Shoring
- Competent Person for Construction Safety

Professional Associations
- American Society of Civil Engineers

Year Career Started
1984

Year Started with B&V
1984

PROJECT EXPERIENCE

City of Grand Island, Headworks Improvements, Grand Island, NE | 2012-Present

Engineering Manager. Responsible for design and on-going construction phase services for the $17M improvements at the City's WWTP to replace aging equipment. The project consists of a new headworks facility with deep mechanical bar screens and submersible pumps (50 mgd total capacity), vortex grit facility, flow distribution, engine-generator, and odor control systems.

Water Services Department | Water Treatment Plant Secondary Pump Station West Header & Valve Replacement; Kansas City, MO | 2013 - Present

Engineering Manager. Led the technical evaluation and design for replacing the existing West Header Chamber structure and south distribution system header piping, valves, and appurtenances. Due to need to maintain service, a risk management plan was prepared using the preferred construction sequencing to eliminate risks or identify mitigation measures to manage risk.

Johnson County Wastewater, Mill Creek Regional Wastewater Treatment Plant – Influent Gates, Johnson County, KS | 2013-Present

Engineering Manager. Responsible for the evaluation of replacement gate alternatives, lighting, and gas detection system for the influent pump station screening area that no longer function due to past flooding events. Reviewed constructability, sequencing, and temporary flow diversion options. The project consists of the demolition of the existing equipment; new stainless steel stop logs to isolate mechanical bar screens; new corrosion-resistant main and emergency exit lighting, and; new gas detection system consisting of infrared hydrogen sulfide and combustible gas sensors, dual-head sample pump, and sampling lines. Construction to occur summer of 2014.

City of Grand Island, Aeration Basin Improvements, Grand Island, NE | 2010-2013

Engineering Manager. Responsible for preliminary design and on-going construction phase services for the $3.6M rehabilitation of the City's aeration system. The project consists of replacement of two existing multi-stage blowers with two single-stage blowers and aeration basin improvements. Valve and piping modifications and replacement, along with replacement of the existing fine bubble aeration system within the existing aeration basins, were also

included with the improvements to further reduce electrical consumption and replace aging equipment.

Water Services Department | Water Treatment Plant Renovation of Filter Galleries A and B; Kansas City, MO | 2008-2012

Engineering Manager. Responsible for the evaluation, design, and construction oversight for the $12.5M renovation of 24 filters to improve filter performance and operational reliability, improve control system functionality and automation of filter backwash operations, and restore structural integrity. Project elements included: replacement of sand filter media and gravel underdrains with new plastic underdrains, porous plates and fine sand; air scour backwash system integrated with existing water backwash system; filter valve replacement; backwash water supply system improvements; concrete rehabilitation to improve structural integrity of elevated walkways and eliminate water leakages into pipe galleries, and; control system upgrades to enable having six filter backwashes in the queue.

City of Austin, Jollyville Transmission Main, Austin, TX | 2010-2011

Engineering Manager. Responsible for the final design and permitting of approximately 6.5 miles of 84-inch water transmission main in northwest Austin. The Jollyville Transmission Main is an integral part of the Water Treatment Plant #4 project and will convey water to the existing Jollyville Reservoir. The main will be tunneled in deep rock (Glen Rose formation) with a final liner constructed of steel pipe or pre-stressed concrete cylinder pipe.

City of Grand Island, Primary Clarifier Mechanism Replacement, Grand Island, NE | 2009-2010

Engineering Manager. Responsible for the design and construction phase services for the replacement of two existing 90-foot diameter primary clarifier mechanisms.

Johnson County Wastewater, Douglas L. Smith Middle Basin Treatment Plant Expansion and Nutrient Removal Project, Johnson County, KS | 2007-2010

Engineering Manager. Design of a new treatment train and retrofit of 3 existing treatment trains for biological nitrogen and phosphorous removal with an average daily flow of 14 mgd. Conversion of existing wet-weather lagoons to a variable head excess flow equalization basin. Design of a sludge fermenter for volatile fatty acid supplementation for the biological phosphorous removal process.

Nitesh Poladia

Mr. Poladia is an Associate Cost Estimator for the Project Controls and Estimating group with Black & Veatch with a varied project experience in Water Projects. His work experience includes developing of Opinion of Probable Project Costs (OPC) and Construction Detailed Opinion of Probable Construction Costs (DOPC). OPC includes Conceptual/Budget, 30%, 60%, 90% and 100% (AACE 3/2/1) final costs. DOPC's are used in preparing Hard Dollar Bidding or Independent Checking Contractor detail costs for Clients. Mr. Poladia's experience in cost analysis and engineering have included working on both domestic and international projects, and a number of different project delivery methods including traditional and design build.

Prepares construction cost estimates in the Water Division. Provided Conceptual, Preliminary, Definitive, and Final Detailed Opinion of Probable Construction Cost (estimates) including Change Orders (estimates) in Hydro-Electric Power Generation, Dams, Pipeline Trench, Tunnels, and Reservoirs (energy, drinking water, storm water, and sewer water) and Water Treatment Industries. Developed and implemented:

- Pricing database
- SAGE Timberline templates
- Timberline assembly development
- 5-D Model material take-off
- Innovaya Software
- VICO Software

PROJECT EXPERIENCE

Public Utilities Board of Singapore| Deep Tunnel Sewerage System Phase 2; Singapore | 2014

Project Estimator. Lead estimating efforts in preparing feasibility study (conceptual) cost estimate for JV of BV & AECOM for Deep Tunnel Sewerage System (DTSS). The scope of the overall project includes a comprehensive study and validation of entire DTSS program which includes DTSS Phase 1 which is in operation and the proposed DTSS Phase 2 comprising of Link Sewers, South Tunnel, Tuas Water Reclamation Plant, Deep Sea Outfall and Integrated Waste Management Facility.

Metro Vancouver| Annacis WWTP Influent & Outfall Upgrades; Vancouver, BC | 2014

Lead Estimator. Lead estimating efforts in preparing conceptual cost estimate for Metro Vancouver project. Efforts included calculating quantities take-off and developing unit costs for various alternatives for Amil Gates, Micro Tunneling, Open Trench Tunnels, and routing of Outfall pipes.

LEAD ESTIMATOR

Specialization:
Cost Estimating

Office Location
Kansas City, MO – W3

Education
- B.S. Civil Engineering, University of Mumbai - India, 2004
- M.S. Environmental Engineering, University of Alabama – 2008

Specialization Certification
- OSHA 40-Hour HAZWOPER Certification
- OSHA 10-Hour Construction Certification
- First Aid/CPR Certification

Professional Registration
EIT

Year Career Started
2008

Year Started with B&V
2008

Citizenship
Permanent Resident - USA

Language Capabilities
English

San Antonio Water System |Water Resources Integration Program – Pump Station Projects; San Antonio, TX| 2012

Lead Estimator. Lead estimating efforts in preparing 60% & 90%OPC estimates for 2 pump stations. Efforts included collaborating with the team in developing quantity takeoffs and creating timberline estimates.

City of Columbus | OIS Augmentation & Relief Sewer (OARS) Project (Tunnel & Shafts); Columbus, OH | 2010

Estimator. Worked on 3rd party review estimate for PM/CM team in Columbus, OH. Lead the effort in collaborating work for reviewing the estimate with joint venture partner H R Gray as well as the design team of DLZ Corporation. Task involved reviewing the estimate prepared by the design firm for Phase II Shafts 3, 4 & 5 for approximately 23,300 feet long tunnel (20' dia.).

Johnson County | Water Mill Creek Regional Effluent Tunnel; Kansas City, KS | 2010

Estimator. Lead the effort in developing Level I, Level II & Level III submittal DOPC calculating the quantities and developing the cost estimate for the WWTP facility and 96" dia. Tunnel. Responsible for coordinating report development within the engineering design team to meet the client's specific needs.

New York City Department of Environment Protection | Water Treatment Industries and Pipeline Trenching/Tunneling; Manhattan, NY| 2010

Estimator. Most recently, he has worked extensively on Black & Veatch's NYC DEP's Change Order contracts, assisting Lead Estimator preparing cost estimate assumption write-ups Detail Opinion of Probable Construction Costs using Timberline software for Manhattan Tunnels.

Metropolitan Water Reclamation District of Greater Chicago | Thornton Composite Reservoir; Chicago, IL | 2010

Estimator. Lead the effort in developing 60%, 90% & 100% Submittal DOPC for the Clients using Timberline software. Responsibilities included collaborating with engineers the detail, scope and quantities for shafts & tunnels and preparing a detailed estimate in Sage Timberline.

Metropolitan Water Reclamation District of Greater Chicago | Thornton Composite Reservoir; Chicago, IL | 2009

Estimator. Prepared the Preliminary Detailed Opinion of Probable Construction Cost Estimate (DOPC) using the Sage Timberline software. Responsibilities included developing 13 different estimates using RS Means Estimating guide for cost data and utilizing the Timberline tools to meet the deliverable product.

Ismail R. Muhammad

Mr. Muhammad started his experience as an assistant construction manager for a General Contractor in Chicago, IL. With a desire to learn more about project Design to serve as a better Construction Engineer, his service with B&V began in Kansas City with the Design-Build Group. Since, he has been involved with water projects for wastewater and water plants, desalination plants, reservoirs, and other water related projects in the United States. His experience also includes an onsite assignment in South America.

Specialization:
Construction, Engineering and Management

Office Location
Chicago, Illinois

Education
- B.S., Construction Engineering, Purdue University, 2008
- M.B.A., Purdue University, 2011

Specialization Certifications
10-Hour OSHA Construction Training; BHP Billiton Cero Daño (zero harm) Safety Training

Professional Associations
NSBE

Year Started with B&V
2007

PROJECT EXPERIENCE

Metropolitan Water Reclamation District of Greater Chicago | Thornton Composite Reservoir; Thornton, Illinois

Project Engineer. Design and construction phase services for a 7.9 billion CSO and floodwater storage reservoir in a 300-foot deep limestone quarry. The reservoir is part of MWRDGC's Tunnel and Reservoir Plan (TARP) and will minimize CSOs and reduce flood damages in the service area. Prepared technical memorandum for reservoir aeration system, including development of concepts for managing odors and conceptual designs of a system layout for solar powered aeration/circulator equipment to maintain a steady oxic cap during reservoir operation.

Construction phase services include management of submittal documents, change orders and RFI's from the contractors for two construction contracts: the Final Reservoir Preparation that includes a deep 22-ft diameter connection tunnel and the Groundwater Protection System contract.

For the Groundwater Protection System, inclined borings are being drilled to depths of up to 550 feet for development of a 500-foot deep grout curtain around the reservoir perimeter to prevent degradation of groundwater resources. Responsibilities include evaluating the effectiveness of borehole production and tracking unit price line items.

Resident Engineer – onsite responsibilities include oversight of shotcrete and wire mesh reinforcement of argillaceous material on the interior perimeter of the reservoir. Also assisted in oversight of over 600-foot deep monitoring well installation.

US Army Corps of Engineers |CFD Modeling of the McCook Reservoir Distribution Tunnel System; Chicago, Illinois

Project Engineer. The McCook Reservoir is part of the Chicagoland Underflow Plan (CUP) that will provide approximately 10 billion gallons of storage for combined sewer overflows (CSOs). The Distribution Tunnel System will be used to regulate CSOs to and from the reservoir. Computational Fluid Dynamics (CFD) modeling is being used to simulate hydraulic characteristics, optimize the configuration, and predict sediment depositional patterns. Responsibilities

include development of the Quality Control Plan and assisting with the technical execution of the project and preparation of a report for the CFD modeling.

US Army Corps of Engineers | Equipment Inspection of the McCook Res. Distribution Tunnel System; Chicago, Illinois

Project Engineer. Inundation of the Distribution Valve Chamber approximately 300ft below ground caused water damage and hydrogen sulfide corrosion to electrical and mechanical equipment. An inspection team is evaluating the condition of the equipment and developing recommendations on replacement or repair needs. Responsibilities include development of Quality Control Plan, Accident Prevention Plan, cost estimation of mechanical equipment repair or replacement, and assisting in preparation of inspection report. Work also includes onsite visit and review of As-builts, shop drawings, O&M manuals and specifications to provide equipment and reference drawings for inspection as well as provide a layout for a new electrical room.

Milwaukee Metropolitan Sewerage District |Bypass Pump Station; Milwaukee, Wisconsin

Design Engineer. Work includes takeoffs for Opinion of Probable Cost Estimate for three bypass alternatives. Two alternatives involve analysis of dual chamber concrete conduits and the third includes analysis of 84" diameter pipe conduit. Analysis includes development of hydraulic profiles.

Metropolitan Water Reclamation District of Greater Chicago | Stickney Westside Plant Grit Handling Facility; Chicago, Illinois

Design Engineer. Responsible for design work associated with installation of a new aerated grit handling facility and equipment. The plant is designed using modern 3D CAD modeling and CFD design input. The project involves new aeration basins with traveling bridge systems for removing grit from the 720 MGD Westside Stickney CSO treatment plant. Work includes constructability analysis, design alternatives evaluation, CAD design, design calculations review, and preparing equipment specifications.

Milwaukee Metropolitan Sewerage District | Inline Storage System Pump Station Upgrades; Milwaukee, Wisconsin

Design Engineer. Work includes analysis of new water supply line for conceptual design. Task involves review of Record and Bid drawings for indentifying site utilities and providing new interior pipe arrangement for facility.

Attachment B

Representative Prior Experience

Table of Contents

McCook Reservoir Connection CSO Tunnel

Chicago, Illinois

The Chicago Underflow Plan (CUP) McCook Reservoir Project will provide one of three combined sewer overflow (CSO) reservoirs of the Chicago Tunnel and Reservoir Plan (TARP). The CUP McCook Reservoir project is being implemented to reduce CSOs and flooding in the Mainstream and Des Plaines Tunnel systems served by the TARP. McCook Reservoir (10 billion gallons) will be excavated 300 ft into dolomitic limestone at the MWRDGC Lawndale Avenue Solids Management Area (LASMA).

Black & Veatch provided value engineering, design and construction engineering services for the Chicago District, U.S. Army Corps of Engineers (USACE) to the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) on the McCook Main Tunnel System (MTS) which will connect the existing Mainstream Tunnel with the McCook Reservoir which is currently being excavated. The MTS includes the following components:

- Main Tunnel - a 1,600 foot long, 33 foot inside diameter (ID) tunnel extending from the Mainstream Tunnel to the McCook Reservoir
- Main Gate/Access Shaft - an 90 foot ID shaft located near the mid-point of the Main Tunnel alignment, extending some 285 feet below existing grade
- Construction Shaft - a 25 foot ID shaft located approximately 400 feet downstream of the Mainstream Tunnel connection to facilitate Main Tunnel construction
- Gates - three steel wheel gates and associated gate control structures on each of the bifurcated trunks (six gates total)
- Connections – engineered connections on each end of the Main Tunnel alignment at the Mainstream Tunnel and the McCook Reservoir/Main Tunnel portal including an energy dissipation structure.

Key Project Elements

- CSO Transmission tunnel and storage reservoir
- Vertical Storage
- 1,600 ft of 33ft diameter drill & blast tunnel
- 410 ft deep grout curtain
- GBR
- Cast-in-Place Concrete lining
- High Head Gates
- Hydraulic modeling
- CFD Modeling
- Odour Control

Project Involvement

- Value Engineering
- Preliminary Engineering
- Cost Estimating
- Detailed Design
- Construction Services

Key Team Members

Faruk Oksuz, Project Director
Miguel Sanchez, PM
Paul Smith, Constr Review
Ray Brainard, Tunnel Inspection
Clay Haynes, Lead Tunnel Design,
Cary Hirner, Value Engineering
James McKelvey, Preliminary Design

Period of Service

Design: 2007 to 2010
Construction Completed by 2015

Project Value

$150M

Client Reference

Dave Schieman
Civil Design Section
U.S. Army Corps of Engineers, Chicago District
(312)846-5426
David.R.Schiemann@usace.army.mil

Thornton Composite Reservoir & Tunnel

Chicago, Illinois

The Thornton Composite Reservoir is part of the Metropolitan Water Reclamation District of Great Chicago (MWRDGC) Tunnel and Reservoir Plan (TARP) to minimize and eliminate waterway pollution by CSOs and provide an outlet for floodwater. Once complete Thornton Reservoir will provide 30 billion liters of storage capacity, of which 18 billion liters is allocated to CSOs and 12 billion liters to floodwater from Thorn Creek.

Black & Veatch was retained by MWRDGC under four contracts to design and provide construction phase services for the groundwater protection system (GPS) and final reservoir preparation project components. The GPS, which consists of a 540 ft deep grout curtain, is required on the north, east and west sides of the 300 ft deep reservoir to prevent CSO and flood water from migrating into the local bedrock and affecting groundwater resources once the reservoir is operational.

Black & Veatch is also responsible for the Final Reservoir Preparation project components necessary to commence reservoir operations. This work includes designing 1,050 ft of 20 ft diameter storm water tunnel to redirect flow from an existing tunnel into the Composite Reservoir; construction of a 32 ft wide, 165 ft long and up to 65 ft high cavern; stability measures for the 300 ft tall rock highwalls; a concrete energy dissipation apron; construction of two reinforced concrete Tunnel Plugs within the existing Diversion Tunnel; conversion of the Diversion Tunnel between the Tunnel Plugs into a drainage adit; concrete lining 3,600 ft of existing Diversion Tunnel; construction of a 20 ft and 10 ft diameter shaft; installation of reservoir level and tunnel inflow instrumentation; installation of geotechnical instrumentation; construction of a covered, open-air overlook platform; and construction of an aggregate sediment dewatering area. Black & Veatch is also responsible for developing the wet weather flow, solids and odor management plans and procedures for reservoir operation; and updating MWRDGC's Calumet TARP System Operational Plan.

Black & Veatch completed value engineering on the tunnel and drop shaft scheme which resulted in a revised drop shaft configuration that saved the project $2M.

Key Project Elements

- Stormwater Transmission Tunnel and Storage reservoir
- Vertical Storage
- 320m of 6.1 m diameter drill & blast tunnel
- GBR
- Cast-in-Place Concrete
- Lining
- Deaeration Chamber
- Deep Grout Curtain
- Hydraulic modeling
- CFD Modeling
- Odour Control

Project Involvement

- Preliminary Engineering
- Cost Estimating
- Detailed Design
- Value Engineering
- Construction Services

Key Team Members

Faruk Oksuz, Project Director
Cary Hirner, Project Manager
Ray Brainard, Tunnel Design
Brian Gettinger, Project Engineer
James Powell, CFD

Period of Service

Design: 2007 to 2010
Construction Completed in 2013

Project Value

$125M

Client Reference

Mr. Kevin Fitzpatrick
Principle Civil Engineer
MWRDGC
101 East Erie Street
Chicago, Illinois
(312) 751-3163
Kevin.Fitzpatrick@mwrd.org

Cady Marsh Flood Relief Tunnel

Griffith, Indiana

As part of a comprehensive program to mitigate damages to businesses and personnel property caused by flooding of the Cady Marsh Ditch, a 1.2-mile long large diameter conveyance pipeline was constructed. This 10-foot diameter inverted siphon pipeline alignment follows a main traffic thoroughfare and crosses a four-lane highway and a critical underground utility corridor.

Black & Veatch was responsible for providing full-time construction management and inspection support to the Corps of Engineers during the construction of the tunnel and shafts, and for preparing the Operations and Maintenance Manual. Black & Veatch led the Corps of Engineers in developing and implementing risk management strategies for the project. This project was the first time the Corps of Engineers, Chicago District used a Geotechnical Baseline Report (GBR), which is recommended by the ASCE for underground construction. In addition to the GBR, the final design included preparing Plans, Specifications, and Geotechnical Data Report.

To minimize public disruptions during construction all tunnel mining, spoil removal and equipment, material and man entry into the tunnel was done through the outlet shaft located on the riverside of the levee, which was removed from the residential areas. Public inconveniences were limited to traffic disruptions necessary to construct the three access shafts that were installed for future storm sewer connections, a TBM removal shaft that also served as the inlet conveyance shaft and to install dewatering wells along a portion of the alignment to facilitate tunnel mining and concrete lining.

"Black & Veatch spent an entire day with us scoping out the steps involved in developing a workable tunnel design in soft soil. They made certain we understood the various alternatives. Black and Veatch promoted developing a geotechnical baseline report and requiring a Disputes Resolution Board in the contract, something new to us, that is now coming into regular use in the industry. They were extremely cooperative and diligent in incorporating modifications into their work while still keeping the overall project on schedule."

Joseph Schmidt, S.E., Design Branch Chief, U.S. Army Corps of Engineers - Chicago District

Key Project Elements

- Inverted siphon stormwater tunnel
- 10 ft diameter, 1.2 miles long
- Inlet & outlet structure
- Screening structure
- Utility coordination

Project Involvement

- Feasibility Study
- Open Cut vs. Tunnel Evaluation
- Geotechnical Studies
- Tunnel Detailed Design
- Shaft Design
- Cost Estimating
- Construction Scheduling
- Construction Management Support
- Resident Engineering
- Risk Management

Key Team Members

Faruk Oksuz
Cary Hirner
Clay Haynes

Period of Service

Design: 2004 to 2005
Construction Completed in 2006

Project Value

$20M

Client Reference

Imad Samara
Project Manager
USACE, Chicago District
111 North Canal Street
Chicago, IL 60606-7206
(312) 353-6400 ext. 1809
Imad.Samara@
usace.army.mil

Northwest Side Relief CSO Sewer

Milwaukee, Wisconsin

The Northwest Side Relief Tunnel (NWSR) project was the largest capital improvement facility in the Milwaukee Metropolitan Sewerage District's 2010 Facilities Plan. The project included design and construction of a 7.1 mile long and 20-ft diameter hard rock tunnel and associated drop shafts, diversion structures, valve shaft and chamber design, and surface works in both soils and hard rock.

The design of the NWSRS included review and evaluation of alternatives which ultimately led to extending the tunnel length from approximately 5 to 7 miles, re-alignment of the tunnel to accommodate easement, access, and tunnel boring machine constraints, enlargement of the tunnel diameter from 12 to 20 feet, and unique pre-excavation grouting and cutoff grouting techniques to minimize groundwater infiltration and exfiltration concerns.

Black & Veatch prepared the drawings and specifications, Geotechnical Baseline Report, Geotechnical Data Report, Design Report, opinion of probable construction costs, and resident engineer memorandum; conducted geotechnical investigations, assisted in securing project permits and easements, and is providing engineering support during construction.

Key challenges addressed on the project included hard rock tunneling and management of risks associated with fault and shear zones, groundwater infiltration, and tunnel boring machine (TBM) selection with pre-excavation grouting capabilities. Black & Veatch also addressed critical issues relating to tunnel alignment selection in urban and environmentally sensitive areas, project permitting, soils excavations and hard rock blasting design, geotechnical design elements of shafts and diversion structures, ground support, groundwater management, and community relations.

Key Project Elements
- CSO Transmission and Storage Tunnel
- GBR
- 11.4 km long, 6.1 m diameter TBM excavated tunnel
- Cast-in-Place Concrete Liner
- Six Deep Shafts and Diversion Structures
- Hydraulic Modelling
- Odour Control

Project Involvement
- Design and Construction Management Support
- Conveyance and Storage Systems
- Geotechnical
- Opinion of Probable Cost

Key Team Members
- Faruk Oksuz – Project Manager
- Clay Haynes – Lead Tunnel Design

Contract Dates
1999 to 2008

Construction Cost
$126M

Client Reference
Kevin Shafer
Executive Director
Milwaukee Metropolitan Sewerage District
260 West Seeboth Street
Milwaukee, WI 53204
(414) 272-2088
kshafer@mmsd.com

Black & Veatch's nationally award-winning Northwest Side Relief Sewer project succeeded due to a superior approach to risk management

"Black & Veatch's project leadership skills and engineering talents in large diameter tunnels and conveyance systems made the design and construction of this project an exemplary success for us and many stakeholders. We believe that Black & Veatch helped us set new standards for successful tunnel projects in Milwaukee, as well as the general tunneling practice, with innovative solutions and a comprehensive risk management strategy for on time and within budget performance." - Kevin I. Shafer, PE, executive director, Milwaukee Metropolitan Sewerage District

Olentangy-Scioto Intercepting Sewer Augmentation and Relief (OARS) CSO Tunnel

Columbus, Ohio

The OARS Tunnel as part of the City of Columbus's Wet Weather Management Plan (WWMP) aims to solve the City's CSO's problem while building a better, healthier, and greener Columbus. The 23,000 ft long and 20 ft diameter OARS Tunnel will store and convey CSOs' 180 ft below the surface for treatment. Black & Veatch is providing 3rd Party Construction Management for all phases of the project.

The OARS Tunnel Project has been split into two phases. Phase 1 construction began in late 2010 and consists of the construction of the tunnel and three of the six shafts ranging in diameter from 40 to 52 ft diameter as well as large diameter surface pipe, a tangential inlet approach, screening structure and building, and a by-pass structure over the existing interceptor sewer.

The second phase consists of the construction of three additional shafts with internal hydraulic drop shafts and ventilation pipes, as well as large diameter surface pipe, manholes, flow diversion structures, sluice gates, a submersible pumping system, a pump electrical building, and a river overflow structure.

As part of its responsibilities as CM, Black & Veatch lead a team of professionals to complete expedited reviews of the construction documents for the OARS Phase 1 and Phase 2 projects. Our comments were summarized in a Risk Register with rankings of high, medium and low importance and reviewed with the Design Team and City. Black & Veatch maintains the Risk Register and reviews updates for the Decision Team and City's use.

Key Project Elements

- CSO Transmission and Storage Tunnel
- 23,000 ft of 20 ft diameter tunnel, 180 ft deep
- Precast Concrete Segment Lining TBM excavated tunnel
- 6 deep shafts
- Risk register

Project Involvement

- Construction Administration
- Construction Inspection
- Constructability Review

Key Team Members

Paul Smith – Construction Manager
David Day – Project Manager
Ray Brainard - Geologist
James McKelvey – Technical Advisor
Brian Gettinger – Office Engineer

Contract Dates

Design completed in 2010
Construction completed by 2025

Construction Cost*

$340 M

Client Reference

John Newsome, P.E.
Project Manager, Public Utilities Department
City of Columbus Division of Sewerage & Drainage
1250 Fairwood Avenue
Columbus, OH 43206
(614) 645-8460
jgnewsome@columbus.gov

Deep Rock CSO Tunnel Connector (DRTC)

Indianapolis, Indiana

Black & Veatch is providing full time inspection services for the DRTC shaft and tunnel construction as part of the Construction Inspection Team. The DRTC project includes approximately 40,000 ft of 20 ft excavated diameter rock tunnel excavated 200 to 250 ft below grade. The project also features about 3,200 ft of connection tunnels, three tangential vortex drop shafts, three utility shafts, two major shafts: a launch shaft at the south end at the Southport Advanced Wastewater Treatment (AWT) facility, and a retrieval shaft at the north terminus of the tunnel. A separate construction contract will include the tunnel dewatering PS, designated as the Deep Rock Tunnel Connector Pump Station (DRTC PS), with a firm capacity of 90 MGD. Black & Veatch is also providing construction administration and inspection for the PS construction contract(s).

Black & Veatch assisted in the evaluation of three alternatives for the deep rock tunnel, prepared recommendations on the final tunnel alignment, diameter, materials of construction, and construction methods, and provided conveyance systems for the connection and gravity flow from CSOs 008, 117, and 118. We also provided physical modeling that advanced the industry knowledge of Deep CSO Hydraulic Drop Shafts by directing the physical modeling of the baffle - plunge type drop shaft.

Black & Veatch also participated in value engineering and preliminary geotechnical program for the Deep Rock Tunnel Connector. The subsurface investigation supported AECOM's design and permitting efforts. Five borings were drilled and five piezometers were installed.

Key Project Elements
- CSO Tunnel
- 40,000 ft long, 20 ft diameter, 200+ ft deep
- Cast-in-Place Concrete Liner
- TBM excavated tunnel
- Physical model of baffle drop sgaft
- Eight shafts

Project Involvement
- Geotechnical investigations and reporting
- Detailed cost estimating
- Tunnel and levee inspection
- Construction management
- Project controls

Key Team Members
James McKelvey, Deputy Manager Construction Inspection Team
Mark Bradford, Inspector
David Day, Technical Advisor
Cary Hirner, QC

Contract Dates
2011 to 2017
Construction to be completed by 2017

Construction Cost
$180M

Client Reference
Tim Shutters
Construction Supervisor
Deep Rock Tunnel Connector
Citizens Energy Group
2150 Dr. Martin Luther King Jr. Street, Indianapolis, IN 46202
(317) 429-3973
tshutters@citizensenergygroup.com

Global Tunneling Experience

YEAR	CLIENT	PROJECT NAME AND LOCATION	PROJECT DESCRIPTION	CONVEYANCE	SERVICES PROVIDED*
Ongoing	Confidential Client	New Marine Works Project	Two 1,700-ft long x 6.5-ft diameter microtunnels and two 1,050-ft long x 6.5-ft diameter microtunnels	Water	FS, DD, CM
Ongoing	Johnson County Wastewater	Mill Creek Effluent Tunnel, Shawnee, Kansas	9,780 feet long, 96 inch diameter rock tunnel	Wastewater	CD, DD, CM
Ongoing	Austin Water Utilities	Jollyville Tunnel, Austin, Texas	36,000 feet long, 84 inch diameter rock tunnel	Water	CD, DD, CM
Ongoing	MSD of Greater Cincinnati	Lower Mill Creek Phase 1 Tunnel, Cincinnati, Ohio	7,600 feet long, 30 foot diameter rock tunnel	CSO	CD, DD
Ongoing	NYC Department of Environmental Protection	Water Tunnel No. 3	Riser shafts, electrical and piping for 15 miles of tunnel, 16 to 20 foot diameter	Water	CM
Ongoing	Indianapolis DPW	Belmont North relief Interceptor Section 1, Indianapolis, Indiana	3,800 feet long, 6 foot diameter microtunnel	Wastewater	CM
Ongoing	San Francisco Public Utilities Commission	New Irvington Tunnel	18,400 ft long with horseshoe shape, 150 to 170-feet below ground and a finished internal diameter between 8.5-feet and 10-feet.	Water	CM
Ongoing	Indianapolis DPW	Deep Rock Tunnel Connector	30,000 feet long, 18 foot diameter rock tunnel	CSO	CM
Ongoing	USACE, Chicago District	McCook Reservoir Connection Tunnel, Chicago, Illinois	1,500 feet long, 30 foot diameter rock tunnel w/ bifurcation and high head gate shaft	CSO	DD, CM
Ongoing	Region of York, Ontario	Upper York Sewage Servicing EA, Toronto, Canada	Large diameter tunnels to control overflows	CSO	FS
Ongoing	El Dorado Irrigation District	Folsom Lake Intake, Folsom, California	600 feet long, 54 inch diameter microtunnel lake tap	Water	DD
Ongoing	City of Olathe, Kansas	Kansas River Crossing	Twin 2,000 feet long, 42 inch diameter HDD crossings	Water	DD

YEAR	CLIENT	PROJECT NAME AND LOCATION	PROJECT DESCRIPTION	CONVEYANCE	SERVICES PROVIDED*
Ongoing	Indianapolis DPW, USACE	Fall Creek and White River CSO Tunnel, Indianapolis, Indiana	10 mile long x 26 to 33-ft diameter rock tunnel, consolidation sewers, drop shafts, 4 miles of rock/ soft ground connection tunnels	CSO	FS, CD, DD
Ongoing	Metropolitan Water Reclamation District – Chicago	Thornton Composite Reservoir, Chicago, Illinois	1,100 feet long, 22 foot diameter drill and blast rock tunnel and outlet structure, tunnel plugs, 70 foot tall deaeration chamber	Stormwater	CD, DD, CM
Ongoing	Water Supplies Department, Hong Kong	Inter-reservoirs Transfer Scheme, Hong Kong	10,000 feet long, 10 feet diameter rock TBM tunnel to interconnect two impounding reservoirs.	Water	FS, CM
Ongoing	Thames Water	Tideway Tunnel, London, England	20 miles long, 23 foot diameter tunnels	CSO	FS, CD
Ongoing	North Charleston Sewer District	Sewer District NCSD Outfall Line Investigation, North Charleston, South Carolina	Evaluate the feasibility of constructing a regional wastewater tunnel and ocean outfall	Wastewater	FS
Ongoing	USACE, Chicago District	McCook Reservoir Connection Tunnel Gates	Six 300 foot head wheel gates, each 14.5 wide x 29 ft high	CSO	DD, CM
Ongoing	Milwaukee Metropolitan Sewer District	Pump Station expansion, Milwaukee, Wisconsin	Determine feasible approach to new pump station configurations	CSO	FS, DD
Ongoing	Calleguas Municipal Water District, CA	Ocean Outfall Rehabilitation, Los Angeles, California	30-in diameter x 5,000 feet long HDD Outfall to Pacific Ocean	Water	CD
Ongoing	Water Supplies Department, Hong Kong	Au Tau to Yau Kom Tau Pipeline, Hong Kong	5 km of pipeline with large trenchless crossings	Water	DD
Ongoing	San Francisco Public Utilities Commission	Alameda Siphon No. 4, San Francisco, California	500 ft x 96-in casing pipe installed using microtunneling	Water Supply	DD
Ongoing	Metropolitan	Pipeline 6, San Diego, California	6 miles of 10 ft diameter tunnel in rock	Water Supply	FS

YEAR	CLIENT	PROJECT NAME AND LOCATION	PROJECT DESCRIPTION	CONVEYANCE	SERVICES PROVIDED*
	Water District of Southern California				
Ongoing	Sanitation Districts of Los Angeles County	Ocean Outfall Tunnel, Los Angeles, California	18-ft diameter by 60,000 lf of soft ground tunnel	Wastewater	CD, DD
Ongoing	Columbus DPW	Olentangy Scioto Interceptor Sewer Augmentation and Relief Sewer (OARS), Columbus, Ohio	18 foot diameter, 4 miles long Sewer tunnel through the center of downtown Columbus, OH. Tunnel will be in limestone containing high concentrations of petroleum product.	CSO	VE, FS, CM
Ongoing	City of Charleston	Spring /Fishburne Stormwater Drainage Basin and Ocean Outfall, Charleston, South Carolina	12-ft diameter x 12,000 feet long stormwater tunnel with 14 drop shafts and an outfall to the Ashley River	Stormwater	CD, DD
Ongoing	Sydney Water, Sydney, Australia	Desalination Intake and Outlet Tunnel, Sydney, Australia	Sub-sea 13 feet diameter, 1.5 mile long intake and outlet tunnel for desalination project	Seawater/ RO Concentrate	Blueprint Design
Ongoing	Water Supplies Department, Hong Kong	Lantau Island Tunnel, Hong Kong	23,000 feet long, 13 feet diameter TBM rock tunnel to connect two water treatment plants	Water Supply	FS, CD, DD
Ongoing	Metropolitan Water District of Southern California	Santa Ana River Tunnel, San Bernardino, California	2,800-ft long x 12.0-ft diameter, steel lined tunnel in boulder-alluvium soil	Water Supply	FS, CD, DD, CM
Ongoing	Washington Suburban Sanitary Commission	Bi-County Water Main Tunnel, Washington D.C.	30,000-ft long x 7-ft diameter fully lined rock tunnel	Water Supply	FS, CD, DD, CM
Ongoing	Longtan Hydropower Development Corp	Longtan Hydropower Project Underground Work, China	124 miles of tunnel, 12.5 diameter of rock excavation	Hydropower	EA
Ongoing	Orange County Sanitation District	Newport Trunk Sewer, Los Angeles, California	96-in diameter x 1,400 feet long soft ground tunnel beneath Santa Ana River	Wastewater	CD, DD

YEAR	CLIENT	PROJECT NAME AND LOCATION	PROJECT DESCRIPTION	CONVEYANCE	SERVICES PROVIDED*
2010	Metropolitan Water Reclamation District – Chicago	TARP Reliablilty & Risk Assessment, Chicago, Illinois	Assess Management for Mainstream TARP tunnel (40.5 miles long, 8 to 30 foot diameter), shafts and pump stations	CSO	EA
2010	Clean Water Coalition	Reach 4 SCOP – River Mountains Tunnel #3, Las Vegas, Nevada	40,000 feet long, 10 foot diameter tunnel and hydropower plant	Wastewater	FS, CD, DD
2010	City of St. Joseph, Missouri	CSO Long Term Control Plan, St. Joseph, Missouri	20,000 feet long, 10 - 20 foot diameter rock tunnel	CSO	FS
2010	City of Omaha, Nebraska	Omaha CSO Long Term Control Plan, Omaha, Nebraska	5.4 miles long, 17 foot diameter storage and conveyance rock tunnel	CSO	FS
2010	Colorado Springs Utilities	Rampart Pipeline Trenchless Crossings, Aurora, Colorado	Four microtunnel crossings of rivers, road and railroads	Water Supply	FS, DD
2009	City of Omaha, Nebraska	Minne Lusa Conveyance Tunnel, Omaha, Nebraska	7,900 feet long, 12.5 foot diameter soft ground tunnel	Stormwater	FS
2008	Clean Water Coalition	System Conveyance and Operations Program, Las Vegas, Nevada	40,000 feet long, 10 foot diameter fully lined rock tunnel, 900 feet deep, 5,000 feet long, 10-ft diameter rock tunnel, hydropower plant, effluent discharge/diffuser in Lake Mead	Wastewater	FS, CD
2011	St. Louis Metropolitan Sewer District, MO	Harlem Baden Tunnel, St. Louis, Missouri	10 mile long x 10 to 36-ft diameter rock and soft ground tunnels	Flood Control	FS, CD
2010	New Castle County, Delaware	North Delaware Interceptor, Wilmington, Delaware	6 microtunnel drives (soil or rock), 54-in to 60-in diameter, 2,400 feet long (combined length) of new sewer installation	Wastewater	DD, CM
2010	San Antonio Water System (SAWS)	Eastern Watershed Sewer Relief Line (E-03), San Antonio, Texas	14 microtunnel drives (soil), 42-in to 78-in diameter, 3,800 feet long (combined length) of new sewer installation	Wastewater	DD, CM
2010	City of East Chicago	East Chicago, Raw Water Pipeline, East Chicago, Indiana	72-in diameter casing pipe with a 48-in diameter carrier pipe, 1,000 feet long	Water Supply	DD, CM

YEAR	CLIENT	PROJECT NAME AND LOCATION	PROJECT DESCRIPTION	CONVEYANCE	SERVICES PROVIDED*
			microtunneled (soil) raw water transmission line		
2010	Town of Oak Island, NC	Oak Island Force Main, Oak Island, North Carolina	20-inch diameter, 1,500 feet long (composite curve) HDD installation under the Atlantic Intracoastal Waterway	Wastewater	CD, DD, CM

*Services Provided – Legend
CM – Construction Management/Construction Phase Services
CD – Conceptual Design
DB – Design Build
DD – Detailed Design
EA – Expert Advice
FS – Feasibility Study
OE – Owner's Engineer for Design Build
VE – Value Engineering

Attachment C

Completed Compliance Affidavit

ATTACHMENT 1

COMPLIANCE AFFIDAVIT

As a condition of entering into a contract with the Village of Winnetka, and under oath and penalty of perjury and possible termination of contract rights and debarment, the undersigned deposes and states that he has the authority to make any certifications required by this Affidavit on behalf of the bidder, and that all information contained in this Affidavit is true and correct in both substance and fact.

Section 1: BID RIGGING AND ROTATING

1. This bid is not made in the interest of, or on behalf of an undisclosed person, partnership, company, association, organization or corporation;

2. The bidder has not in any manner directly or indirectly sought by communication, consultation or agreement with anyone to fix the bid price of any bidder, or to fix any overhead profit or cost element of their bid price or that of any other bidder, or to secure any advantage against the Village of Winnetka or anyone interested in the proper contract;

3. This bid is genuine and not collusive or sham;

4. The prices, breakdowns of prices and all the contents quoted in this bid have not knowingly been disclosed by the bidder directly or indirectly to any other bidder or any competitor prior to the bid opening;

5. All statements contained in this bid are true;

6. No attempt has been or will be made by the bidder to induce any other person or firm to submit a false or sham bid;

7. No attempt has been or will be made by the bidder to induce any other person or firm to submit or not submit a bid for the purpose of restricting competition;

8. The undersigned on behalf of the entity making this proposal or bid certifies the bidder has never been convicted for a violation of State laws prohibiting bid rigging or rotating.

Section 2: TAX COMPLIANCE

1. The undersigned on behalf of the entity making this proposal or bid certifies that neither the undersigned nor the entity is barred from contracting with the Village of Winnetka because of any delinquency in the payment of any tax administered by the State of Illinois, Department of Revenue, unless the undersigned or the entity is contesting, in accordance with the procedures established by the appropriate revenue

act, liability of the tax or the amount of tax;

2. The undersigned or the entity making this proposal or bid understands that making a false statement regarding delinquency of taxes is a Class A Misdemeanor and in addition voids the contract and allows the municipality to recover all amounts paid to the entity under the contract in civil action.

Section 3: EQUAL EMPLOYMENT OPPORTUNITY

This EQUAL OPPORTUNITY CLAUSE is required by the Illinois Human Rights Act, 775 ILCS 5/101 et seq.

In the event of the contractor's non-compliance with any provision of the Equal Employment Opportunity Clause, the Illinois Human Rights Act, or the Rules and Regulations for Public Contracts of the Department of Human Rights, the contractor may be declared non-responsive and therefore ineligible for future contractor subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be canceled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies involved as provided by statute or regulations.

During the performance of this contract, the contractor agrees:

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or woman are underutilized and will take appropriate action to rectify any such underutilization;

2. That, if it hires additional employees in order to perform this contract, or any portion hereof, it will determine the availability (in accordance with the Department's Rules and Regulations for Public Contract's) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized;

3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other such agreement or understanding, a notice advising such labor organization or representative of the contractor's obligation under the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contract. If any such labor organization or representative fails or refuses to cooperate with the contractor in its efforts to comply with such Act and Rules and Regulations, the contractor will promptly so notify the Department and

contracting agency will recruit employees from other sources when needed to fulfill its obligation hereunder.

5. That it will submit reports as required by the Department's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Department or contracting agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contracts.

6. That it will permit access to all relevant books, records, accounts, and work sites by personnel of the contracting agency and the Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Departments Rules and Regulations for Public Contracts.

7. That it will include verbatim or by reference the provisions of this Equal Opportunity Clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so such provisions will be binding upon such subcontractor. In the same manner as the other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the contractor will not utilize any subcontractor declared by the Illinois Human Rights Department to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

Section 4: ILLINOIS DRUG FREE WORK PLACE ACT

The undersigned will publish a statement:

1. Notifying employees that the unlawful manufacture, distribution, dispensation, possession, or a use of a controlled substance is prohibited in the work place;

2. Specifying the actions that will be taken against employees for violating this provision;

3. Notifying the employees that, as a condition of their employment to do work under the contract with the Village of Winnetka, the employee will:

    A. Abide by the terms of the statement;

    B. Notify the undersigned of any criminal drug statute conviction for a violation occurring in the work place not later than five (5) days after such a conviction.

4. Establishing a drug free awareness program to inform employees about:

    A. The dangers of drug abuse in the work place;

B. The policy of maintaining a drug-free work place;

C. Any available drug counseling, rehabilitation or employee assistance programs;

D. The penalties that may be imposed upon an employee for drug violations.

5. The undersigned shall provide a copy of the required statement to each employee engaged in the performance of the contract with the Village of Winnetka, and shall post the statement in a prominent place in the work place.

6. The undersigned will notify the Village of Winnetka within ten (10) days of receiving notice of an employee's conviction.

7. Make a good faith effort to maintain a drug free work place through the implementation of these policies.

8. The undersigned further affirms that within thirty (30) days after receiving notice of a conviction of a violation of the criminal drug statute occurring in the work place he shall:

A. Take appropriate action against such employee up to and including termination; or

B. Require the employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.

Section 5: SEXUAL HARRASSMENT POLICY

The undersigned on behalf of the entity making this proposal or bid certifies that a written sexual harassment policy is in place pursuant to Public Act 87-1257, effective July 1, 1993, 775 ILCS 5/2-105 (A).

This Act has been amended to provide that every party to a public contract must have written sexual harassment policies that include, at a minimum, the following information:

1. The illegality of sexual harassment;

2. The definition of sexual harassment under State law;

3. A description of sexual harassment, utilizing examples;

4. The vendor's internal complaint process, including penalties;

5. The legal recourse, investigative and complaint process available through the Department of Human Rights, and the Human Rights Commission;

6. Directions on how to contact the Department and Commission;

7. Protection against retaliation as provided by 6-101 of the Act.

Section 6: VENDOR INFORMATION

1. Is the bidder a publicly traded company? (yes or no) No
If the answer is yes, state the number of outstanding shares in each class of stock. Provide the name of the market or exchange on which the company's stock is traded.

_____

_____

_____

_____

2. Is the bidder 50% or more owned by a publicly traded company? (yes or no) No

If the answer to the above question is yes, name the publicly traded company or companies owning 50% or more of your stock, state the number of outstanding shares in each class of stock and provide the name of the market or exchange on which the stock of such company or companies is traded.

_____

_____

_____

_____

IT IS EXPRESSLY UNDERSTOOD THAT THE FOREGOING STATEMENTS AND REPRESENTATIONS AND PROMISES ARE MADE AS A CONDITION TO THE RIGHT OF THE BIDDER TO RECEIVE PAYMENT UNDER ANY AWARD MADE UNDER THE TERMS AND PROVISIONS OF THIS BID.

SIGNATURE: _____

NAME: Frank Oksuz TITLE: Vice President
(print or type)

Subscribed and sworn to me this 22 day of May, ~~2012~~ 2015, A.D.

By: _____
(Notary Public)

-Seal-

OFFICIAL SEAL
SHARON S KOOPMAN
Notary Public - State of Illinois
My Commission Expires Apr 8, 2016

BLACK & VEATCH
Building a world of difference.

FARUK OKSUZ, PE
Vice President, B&V Water
101 N. WACKER DR. SUITE 1100 CHICAGO, IL 60606 USA
+1 312-683-7850 | **OKSUZF@BV.COM**

May 22, 2015

Village of Winnetka
510 Green Bay Road
Winnetka, IL 60093

STADI Project Review
835722.1200

Attention: Mr. Nicholas Mostardo
Financial Services Coordinator

Re: Budget for Independent Cost and Value Engineering Review of Stormwater Improvement Program – Willow Road Tunnel and Area Drainage Improvement Project

Dear Mr. Mostardo,

Black & Veatch Corporation (B&V) is pleased to submit this itemized budget in response to the Village of Winnetka's (Village)'s Request for Proposal (RFP) for an Independent Cost Review and Value Engineering (VE) Study for the proposed Willow Road Stormwater Tunnel and Area Drainage Improvement (STADI) Project.

We understand that the Phase I Cost Review Tasks will be completed prior to authorization and proceeding with the Phase II VE Study.

If you have any questions, please call or email me at the contact information above.

Very truly yours,
BLACK & VEATCH

Faruk Oksuz, PE
Vice President

Enclosure.

cc: Dave Koch (B&V)
Cary Hirner (B&V)

VILLAGE OF WINNETKA - Willow Road Stormwater Tunnel and Area Drainage Improvement (STADI) Project
Cost Estimate Review and VE Study RFP
BLACK & VEATCH - BUDGET ESTIMATE - MAY 22, 2015

Review and VE - Ballpart Fee Estimates

PHASE I - COST ESTIMATING REVIEW BUDGET

	TASK 1 - PRELIM ENG REVIEW	TASK 2 - PDR REVIEW	TASK 3 - COST REVIEW		TOTAL HOURS	HOURLY RATES	LABOR COST
Project Principal/Manager	2	2	2		6	$275	$1,650
Tunneling Specialist	8	8	4		20	$220	$4,400
Cost Estimator	8	16	32		56	$160	$8,960
Staff Eng (Reports & Admin)	4	8	4		16	$120	$1,920
Subtotal - Hours	22	34	42		**98**		

Total Labor	$16,930
ODC *:	$500
Total Phase I:	$17,430

PHASE II - VE STUDY BUDGET

	TASK 1 - PRE VE WORKSHOP	TASK 2 - VE WORKSHOP	TASK 3- POST WORKSHOP	TASK 4- VE ANALYSIS	TOTAL HOURS	HOURLY RATES	LABOR COST
VE Team Leader	10	40	4	4	58	$275	$15,950
Tunneling Specialist	10	40	16	16	82	$220	$18,040
Trench/Trenchless Specialist	10	40	4	4	58	$220	$12,760
Hydraulic Engineer	10	40	4	4	58	$180	$10,440
Cost Estimator	20	24	16	16	76	$160	$12,160
Staff Eng (Reports & Admin)	10	24	16	16	66	$120	$7,920
Subtotal - Hours	60	168	56	56	**340**		

Total Labor :	$43,280
ODC *:	$11,800
Total Phase II :	$55,080

* Other direct costs (ODCs) include travel, communications, report reproduction, and other misc expenses.

Estimated ODCs:	Costs
Travel	$550
Hotels, per diem	$400
Other (parking, meeting, etc.)	$125
Reproduction	$600
Subtotal (Phase 1)	$1,675
Travel	$2,200
Hotels, per diem	$6,600
Other (parking, meeting, etc.)	$1,600
Reproduction	$1,400
Subtotal (Phase 2)	$11,800

-SAMPLE-

ENGINEERING SERVICES AGREEMENT

This Agreement (Agreement), effective _____2015, is by and between the Village of Winnetka (Client) and Black & Veatch Corporation (Engineer). Engineer shall perform the services described in Attachment A--Scope of Services (Services) with regard to Independent Cost Review and Value Engineering (VE) Study for the proposed Willow Road Stormwater Tunnel and Area Drainage Improvement (STADI) project (Project) and payment shall be due and payable upon receipt in accordance with Attachment B--Compensation. Payments due Engineer under this Agreement shall be electronically transferred either by ACH, specifically in CCD+ or CTX format, or wire transfer to the bank account and in accordance with the bank instructions identified in Engineer's most recent invoice in immediately available funds no later than the payment due date. Invoice number and project name shall be referenced in the bank wire reference fields or the ACH addenda information. In the event that such electronic funds transfer methods are not available to Client, then payments due Engineer under this Agreement shall be made by check and mailed to the PO Box identified in the remittance instructions on the Engineer's most recent invoice. The Remittance Advice document shall be mailed with the check to the PO Box.

1. Engineer warrants that it shall perform the Services in accordance with the standards of care and diligence normally practiced by recognized engineering firms in performing services of a similar nature. If, during the six month period following the earlier of completion or termination of the Services it is shown there is an error in the Services caused solely by Engineer's failure to meet such standards, and Client has promptly notified Engineer in writing of any such error within that period, Engineer shall perform, at Engineer's cost, such corrective engineering services within the original Scope of Services as may be necessary to remedy such error. **The liabilities, obligations, warranties, and remedies of the parties are exclusively those expressly set forth in this Agreement, and in lieu of any others available at law or otherwise. Indemnities against, releases from, and limitations on liability, and limitations on remedies expressed in this Agreement, as well as waivers of rights, including, but not limited to, subrogation rights, shall apply even in the event of the fault, tort (including negligence), strict liability or other basis of legal liability by the party indemnified or released or whose liability is limited or allocated to the party giving the indemnity, or against whom remedies have been limited.**

2. Engineer shall maintain in force, during the period that Services are performed, workers' compensation insurance in accordance with the laws of the states having jurisdiction over Engineer's employees who are engaged in the Services and employer's liability insurance with a limit of $100,000 each occurrence. Engineer also shall maintain commercial general liability insurance with a limit of $1,000,000 per occurrence and in the aggregate; automobile liability insurance with combined single limit of $1,000,000; and professional liability insurance with a per occurrence and aggregate limit of $1,000,000. Client shall require all Project contractors under contract with Client to include Client and Engineer as additional insureds on their general, automobile, excess and umbrella liability insurance policies. Further, Client shall obtain and maintain for the benefit of Engineer the same indemnities, insurance benefits, and waivers of subrogation rights obtained for the protection of Client from any construction contractor and subcontractor working on the Project and shall obtain from that contractor and subcontractor insurance certificates evidencing the required coverages.

3. Engineer shall indemnify Client against any and all claims, demands and causes of action for bodily injury to or death of persons or for damage to or destruction of property (other than property of Client or construction work in progress, for which Client shall have responsibility) resulting solely from any and all negligent physical acts of Engineer while at Client's facility. The parties hereby waive all claims for property damage against the other, however, such damages may be caused, including without limitation the negligence or fault of the other party, and shall require their insurers to waive subrogation rights against the other party under any applicable policy of property insurance.

4. In performance of the Services, it is understood that Engineer may be supplied with certain information and/or data by Client and/or others, and that Engineer will rely on such information. It is agreed that the accuracy of such information is not within Engineer's control and Engineer shall not be liable for its accuracy, nor for its verification.

5. Client may, with or without cause, terminate the Services at any time upon ten working days written notice to Engineer. In such case, Engineer shall be paid costs incurred and fees earned to the date of termination and through demobilization and neither party shall be entitled to any other compensation or damages from the other.

6. Client may audit and inspect Engineer's records and accounts covering reimbursable costs for a period of six months following the completion of Engineer's Services. The purpose of any such audit shall be only for verification of such costs. Engineer shall not be required to keep records of or provide access to those of its costs expressed as fixed rates, a lump sum, or as a percentage of other costs.

7. Engineer does not guarantee that proposals, bids or actual project costs will not vary from Engineer's opinions of probable cost or that actual schedules will not vary from Engineer's projected schedules. Engineer shall not be responsible for: (1) construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the Project; (2) the failure of any contractor, subcontractor, vendor, or other Project participant, not under contract to Engineer, to fulfill contractual responsibilities to the Client or to comply with federal, state, or local laws, regulations, and codes; or (3) procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to Engineer in Attachment A, Scope of Services.

8. Neither party shall be responsible or held liable to the other party for special, indirect, incidental, punitive, exemplary, or consequential damages, or for loss of profit, investment, product, use, goodwill, opportunity, or revenue; business interruption; cost of capital or replacement goods, services, facilities or power; governmental and regulatory sanctions; and claims of customers for all such damages; whether arising under breach of contract or warranty, tort, strict liability, indemnity, or any other theory of legal liability. Engineer's total aggregate liability to Client under this Agreement whether arising under breach of warranty or contract, tort, strict liability, indemnity, or any other theory of legal liability, shall not exceed the compensation actually received by Engineer under this Agreement.

9. Except for Client's obligation to make payments, neither party shall be in default hereunder to the extent such default is caused by a cause or circumstance beyond such party's reasonable control. Engineer shall be entitled to an equitable adjustment in schedule and compensation in the event such circumstances occur.

10. Client hereby agrees that Engineer may subcontract portions of the Services to its related or affiliated entities.

This Agreement and the attached Attachments constitute the entire Agreement. No other representations of any kind, oral or otherwise, shall have any effect. This Agreement shall be governed by the laws of the state of Kansas, without giving effect to principles thereof resulting in the application of the laws of another jurisdiction as governing law.

_____ (Client)	Black & Veatch Corporation (Engineer)
By:_____	By:_____
Date:_____	Date:_____

ATTACHMENT #3

V3 COMPANIES RESPONSE

Proposal

Submitted to: Village of Winnetka | May 22, 2015

Independent Cost and Value Engineering Review of Stormwater Improvement Program Willow Tunnel & Area Drainage Improvement Project

WWW.V3CO.COM | 888.707.2779

Table of Contents

Project Budget Enclosed in a Separate Sealed Envelope

Section 1
Cover Letter

May 22, 2015

Mr. Steven M. Saunders
Director of Public Works
Village of Winnetka
1390 Willow Road
Winnetka, IL 60093

Regarding: **Independent Cost and Value Engineering Review of Stormwater Improvement Program Willow Road Stormwater Tunnel and Area Drainage Improvement Project**

Dear Mr. Saunders:

V3 Companies of Illinois Ltd. (V3) is pleased to submit this proposal to provide technical review, cost analysis and value engineering services for the Village of Winnetka.

The V3 team consists of Hatch Mott MacDonald (HMM) and Strategic Value Solutions (SVS). This team is ideally suited to perform the services requested by the Village for the following reasons:

- V3 is recognized for technical expertise in hydrology and hydraulics. We have performed many unique and complex drainage remediation projects in northeast Illinois, as well as several hydrological and hydraulic peer reviews.
- HMM is recognized as the premier tunneling expert in North America, having developed many of the processes and procedures that are now considered to be tunneling industry best practices. They can draw on the resources of more than 2,500 professionals in North America, providing a wide range of specific tunneling expertise. They are also very familiar with the Willow Road Stormwater tunnel project.
- SVS has a 25 year history of helping maximize Capital Improvement projects for their clients with up to $75 billion in capital costs evaluated. They have performed VE Workshops on several similar flood control projects.

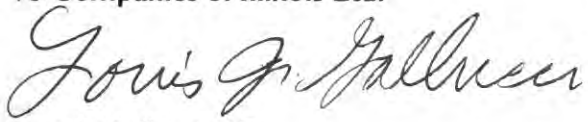
HMM and V3 have a history of working together on stormwater and flood control projects. We are currently teamed on a large diameter combined sewer tunneling project for the City of Chicago's Department of Water Management, and a combined sewer overflow tunnel project for the City of Joliet. Our firms share the same cultural and philosophical approach to business, which is to put the needs of the project and its stakeholders first at all times.

We have assembled a project team based on the team members' ability to successfully deliver the project in a very cost-effective and schedule sensitive manner. Leading the team is Greg Wolterstorff P.E., a hydrology and hydraulics expert, assisted by Mike Vitale at HMM who provides high level tunneling expertise. The Value Engineering lead is John Robinson from Strategic Value Solutions, a leader in value engineering services.

The enclosed proposal demonstrates that our team has the necessary firm experience, a highly trained and experienced staff of professionals and the local knowledge and resources to bring creativity and value to the Village.

We look forward to discussing our team's qualifications further and wish to thank the Village of Winnetka for the opportunity to submit this proposal. Please feel free to contact me at 630-729-6213 or lgallucci@v3co.com.

Sincerely,
V3 Companies of Illinois Ltd.



Louis J. Gallucci, P.E.
Executive Vice President

Section 2
Introduction to Firms

Partnership with Purpose ...

Shared Objectives. Creative Solutions. Profit Enhancements.

Local Office
V3 Companies, Ltd.
7325 Janes Ave.
Woodridge, IL 60517
P: 630-724-9200
F: 630-724-9202
www.v3co.com

Type of Ownership
Employee Owned

State in Which Organized
Illinois

Practice Lines & Service Areas

Transportation & Traffic
Municipal Consulting
Land Development Consulting
LEED & Sustainable Design
Land Strategies
Water Resources
Wetland & Ecology
Surveying & Mapping
Environmental & Brownfields
Ecological Restoration
Construction Management & Contracting
Construction Engineering & Program Management
Structural Design

Contact
Greg Wolterstorff
gwolterstorff@v3co.com

Licensed to Practice:
Arizona, Illinois, Iowa, Colorado, Indiana, Wisconsin

Launched in 1983, V3 Companies embodies founder Rob Petroelje's original vision to create a firm in which clients benefit from a partnership based on long-term relationships, technical excellence and high-caliber project performance. Mr. Petroelje developed V3 around three cornerstones: values, purpose and competency. Our core values – unwavering integrity, commitment to excellence, focus on clients and dedication to employees – define us and guide our decision-making.

V3 has built its advanced reputation by providing professional services across a wide array of disciplines on complex projects for governmental entities and agencies at the municipal, county, state and federal levels. Adhering to our principles has helped V3 generate a very high percentage of repeat clients.

We are committed to enhancing the value of your projects by providing professional and technical services in the "V3 way." By bringing an unwavering focus on your goals and objectives, we're confident that you will benefit from our approach to your project: One of partnership with purpose.

More than 30 Years of Helping You Achieve Your Vision ...

Capabilities & Expertise


Highway Design & Traffic Engineering


Site Development


Construction Engineering & Program Management


Municipal Consulting


Water Resources Engineering


Wetlands & Ecological Design & Construction


General Contracting, Earthwork & Site Utilities


Railroad Design & Construction Management


Structural Engineering


Surveying & Mapping


Land Planning


Environmental Engineering


LEED & Sustainable Design


Geosciences

Hear From Your Peers ...

"[V3's] reviews have been quite thorough, complete and on-time, and they were able to adjust their staffing level to meet our ever-changing needs. An additional benefit is that V3 has a wide range of specialists on staff. Whether the Village needs a surveyor, structural engineer or a wetland expert, V3 has what we need."

Tom Pawlowicz, Village of Bolingbrook

"V3 has done a great job on our project. Their dedication and focus on customer satisfaction is unbelievable. They did what was necessary to ensure that all of the contractor's work was done according to the plans and specifications of the project. From computers to testing equipment, V3 utilized the latest technology and has a staff that is very proficient in using it."

Joseph E. Crowe, P.E., Regional Engineer, Illinois Department of Transportation

"V3 is a great company to work with. [They] handled all the Village requests with eagerness and professionalism. Also, [they] are extremely thorough [and] paid great attention to detail that made this huge task seem easily manageable."

Jim Tock, E.I., Staff Engineer, Village of Downers Grove

Corporate Profile – Tunnels

Hatch Mott MacDonald (HMM) is a multidisciplinary engineering firm with particular expertise and specialization in the planning, design, construction, and operation of tunnels and underground facilities, with complementary specialties, including water supply and wastewater infrastructure engineering. HMM features a staff of over 2,500 across North America, located in 70+ offices and annual revenue over $520,000,000. Globally, HMM is part of an international group with access to over 25,000 staff. National Tunnel Trade Organizations placed HMM 1st in North America in tunnel staff, tunnel revenue, and "trenchless" revenue. Sister company Mott MacDonald, based in London, takes the honor of No. 1 in the world for tunnel staff and tunnel revenue.

For a wide range of clients around the globe, HMM designs tunnels for water supply, sewage, hydropower, roads, railways and subway systems, cables and communications.

HMM's renowned skills for the CSO/Wastewater Market cover all types of tunnels and underground construction in all types of ground:

- Small and Large-Diameter Bored Tunnels
- Cut-and-Cover Pipelines
- Jacked Tunnels/Microtunnels
- Segmentally Lined Tunnels (One-Pass Linings)
- Dredged Underwater Crossings
- NATM Tunnels
- Horizontal Direction Drilling (HDD)
- Tunnel Rehabilitation
- Pump Stations
- Vortex, Baffle and Helicoidal Drop Structures

Nationally, HMM has served as program managers for some of the largest CSO Programs, such as the DCWASA and Hartford CSO Tunnel systems. HMM was also the designer of record for the entire nine miles of Atlanta's West Side CSO Tunnels, which came in more than $40 million under its $250,000,000 budget due largely to innovation in tunnel lining and an outstanding rapport with the Contractor and the City. HMM is the tunnel designer of record for both the NEORSD Euclid Creek (ECT) and the Dugway Tunnels in Cleveland and the WRCT project in Northern Kentucky. These International-Award-Winning tunnels have been extremely successful for many of the same reasons as the Atlanta CSO Tunnels, and the innovations in tunnel lining and drop structures pioneered for the first time in the world by HMM on ECT are now being integrated into CSO programs from Toronto to London to New Zealand.

There are few tunnel projects worldwide where the HMM group is not involved as program managers, designers, construction managers, technical advisors, or claims specialists. At any given time we have over 100 live tunnel projects in Design and CM in North America alone. The HMM reputation has been earned through providing cost effective and innovative solutions for appreciative clients on such marquis projects as the Toronto Subway System, the Channel Tunnel between England and France, the Alaska Way Tunnel (largest in the world), and the BART Tunnel in San Jose. We are currently serving as the overall manager for the MTA in New York's $9 Billion East Side Access Program.

Tunneling Capability

Tunnel cross-over LA Metro

HMM's tunneling capability is based on over 3,000 person years of experience covering 1,500 miles of tunnels. This experience has provided the design expertise and practical knowledge needed to bring clients' projects from concept to completion. HMM provides a host of consulting services including:

- appraisals of technical feasibility, schedule and cost
- studies of alternative options
- design and analysis of all types of tunnels
- preparation of bid documents, for fully designed and design-and-build schemes
- pre- and post-bid design for contractors
- construction management and supervision
- value engineering and advice on construction problems
- inspection of existing tunnels and remedial works

As well as technical expertise, HMM's proven skills in project, design, and construction management ensure that schedule and budget are strictly controlled, regardless of project size, and that clients receive a responsive, effective and cost-efficient service.

HMM's commitment to tailoring services and staffing to meet each client's individual requirements has led to considerable repeat business and continued association with many notable public authorities and owners.

Innovative Approach

Pre-cast segmental lining

HMM has been associated with many novel developments in tunneling over the years including:

- the bentonite slurry shield for soft ground tunneling
- first application of precast concrete tunnel liners in North America
- large scale use of epoxy-coated reinforcement for tunnel linings
- soil injection and chemical ground treatment to aid tunneling progress
- special segmental linings to accommodate openings without hindering the TBM advance
- compensation grouting
- NATM in soft-ground

INTRODUCTION & FIRM PROFILE

Strategic Value Solutions, Inc. (SVS) is a woman-owned, value consulting firm dedicated to providing value improvement services such as value engineering, value analysis, value planning, value management, and related services. SVS brings over 25 years of experience in the value engineering industry to our clients. In that time, we have built a national reputation for delivering high quality, value-added results that consistently exceed the industry norms but more importantly exceed our clients' expectations. Our clients continually look to us for value engineering program guidance, for expertise on large and complex projects, and when exceptional communications skills and tact are required.

Our value engineering experience includes over 500 value improvement workshops on a multitude of capital projects throughout the planning, design and construction phases. Specifically, our focus is on large multi-million dollar to multi-billion dollar infrastructure programs.

Korene V. Robinson, PE and John L. Robinson, PE, CVS-Life are the principals and owners of this certified small and woman-owned firm.

With our capacity to conduct VE studies and our unmatched record of quality results, SVS is a world leader in value engineering services.

Since SVS is solely dedicated to value improvement services, we obtain our technical expertise for team members from a variety of sources, including engineering design firms, universities, and construction firms, as well as a host of specialty consulting firms and individuals.

We have established SVS as a highly efficient, professional services corporation that enables us to meet the widest possible variety of client needs without the burden of unnecessary administrative systems. As a result, we are flexible and able to respond more swiftly and efficiently to meet our clients' needs.

Our vast experience also encompasses studies for military and other federal infrastructure projects – addressing projects such as water and wastewater facilities, flood/drainage control projects, transportation systems, health care, education, and justice facilities.

We've been involved in numerous sensitive projects such as international treaty compliance, historical preservation, and environmental remediation, and we are keenly aware of the importance of political and public sensitivities and commitments.

INTRODUCTION & FIRM PROFILE

Services

- Value Engineering Studies
- Value Planning Studies
- Functional Analysis Concept Development
- Integrated Project Risk Management
- Value Training Workshops
- Programming, Planning and Design Charrettes
- Strategic Planning Workshops
- Decision-Making Workshops
- Function Analysis Workshops
- Constructability Reviews
- Value Analysis Studies
- Value Program Development
- Cost Control Strategies for Capital Program
- Organizational and Process Improvement Workshops
- VECP Development and Processing Support
- Partnering Workshops/Stakeholder Facilitation
- Project Initiation Workshops/Charrettes
- Alternatives Evaluation Workshops
- Value Management

Clients

- Federal Agencies
- County Agencies
- Provincial Agencies
- Municipal Utility Districts
- Sanitary Districts
- State Agencies
- Major Metropolitan Cities
- Port Authorities
- Water Districts and Authorities
- Private and Commercial Parties

Project Types

- Water Treatment
- Pumping Stations
- Tunnels
- Highways
- Railroads
- Airports
- Schools and University Buildings
- Correctional Facilities
- Flood Control
- Environmental Restoration
- Wastewater Treatment
- Pipelines
- Tanks and Reservoirs
- Bridges
- Transit
- Courthouses
- Hospitals and Other Healthcare Facilities
- Military Facilities
- Marine and Coastal Projects
- Dams and Levees

Section 3
Project Team

KEY PROJECT TEAM MEMBERS QUALIFICATIONS

The V3 Team consists of experts in the fields of hydrology and hydraulics, tunneling, and value engineering/cost estimating. V3 has joined with Hatch Mott McDonald and Strategic Value Solutions to bring their respective expertise to assist the Village of Winnetka in the Willow Road STADI project.

V3 Companies of Illinois, Ltd. V3 has a 30 year history of providing water resources engineering with an emphasis on complex hydrology and hydraulics for large watersheds and difficult drainage systems. In addition, V3 self-performs earthwork and underground contracting services and our professional cost estimators prepare construction bids on over $100 Million in work every year. The V3 experts will provide a technical review of the Willow Road STADI project and thoroughly evaluate the cost estimates from the perspective of a contractor, to determine if there are any issues that may be clarified to restrain costs moving forward.

Hatch Mott McDonald. Hatch Mott MacDonald (HMM) is a multidisciplinary engineering firm with particular expertise and specialization in the planning, design, construction, and operation of tunnels and underground facilities. HMM features a staff of over 2,500 across North America, located in 70+ offices and annual revenue over $520,000,000. Globally, HMM is part of an international group with access to over 25,000 staff. National Tunnel Trade Organizations placed HMM 1st in North America in tunnel staff, tunnel revenue, and "trenchless" revenue. To support the technical evaluations and cost of the tunneling, HMM will provide their experts with significant tunnel experience.

In addition, HMM has developed TED (Tunnel Estimating Database), which is a tunnel and shaft construction cost estimating system and is unique to HMM. TED has an excellent track record of producing estimates close to the winning bid on many projects. TED runs on MS-Access 2000, and adopts similar estimating methods to those used by tunneling contractors. It uses a bottom up approach by deriving the costs from labor rates, number of workers, equipment and productivity rates. By maintaining records of advance rates, labor, equipment, and material requirements for particular sizes and types of tunnels, and applying appropriate local unit rates and adjustments for favorable or unfavorable ground conditions, the system models the estimating process applied by contractors during the tendering process. In order to achieve accurate estimates, all elements of the tunnel construction process are modeled. For instance in the case of a sewer tunnel lined with a cast-in-place concrete secondary liner and driven in soft ground using a tunnel boring machine, separate TED runs would be undertaken for TBM set-up, tunnel boring and primary lining erection, TBM maintenance, TBM removal, tunnel clean-up and removal of services, and installation of the cast in place secondary liner.

By adopting this estimating process, the TED system increases the possibility of achieving accurate estimates. To-date, TED has been used to produce over 500 estimates and in cases where the system has been subjected to 'real life' testing where bids are compared with an Engineer's estimate undertaken in advance, the results have been quite impressive. The system is maintained by experienced tunneling engineers with accurate knowledge of tunnel construction processes and the associated labor, equipment, and material requirements. Each new estimate enhances the database of information, and provides the system with greater flexibility and efficiency for the production of future estimates. All estimates produced on TED, are available to our Clients in the form of summary sheets which list labor, equipment, consumables, materials, unit rates, advance rates, and the associated cost of each element of work. These summaries are available in electronic format and can be e-mailed to clients whenever requested. TED's overall flexibility makes it an ideal estimating tool for tunnel planning and option comparison as well as the production of detailed Engineer's estimates in advance of the bid process. Typical tunnel cost estimating outputs from the TED system are included in the table below, which shows that, using this system, we have a remarkable track record of construction cost estimates that are typically within 4 percent of the actual low bid.

Strategic Value Solutions. For 25 years Strategic Value Solutions (SVS) has helped clients optimize over $75 Billion of capital projects for over 100 public and private sector projects. SVS mobilizes a wide network of industry-recognized experts to bring an independent third party evaluation of each project. SVS experts will help test appropriateness of key assumptions and constraints, challenge cost drivers, differentiate between wants and needs, prioritize program implementation and maximize the value of capital investments.

KEY PROJECT TEAM MEMBERS QUALIFICATIONS

Greg Wolterstorff, P.E. – Project Manager and Hydrology/Hydraulics Expert – Phase I & II
Over his nearly 20 year career, Greg has performed various complex hydrology and hydraulic analyses to develop solutions for remediating flooding conditions within identified problem areas. As Director of Natural Resources at V3, he serves as Project Manager for multi-disciplinary teams that work to apply the creative aspects of engineering, science and technology to address each client's goals for a project. Greg has completed peer review stormwater analysis of three separate projects for the Village of Elmwood Park and Oak Park Golf Course, the Elmhurst Park District, and the Village of Algonquin. These stormwater peer review projects were completed in the past two years. These projects involved technical review of information prepared during the design stages of the project, and meetings and evaluation of key project aspects with all affected parties. These recent experiences give Greg, as Project Manager of the Willow Road STADI project, the knowledge and ability to navigate the technical, emotional and political hurdles to making positive outcomes for the Village of Winnetka.

Christian Smith, P.E. - Water Resources Expert – Phase I & On-Call Phase II
Christian has spent nearly 30 years honing his skills of hydrology and hydraulics in the field of water resources engineering. This expertise includes complex modeling, using various software platforms, including steady state and unsteady flow analysis. Christian has recently performed the detailed modeling for Metropolitan Water Reclamation District of Greater Chicago related to two large drainage remediation projects: Melvina Ditch Reservoir Expansion (8 square miles) and Robert Road Drainage Remediation Analysis (10 square miles). He also performed the detailed technical modeling review of the peer review projects as managed by Greg Wolterstorff and mentioned above.

Chris Hanchett, P.E., CFM, LEED AP – Project Engineer – Phase I & On-Call Phase II
Chris has more than 7 years of experience and is involved in the performance of hydrologic and hydraulic analyses associated existing drainage remediation, and stormwater runoff affecting site development and roadway projects. He will be working directly with the Project Manager on the Phase I technical evaluation and will be responsible for reviewing hydrologic and hydraulic modeling, stormwater calculations, preferred project alternatives and master plan exhibits.

Tom Foster – Earthwork Cost Estimator – Phase I, on-call Phase II
Tom is a professional cost estimator with more than 14 years of experience in the construction industry. Over the past eight years Mr. Foster has prepared a yearly average of $60-$100M worth of bids for construction projects in Northeastern Illinois. Tom has prepared a wide variety of natural resource and civil construction bids including a large number of stormwater facilities. Tom's extensive experience with the preparation of construction bids gives him unparalleled knowledge of the earthwork construction market. Tom will review all of the cost opinions prepared by the design team. He will also provide feedback on the constructability and clarity of our work plans, as well as market conditions that may impact construction costs of the project.

Mike Warning – Underground Cost Estimator – Phase I & II
Mike has more than 10 years of construction experience on both public and private sector site infrastructure and also 10 years of experience in the material supplier industry. As a Senior Civil Estimator / Project Manager for V3, he is responsible for overall supervision and execution of an average annual bid volume exceeding $70 million of underground projects. This responsibility includes management of estimating technicians, document management, interface with design teams to understand the overall design intent, vendor and trade contractor interaction and defining the overall parameters for submission of performance guaranteed bids.

John Robinson, P.E., CVS – Life – Value Engineering Team Leader – Phase II
A Principal and Owner of Strategic Value Solutions, Inc., John serves the firm as an Executive Vice President and Senior Project Manager. John's experience includes planning, design, value engineering, and construction of public and private capital projects across the continent. Over 28 years of his career has been spent participating in and leading value engineering studies, with over 500 VE studies to his credit. He is a registered professional engineer and a Certified Value Specialist (CVS, the highest level of certification in value engineering). John's value engineering study experience includes

projects with water and wastewater, flood control, transportation, hazardous materials facilities and remediation, military projects, and buildings. The projects and programs that John has conducted VE studies on have ranged from a few hundred thousand dollars in capital costs to as high as $50 billion. John is past President of SAVE International and Chairman of the SAVE International Certification Board.

Mike Vitale, P.E. – Tunnel Design/Construction Expert – Phase II

As Hatch Mott MacDonald's Senior Vice President and Regional US Tunnel Practice Leader, Chicago native Mike Vitale has extensive, diversified experience in underground design and construction for water/wastewater and transportation projects. His areas of expertise encompass geotechnical engineering, rock engineering, conventional tunnels and lining systems, EPB tunnels, segmental linings, microtunnels, underground structures, shafts and braced excavations.

Mike has served as Design Manager for numerous traditional and design/build tunnels, including some of the largest CSO tunnel projects in the United States and overseas. He has designed and provided CM services for tunnels in all types of soil and rock, from extremely soft, sensitive clays to the hardest basalts. Active nationally on many technical committees and organizations, Mike was one of the primary authors of the ASCE Standard Guideline for Microtunneling. Mike will oversee the home office support related to technical submittals and other required work product and documentation related to tunnels and shafts.

Ben DiFiore, P.E. – Trenched/Trenchless Sewer Design/Construction Expert/Cost Estimator – Phase I & II

Ben DiFiore is a registered Professional Engineer (currently applying for reciprocity in Illinois) and has split his career as an underground contractor and a tunnel consultant. In his tenure at HMM, Ben has worked closely with Mike Vitale as a Project Manager and Assistant Project Manager on several large-diameter sedimentary rock tunnels of similar and greater size/complexity to the Willow Road STADI project. Ben has been intimately involved in the day-to-day production during design and preparation of contract documents and has a keen understanding of the interplay between GBR, Pay Items, and Specifications. Owners and Contractors alike have expressed great appreciation for Ben's savvy handling of difficult problems in the office and in the field. Ben has extensive knowledge of blasting, deep shaft construction in difficult ground, tunneling in limestone, live sewer inspection and connection, hydraulic control structures, traffic control, easement acquisition, and many other key items critical to the success of the Willow Road STADI. He will leverage this design experience and his contracting experience to help the Village achieve their budget.

Organizational Chart

1 – V3 Companies (V3)
2 – Strategic Value Solutions (SVS)
3 – Hatch Mott McDonald (HMM)

Outside Resources

THE VILLAGE OF WINNETKA
SINCE 1869

Project Manager

Greg Wolterstorff, P.E. - V3

Phase I
Technical & Cost Review

Techical Cost Review Team

Christian Smith, P.E. - V3
Water Resources Technical Lead
Chris Hanchett, P.E., CFM, LEED AP – V3
Project Engineer
Tom Foster – V3
Earthwork Cost Estimating
Mike Warning – V3
Underground Cost Estimating
Mike Vitale, P.E. – HMM
Tunnel Technical Lead
Ben DiFiore - HMM
Tunnel Cost Estimator

Phase II
Value Engineering

MWH Design Staff

Value Engineering Team

John L. Robinson, P.E., CVS-Life - SVS
Team Leader
Shawna Chaney - SVS
Team Administrative Assistant
Ben DiFiore - HMM
Trenches/Trenchless Sewer Design/Construction Expert
Greg Wolterstorff, P.E. – V3
Hydrology/Hydraulics Expert
Michael Vitale, P.E. - HMM
Tunnel Design/Construction Expert
Michael Warning – V3
Cost Estimator

Village Staff

On-Call Technical Support Staff*

Christian Smith, P.E. – V3
Water Resources Technical Lead
Tom Foster – V3
Earthwork Cost Estimating
Chris Hanchett, P.E., CFM, LEED AP - V3
Project Engineer

* Available to the on-site Value Engineering Workshop team as needed by phone

GREG WOLTERSTORFF, P.E.

Role: Project Manager

YEARS OF EXPERIENCE

With V3: 19
Other: 0

EDUCATION

Masters of Business Administration
DePaul University
Kellstadt Graduate School of Business

Bachelor of Science
Civil Engineering
Calvin College

REGISTRATIONS

Professional Engineer:
Arizona, 41725, 2004
Illinois, 062-054603
Michigan, 6201061659

PROFESSIONAL ASSOCIATIONS

American Society of Civil Engineers (ASCE)

American Council of Engineering Consultants, Illinois Branch (ACEC-IL)

PUBLICATIONS

Illinois Wetland Project: Design-build-manage approach. Construction Digest, West Edition, September 22, 2003

Holistic Site Development with Floodplain, Stream Habitat and Wetlands. Proceedings of the World Water & Environmental Resources Congress. 2003

Greg Wolterstorff, Director of Natural Resources, is responsible for the day-to-day operations of this diverse and growing practice area. The services provided range from ecological assessment to construction services for restoration of natural areas and surface water modeling to FEMA/US Army Corps of Engineers permitting. His responsibilities include managerial oversight of the Natural Resources team and direct supervision of complex water resources projects. Greg is passionate about meeting V3 client needs with creativity, sustainability and practical solutions.

Mr. Wolterstorff has over 19 years of experience in civil engineering with an emphasis in water resources. His experience includes large projects with hydrologic and hydraulic studies, federal/state/local permitting, and identification and remediation of water storage and conveyance problems.

NOTEWORTHY PROJECT EXPERIENCE

Melvina Ditch Reservoir Expansion, Metropolitan Water Reclamation District, Burbank, Illinois – Project Principal for this large drainage remediation alternatives analysis for a highly-impacted area of Bedford Park and Burbank, Illinois. These communities, totaling an eight-square-mile watershed, had received severe flooding for three consecutive years which caused structural flooding of many residents and businesses. The August 22, 2014 storm event produced 3.6 inches of rain within 40 minutes in this watershed. Existing stormwater storage facilities; Bedford Park Reservoir and Melvina Ditch Reservoir; were overtopped and up to five feet of ponding depth occurred in some of the hardest impacted areas. V3 provided creative engineering and technology solutions to address the problems, including vertical expansion of the Melvina Ditch Reservoir by retrofitting the existing pump station which minimized the footprint of resident buyouts and created cost effective storage solutions in this urbanized community that has limited open space. Greg has developed creative solutions with the design team, assisted the MWRD at the public meetings, and has provided QA/QC for the design reports and technical documents.

Stormwater Master Plan for Roberts Road Drainage Area, Metropolitan Water Reclamation District, Cook County, Illinois – Project Principal for a stormwater study and master plan for a 12-square-mile area in the Cal-Sag Watershed of southern Cook County, including five separate sub-watersheds. The project goal is to identify and evaluate drainage and flooding problem areas within the study area and recommend alternatives that can provide a 100-year level of protection to all structures, including protection against basement flooding. The project includes high-level, conceptual modeling with HEC-RAS and XP-SWMM. One challenge was proper representation of the Lucas Ditch and Lucas Diversion Ditch sub-watersheds, as water crosses back and forth between the watersheds during flood events resulting in "fingers" of floodway that follow the streets through a residential neighborhood. Alternatives include traditional engineering approaches, and creative green infrastructure and planning recommendations, such as creation of new green space along a corridor with high flood frequency, to provide public recreation and open space in a heavily urban / suburban area and remove the most likely-to-flood properties from the flooding area, with new high density housing elevated beyond the flood fringe. The stormwater master plan is unique in that it also seeks alternatives on private property. These alternatives included green infrastructure on residential properties, such as rain cisterns and rain gardens; underground storage on commercial, industrial, and institutional properties; and redevelopment of vacant / underutilized properties to create additional opportunities for flood storage. The project involves public relations

and community engagement to encourage the public to be part of the flooding solution, including use of green infrastructure on private properties to reduce stormwater runoff. Greg has developed corridor planning ideas with the Project Manager and is providing QA/QC support to the team.

Elmhurst Stormwater Peer Review, Elmhurst Park District, Elmhurst, Illinois – Greg is the Project Manager for the project including technical assessment and peer review for the Elmhurst Park District. The City of Elmhurst completed a comprehensive flooding plan and storm sewer system analysis (Plan) in 2012. The preferred alternatives of the Plan were estimated to cost between $30-$45 million to implement. A significant portion of the surface storage to accomplish the Plan was located within the open spaces owned and operated by the Elmhurst Park District and the Elmhurst School Distict 205. The goal of the peer review was to perform a detailed technical review of the proposed modeling and methodology to determine whether the proposed storage improvements in the Park District properties would cause detrimental impacts to the short term and long term core values held by the Park District. Greg oversaw technical review of the entire Plan, with specific attention given to the parks where proposed stormwater improvements and storage was proposed by the City. The team various modifications to the design and function of the storage systems to protect the parks during low flow storm events and achieve drain down of the facilities within 24 hours after a severe storm event. Greg was also recently engaged by the Elmhurst School District 205 to assist in a similar evaluation and technical review of the proposed stormwater alternatives within the School District properties

Oak Park Country Club Stormwater Peer Review, Oak Park Country Club, Elmwood Park, Illinois - Greg is Project Manager for the Oak Park Country Club to provide technical review and assistance to represent the rights and concerns of the golf course associated with the stormwater changes. The Village of Elmwood Park developed a village-wide sewer separation plan which included significant storm sewer improvements and storage requirements through the Oak Park County Club. The estimated cost for stormwater improvements on the golf course was $10 million, including pump station, storage excavation, large box culverts and restoration. Greg assisted with review of construction documents and specifications to confirm that contractors engaged in this project would have the agreed upon restrictions in place for limited use and access to the golf course property. Original plans for this project included enlarging the Golf Course Tributary to convey runoff through the site during large storm events. This design would have increased flow rates and inundations on the golf course, therefore this design was abandoned and dual three-foot by six-foot box culverts were designed for storm conveyance. A large pump station and storage basin was proposed for the far southeast corner of the golf course property. The Village of Elmwood Park engaged V3 directly to perform a peer review of the Des Plaines River HEC-RAS unsteady flow modeling associated with this project, given concerns of the potential to increase flows and elevations within the Des Plaines River due to this significant change in current stormwater patterns. Greg oversaw this detailed review and made various recommendations to consider potential modeling instabilities which appeared in the output. We ultimately confirmed that the impact of this Oak Park Country Club storage and pump station project would have negligible effect on the Des Plaines River.

Golf Club of Illinois Stormwater Peer Review, Algonquin, Illinois – Greg was Project Manager for the technical assessment and peer review on behalf of the Village of Algonquin. The Highlands of Algonquin development is adjacent to the Golf Club of Illinois in Algonquin. Due to proposed stormwater modifications in the existing drainage system associated with the roadways next to the golf course and associated with the golf course ponds, the Golf Club of Illinois requested a Stormwater Peer Review be performed by an independent technical consultant. Greg oversaw hydrologic and hydraulic modeling verification, evaluated the construction documents to confirm plans and modeling matched and had two conference calls with the design team and golf club. Minor modifications to the modeling and construction plans were suggested and V3 ultimately confirmed that the proposed design for the approximately $1 million dollar project met the goals of the project and protected the rights and interests of the Golf Club of Illinois.

CHRISTIAN SMITH, P.E.
Senior Project Engineer

YEARS OF EXPERIENCE

With V3: 10
Other: 14

EDUCATION

Masters of Science
Civil Engineering
Illinois Institute of Technology

Bachelor of Science
Civil Engineering
Illinois Institute of Technology

REGISTRATIONS

Professional Engineer:
Illinois, 062-049583, 1995

Mr. Smith is responsible for complex water resources modeling using hydrologic/hydraulic software programs. He is an expert in unsteady flow analysis and has utilized HEC-RAS Unsteady, XP-SWMM and FEQ on hundreds of projects through his career. Primary responsibilities include preparing concept drainage analysis reports and design and analysis of stormwater management systems. He manages the technical aspects of a project and oversees and trains the various water resources project engineers and design engineers on the project.

NOTEWORTHY PROJECT EXPERIENCE

Melvina Ditch Reservoir Expansion, Metropolitan Water Reclamation District, Burbank, Illinois – Christian was the Senior Project Engineer responsible for setting up hydrologic and hydraulic modeling in XP-SWMM for this large eight square mile watershed. He performed drainage remediation alternatives analysis for a highly-impacted area of Bedford Park and Burbank, Illinois. These communities had received severe flooding for three consecutive years which caused structural flooding of many residents and businesses. The August 22, 2014 storm event produced 3.6 inches of rain within 40 minutes in this watershed. Existing stormwater storage facilities; Bedford Park Reservoir and Melvina Ditch Reservoir; were overtopped and up to five feet of ponding depth occurred in some of the hardest impacted areas. V3 provided creative engineering and technology solutions to address the problems, including vertical expansion of the Melvina Ditch Reservoir by retrofitting the existing pump station which minimized the footprint of resident buyouts and created cost effective storage solutions in this urbanized community that has limited open space. Christian has developed creative solutions with the design team and led the technical implementation of the design team modeling effort.

Stormwater Master Plan for Roberts Road Drainage Area, Metropolitan Water Reclamation District, Cook County, Illinois – Christian was the Senior Project Engineer responsible for setting up hydrologic and hydraulic modeling in HEC-RAS and XP-SWMM for this large twelve square mile watershed. The project goal is to identify and evaluate drainage and flooding problem areas within the study area and recommend alternatives that can provide a 100-year level of protection to all structures, including protection against basement flooding. The project includes high-level, conceptual modeling with HEC-RAS and XP-SWMM. One challenge was proper representation of the Lucas Ditch and Lucas Diversion Ditch sub-watersheds, as water crosses back and forth between the watersheds during flood events resulting in "fingers" of floodway that follow the streets through a residential neighborhood. Alternatives include traditional engineering approaches, and creative green infrastructure and planning recommendations, such as creation of new green space along a corridor with high flood frequency, to provide public recreation and open space in a heavily urban / suburban area and remove the most likely-to-flood properties from the flooding area, with new high density housing elevated beyond the flood fringe. The stormwater master plan is unique in that it also seeks alternatives on private property. These alternatives included green infrastructure on residential properties, such as rain cisterns and rain gardens; underground storage on commercial, industrial, and institutional properties; and redevelopment of vacant / underutilized properties to create additional opportunities for flood storage. The project involves public relations and community engagement to encourage the public to be part of the flooding solution, including use of green infrastructure on private properties to reduce stormwater runoff. Christian has developed creative solutions with the design team and led the technical implementation of the design team modeling effort.

CHRISTIAN SMITH, P.E.
Senior Project Engineer

Elmhurst Stormwater Peer Review, Elmhurst Park District, Elmhurst, Illinois – Christian is the Senior Project Engineer for the project including technical assessment and peer review for the Elmhurst Park District. The City of Elmhurst completed a comprehensive flooding plan and storm sewer system analysis (Plan) in 2012. The preferred alternatives of the Plan were estimated to cost between $30-$45 million to implement. A significant portion of the surface storage to accomplish the Plan was located within the open spaces owned and operated by the Elmhurst Park District and the Elmhurst School Distict 205. The goal of the peer review was to perform a detailed technical review of the proposed modeling and methodology to determine whether the proposed storage improvements in the Park District properties would cause detrimental impacts to the short term and long term core values held by the Park District. Christian performed technical review of the entire Plan, with specific attention given to the parks where proposed stormwater improvements and storage was proposed by the City. He suggested various modifications to the design and function of the storage systems to protect the parks during low flow storm events and achieve drain down of the facilities within 24 hours after a severe storm event.

Oak Park Country Club Stormwater Peer Review, Oak Park Country Club, Elmwood Park, Illinois - Christian is the Senior Project Engineer for the Oak Park Country Club to provide technical review and assistance to represent the rights and concerns of the golf course associated with the stormwater changes. The Village of Elmwood Park developed a village-wide sewer separation plan which included significant storm sewer improvements and storage requirements through the Oak Park County Club. The estimated cost for stormwater improvements on the golf course was $10 million, including pump station, storage excavation, large box culverts and restoration. Original plans for this project included enlarging the Golf Course Tributary to convey runoff through the site during large storm events. This design would have increased flow rates and inundations on the golf course, therefore this design was abandoned and dual three-foot by six-foot box culverts were designed for storm conveyance. A large pump station and storage basin was proposed for the far southeast corner of the golf course property. The Village of Elmwood Park engaged V3 directly to perform a peer review of the Des Plaines River HEC-RAS unsteady flow modeling associated with this project, given concerns of the potential to increase flows and elevations within the Des Plaines River due to this significant change in current stormwater patterns. Christian performed this detailed review and made various recommendations to consider potential modeling instabilities which appeared in the output. V3 ultimately confirmed that the impact of this Oak Park Country Club storage and pump station project would have negligible effect on the Des Plaines River.

Golf Club of Illinois Stormwater Peer Review, Algonquin, Illinois – Christian was Senior Project Engineer for the technical assessment and peer review on behalf of the Village of Algonquin. The Highlands of Algonquin development is adjacent to the Golf Club of Illinois in Algonquin. Due to proposed stormwater modifications in the existing drainage system associated with the roadways next to the golf course and associated with the golf course ponds, the Golf Club of Illinois requested a Stormwater Peer Review be performed by an independent technical consultant. Christian performed hydrologic and hydraulic modeling verification, evaluated the construction documents to confirm plans and modeling matched. Christian suggested minor modifications to the modeling and construction plans and V3 ultimately confirmed that the proposed design for the approximately $1 million dollar project met the goals of the project and protected the rights and interests of the Golf Club of Illinois.

CHRIS HANCHETT, P.E., CFM, LEED AP

Role : Project Engineer

YEARS OF EXPERIENCE

With V3: 8
Other: 1

EDUCATION

Bachelor of Science
Civil Engineering
Calvin College

REGISTRATIONS

Professional Engineer: Illinois, 062-063179, 2011

Certified Floodplain Manager IL-09-00475

Leadership in Energy & Environmental Design Accredited Professional (LEED AP), 2008

Mr. Hanchett is responsible for the site grading and hydrologic/hydraulic design of complex water resource projects. Primary responsibilities include preparing site feasibility reports, design of site grading and earthwork analysis, design of utility systems, design of site access, and design and analysis of stormwater management systems. He coordinates permitting submittals and follows up to obtain permits, and coordination with internal and external design team members.

NOTEWORTHY PROJECT EXPERIENCE

Orland Grassland South Addition Mitigation Project, Illinois Tollway, Rockford, Illinois – Project Engineer for the wetland mitigation site needed to offset wetland impacts associated with the Jane Addams Tollway (I-90) expansion. This project included wetland restoration planning, design and permitting of 160 acres of preserve area within the ownership of the Forest Preserve District of Cook County and adjacent to the Orland Grassland Preserve. V3 evaluated the existing wetland and soil conditions to assess the feasibility of restoring the historic hydrology to the hydric soils on the preserve and enhancing existing wetlands. To determine the potential for wetland restoration, V3 classified and mapped the extent and location of hydric soils present on the site and completed a hydrologic and hydraulic assessment to evaluate surface water conditions after the drain tiles were removed. The final mitigation plan for the Orland Grassland South Addition site includes more than 65 acres of wetland mitigation credits through re-establishment of historic wetlands, enhancement of existing wetlands and prairie buffer establishment. In addition, approximately six acres of stream mitigation credits were achieved through the hydrologic restoration and re-meandering of a headwater swale at the beginning of the unnamed tributary to Marley Creek.

Sunnyland Subdivision Stormwater Improvements, Will County Land Use, Will County, Illinois – Project Engineer responsible for preparing the existing and proposed stormwater master plan for the Sunnyland Subdivision. Mr. Hanchett was involved in the preparation of the concept and preliminary engineering plans for proposed alternatives for remediating the drainage problems within this residential area. This area is subject to frequent flooding due to significant upstream tributary area discharges and insufficient conveyance routes through this subdivision which was constructed with no drainage infrastructure. Both hydrology and hydraulic analyses were performed, including XPSWMM modeling of the complex overflow routing, to identify critical problem areas. The final design will incorporate subdivision wide improvements across the entire Sunnyland Subdivision area to bring benefit to as many properties as possible with the initial funding.

Williston Basin Tributary Area Drainage Analysis, City of Wheaton, Wheaton, Illinois – Project Engineer for the evaluation of the existing flooding conditions within the Williston Basin Tributary Area. The information gathered during storm events served to provide as calibration for the modeling that V3 completed. XPSWMM modeling was completed for the Williston Basin Tributary Area and high water elevations were determined based on critical duration analysis. A total of 66 at-risk structures may be impacted during the 100-year storm event. One challenge for this project included identifying the downstream tailwater condition of the 36-inch storm sewer which drains the entire Williston Basin area. V3 worked with the City of Wheaton to obtain the elevation gauge information for an existing pond and pump station which is the ultimate discharge location for the 36-inch storm sewer. V3 utilized this information to develop the outlet conditions from the drainage area. The other challenge was coordination with the residents to obtain access to their backyards for

performing the required topographic survey. V3 and the City were proactive with communication and worked through the issues of gaining access and avoiding pets during this critical data collection aspect of the project.

Naperville Public Works Service Center, McShane Construction Company Inc., Naperville, Illinois – Design Engineer for the design, consulting and surveying services for 22.8 acre site that will accommodate a new 220,000 square foot public works building and service center, a salt dome, 136 parking spaces for employees and visitors, covered and uncovered material storage bins, vehicle storage areas and a police impound lot. The project involved the demolition of the existing asphalt parking lot and associated utilities that occupied the site, with the majority of the asphalt being recycled for use on the site. Stormwater detention for the property is provided on-site in a dry, naturalized detention basin constructed at the southeast corner of the property. As much as possible, stormwater runoff from the site drained through vegetated swales and infiltration trenches in order to remove sediment and pollutants prior to reaching the detention basin and discharging off-site. The project will be striving for LEED certification through the United States Green Building Council.

Water Street District, Moser Enterprises, Naperville, Illinois – Design Engineer for this high profile, 2.0-acre redevelopment along Water Street and Webster Street in downtown Naperville. The site was developed in two phases with the project's first phase consisting of a three-story office building, a five-story mixed-use building, a five-story mixed-use tower along with a four-story, 800-space parking structure. Full improvements to Water Street and Webster Street were required in Phase I and Phase II included two five-story mixed-use buildings and improvements to the City's riverwalk along the DuPage River. Permits were required from the City, DuPage County Department of Environmental Concerns, Army Corps of Engineers and Federal Emergency Management Agency (FEMA). V3 worked with the developer to strategically phase the development, allowing construction to commence prior to obtaining the FEMA permit. All required stormwater management and floodplain compensatory storage was provided under the parking structure in Phase I and plaza area in Phase II. V3 worked with the City to allow a fee-in-lieu-of-stormwater detention in Phase I and provide all required detention for the project in Phase II to defer construction costs and solve logistical issues between phases.

Department of Streets and Sanitation Campus Site Development, City of Chicago Department of Fleets and Facilities Management, Chicago, Illinois – Design Engineer for The City of Chicago's property which is approximately 5.3 acres located at 2302-2352 S. Ashland Avenue. Garage facilities for various departments are located on the site along with an office building that was recently renovated to LEED EB Gold.

The task order included the reconstruction of the north parking lot, bringing the parking facilities up to meet ADA code, improve drainage along the private rail line, minimal improvements to the south parking lot plus a streetscape design of Ashland Avenue along the frontage of the property.

Accessible stalls were provided in the north and south parking lots. Close coordination with the City and MOPD was required to determine the distribution of the accessible stalls based on the location of employees using the spaces.

The north parking lot was updated to meet the current landscape and stormwater codes. With respect to stormwater, volume control requirements were satisfied based on the increase of pervious area, however rate control (detention) was still required. The required detention volume was reduced thru the use of bioinfiltration areas use of pervious pavers since the native soils are sandy and have good percolation rates.

A drip irrigation system was also designed for dry periods. In line with the desire to incorporate green infrastructure into the design, LED lights were used to as part of the parking lot lighting design.

At the start of the project, the Ashland Avenue frontage was not ADA compliant and was often parked on by employees. Several meetings were held with the City to determine the appropriate streetscape design. Alternates such as bump outs to provide on-street protected parking were considered. The final design included tree pits, root paths to oversized green areas on site to provide for a healthier tree environment, re-grading to meet ADA compliance, plus design and installation of new street lights.

MIKE WARNING

Role: Underground Cost Estimating

YEARS OF EXPERIENCE

With V3: January 2015
Other: 20

EDUCATION

Bachelor of Science
Business Administration
University of Missouri-Columbia

CONTINUING EDUCATION

HCSS:
Annual Training
Conference: 2003 & 2004

SDC & Associates:
Improve Cash Flow with Documentation-Change Orders-Delays-Inefficiencies

AREAS OF SPECIALIZED SKILL

Proficiency in HCSS Bidding/Estimating Software

IDOT Bidding and Management Process

The Tollway Bidding & Management Process (E-Builder User)

Logistic Planning

Alternatives Analysis

Scheduling & Production

Mr. Warning has more than 10 years of construction experience on both public and private sector site infrastructure and also 10 years of experience in the material supplier industry. As a Senior Civil Estimator / Project Manager for V3 Companies, he is responsible for overall supervision and execution of an average annual bid volume exceeding $70 million. This responsibility includes management of estimating technicians, document management, interface with design teams to understand the overall design intent, vendor and trade contractor interaction and defining the overall parameters for submission of performance guaranteed bids. His responsibilities also include the advertisement and solicitation for public bidding on behalf of public entities including specific interaction with DBE/MBE vendors and subcontractors along with preparation of the required documentation.

ESTIMATOR RESPONSIBILITIES

HCSS Heavy Bid Software – Mr. Warning manages this software which provides V3 with the ability to assemble work crews specific to each trade and analyze the production for each scope of work. It maintains historical data for equipment, labor and material costs and can be adjusted to reflect current market conditions.

In-House Estimating Staff – Mr. Warning works alongside the project team members, completing a review of each project for scope, logistics and scheduling. In addition, this staff will complete a take-off of all quantities associated with each scope of work and apply unit rates from historical data and adjust for current market conditions.

Trade Contractor Pricing – When and if appropriate for the specific project, V3 estimators will solicit trade contractor pricing for defined scopes of work. A specific bid package would be issued to the trade firm with direction to provide pricing and any comments for improved efficiency and value engineering associated with that work. This pricing will be evaluated against the pricing assembled by the estimating staff and revised as necessary to reflect the most accurate conditions.

Self-Perform Work – V3 is also a trade company that self-performs earthwork, select site demolition and utility installations, naturalized planting and ecologic restoration. Mr. Warning is responsible for maintaining actual field data relating to crew sizes required by task, equipment needed and expected production. These trade services allow V3 to provide real-world, practical pricing and assessment of each project.

PREVIOUS PROJECT EXPERIENCE

Willow Road Improvements, IDOT, Northfield, Northbrook & Glenview, Illinois – Estimator/Project Manager for the construction of new sanitary sewer that was up to 25 feet deep, watermain and storm sewer that was up to 20 feet deep with 72-inch diameter RCP pipe. This project was $6.5 million in underground site utilities.

75th Street Improvements, IDOT, Darien, Illinois – Estimator/Project Manager for the construction watermain and storm sewer that was up to 20 feet deep with 54-inch diameter RCP pipe. Project was approximately $1.5 million in underground site utilities.

The Woods of South Barrington (Phase I, II & III), Village of South Barrington, Barrington, Illinois – Estimator/Project Manager for the construction new sanitary sewer that was up to 30 feet deep, watermain and storm sewer that was

up to 20 feet deep with 60-inch diameter RCP pipe. Project was approximately $6 million in underground site utilities.

Bowes Creek Country Club (Phase I, II & III), City of Elgin , Elgin, Illinois – Estimator/Project Manager for the construction new sanitary sewer that was up to 20 feet deep, watermain and storm sewer that was up to 15 feet deep with 60-inch diameter RCP pipe. Project was approximately $7 million in underground site utilities.

The Woodlands Phase I & The Infrastructure Program, Village of Hinsdale, Hinsdale, Illinois – Estimator/Project Manager for the construction new sanitary sewer, watermain and storm sewer. The storm sewer system at The Woodlands included CMP underground detention for water storage to improve area flooding (12-inch up to 96-inch diameter). Mr. Warning also managed pavement removal and replacement, new curb and gutter system, complete restoration with sod and rain gardens in certain areas at Woodlands. The two projects were a combined $6 million in infrastructure work.

The Arboretum Of South Barrington, South Barrington, Illinois – Estimator/Project Manager for the construction new sanitary sewer that was up to 25' deep, watermain and storm sewer that was up to 20 feet deep with 72-inch diameter RCP pipe along with a box culvert that was installed across the site. This was approximately $7 million in underground site utilities.

Storm Sewer Replacement, Village of Downers Grove, Downers Grove, Illinois – Estimator/Project Manager for this design/build project which involved the construction of a storm sewer system on a busy residential street that needed to remain open at all times. A special storm structure had to be constructed at the end of an 11-inch storm sewer pipe and installed in close proximity to existing residential homes and driveways. A unique challenge was managing a 24-hour pumping effort that was needed to drop the water level to allow work to proceed.

Pine Dunes Forest Preserve Wetland Mitigation Area for the Elgin O'Hare Western Access for the Illinois Tollway (Contract No. I-13-4619), Lake County Forest Preserves, Lake County, Illinois – Estimator/Project Manager for this job that was awarded at $9.3 million. There was 40,000 cubic yards of earth excavation and 200,000 square yards of topsoil remove and respread along with appropriate storm sewers a 400-acre site that included a two-mile bike path four boardwalks. This was for the enhancement of the existing wetlands, old fields and upland woodlands along with other associated activities for this mitigation project that was needed for the Elgin O'Hare project.

Commuter Drive Improvements, IDOT, Arlington Heights & Palatine, Illinois – Estimator/Project Manager for the construction of new storm sewer, bike path and new asphalt road along the north side of the Arlington Park race track. Project was approximately $2 million in infrastructure work.

Johnsburg Road Improvements Phase 1, IDOT, Johnsburg, Illinois – Estimator/Project Manager for the construction of new storm sewer and full reconstruct of existing Johnsburg Road. Installed new pavement and curb and gutter along with landscape restoration. Project was approximately $4.5 million in infrastructure work.

Eagle Heights North Infrastructure Improvements, City of Elgin, Elgin, Illinois – Estimator/Project Manager for the construction new sanitary sewer, watermain and storm sewer. Mr. Warning also managed pavement removal and replacement, new curb and gutter system for this subdivision and complete restoration with sod. This first phase was approximately $5 million in infrastructure work.

Item #137, New Bituminous Concrete Overlay, IDOT, Carpentersville, Illinois – Estimator/Project Manager for the construction new sanitary sewer, watermain and storm sewer. Mr. Warning also managed the removal and replacement of pavement, new curb and gutter system for this subdivision and complete restoration with seed and blanket. Project was approximately $6 million in infrastructure work.

Country Lakes Park, Naperville Park District, Naperville, Illinois – Estimator/Project Manager for Phase I of underground storm utilities.

TOM FOSTER

Role : Earthwork Cost Estimator

YEARS OF EXPERIENCE

With V3: 16
Other: 5

EDUCATION

Northern Illinois University

CONTINUING EDUCATION

HCSS:
Annual training conference: 2007, 2008, 2009

IDOT:
Bituminous Pavement Inspection

UNIVERSITY OF WISCONSIN:
Soils engineering for Non-Soils Engineers and Technicians

Effective Construction Contract and Field Administration

AREAS OF SPECIALIZED SKILL

Proficiency in HCSS Bidding/Estimating Software

Carlson Take-off Software

Earthwork Balance Analysis

Logistics Planning

Alternatives Analysis

Scheduling & Production

Mr. Foster has more than 21 years of construction experience on both public and private sector site infrastructure and ecological restoration projects. As a Senior Civil Estimator for V3 Companies, he is responsible for the overall supervision and execution of an average annual bid volume exceeding $70 million. This responsibility includes management of estimating technicians, document management, interface with design teams to understand the overall design intent, vendor and trade contractor interaction, and defining the overall parameters for submission of performance guaranteed bids. His responsibilities also include the advertisement and solicitation for public bidding on behalf of public entities including specific interaction with DBE/MBE vendors and subcontractors along with preparation of the required documentation.

RESPONSIBILITIES

HCSS Heavy Bid Software – Mr. Foster manages this software which provides V3 with the ability to assemble work crews specific to each trade and analyze the production for each scope of work. It maintains historical data for equipment, labor and material costs and can be adjusted to reflect current market conditions.

In-House Estimating Staff – Mr. Foster supervises a staff of estimating professionals. This staff, along with the project team members, will complete a review of each project for scope, logistics, and scheduling. In addition, this staff will complete a take-off of all quantities associated with each scope of work and apply unit rates from historical data and adjust for current market conditions.

Trade Contractor Pricing – When and if appropriate for the specific project, V3 estimators will solicit trade contractor pricing for defined scopes of work. A specific bid package would be issued to the trade firm with direction to provide pricing and any comments for improved efficiency and value engineering associated with that work. This pricing will be evaluated against the pricing assembled by the estimating staff and revised as necessary to reflect the most accurate conditions.

Self-Perform Work – V3 is also a trade company that self-performs earthwork, select site demolition and utility installations, naturalized planting and ecologic restoration. Mr. Foster is responsible for maintaining actual field data relating to crew sizes required by task, equipment needed, and the production that can be expected. These trade services allow V3 to provide real-world, practical pricing and assessment of each project.

Michael G. Vitale, PE

Education
MS, Civil Engineering, University of Illinois at Urbana/Champaign, 1984

BS, Civil Engineering, University of Illinois at Urbana/Champaign, 1982

Registration
Professional Engineer
OH, E-66491, 2002
MI, 34579, 1989
WA, 26746, 1990
IL, 062-055275, 2002
IN, PE10200113, 2002
KY, PE22782, 2002
GA, PE028548, 2003
WI, 37090-006, 2004

Years in Practice – 30

Memberships
American Society of Civil Engineers (ASCE)

Underground Construction Association (UCA of SME)

International Tunnelling Association (ITA)

British Tunnelling Society (BTS)

North American Society for Trenchless Technology (NASTT)

Society for Mining, Metallurgy and Exploration (SME)

Experience Summary

As Senior Vice President and Regional US Tunnel Practice Leader for Hatch Mott MacDonald, Mr. Vitale has extensive, diversified experience in underground design and construction for water/wastewater and transportation projects. His areas of expertise encompass geotechnical engineering, rock engineering, conventional tunnels and lining systems, EPB tunnels, segmental linings, microtunnels, underground structures, shafts, and braced excavations. He has served as Design Manager for numerous tunnels, including some of the largest CSO tunnel projects in the United States and overseas. Mr. Vitale has extensive design/build tunnel experience in addition to traditional delivery methods, and has been involved in tunnels around the world in all types of soil and rock, from extremely soft, sensitive clays to the hardest basalts. He is active nationally on many technical tunnel committees and organizations and was one of the primary authors of the ASCE Standard Guideline for Microtunneling.

Select Tunnel Experience

Des Plaines River Tunnel, and Long Term Control Plan Projects, City of Des Plaines, IL
Provided constructability review and value engineering recommendations for a 900-foot long tunnel under the Des Plaines River (designed by others). Serving on JV board with V3 for Construction Services Contract; JV is providing Resident Engineering and Inspection services.

37th Street Tunnel, City of Chicago Department of Water Management, Chicago, IL
Project Director on Construction Services Contract, providing inspection services for a pipe-jacked tunnel through glacial soils near 37th and Archer in Chicago.

Dugway Storage CSO Tunnel (DST), NEORSD, Cleveland, OH
Hatch Mott MacDonald Joint Venture Board Member and Project Director responsible for design of shafts, tunnels, and near surface structures. HMM is working in a Joint Venture with MWH Americas on this project which includes three miles of 24-foot finished-diameter tunnel in chagrin shale, up to 250 feet deep. This project is similar in all aspects to the Euclid Creek Tunnel described below and continues the innovative use of Baffle Drop Structures, steel fiber segment reinforcement and two-part segment void grout in rock in conjunction with an open TBM. Final design was completed in July of 2014. The JV is Currently providing construction services through project completion in 2018.

Euclid Creek CSO Tunnel (ECT), NEORSD, Cleveland, OH
Tunnel Design Manager during design, and Project Director through Construction. Co-authored the Geotechnical Baseline Report and provided overall direction, review and quality checks for all aspects of underground design and risk management. The project includes three miles of 24-foot finished-diameter tunnel in chagrin shale, up to 250 feet deep, and almost a mile of near-surface, small-diameter consolidation sewers, including four to six foot diameter microtunnels. Tunnel support is via bolted, gasketed precast concrete segments and is one of the first in the US to be entirely reinforced with steel fiber. This project is also the first to pioneer the use of 2-part rapid set grout injected through the tail skin of an open TBM in rock. Flow drops are baffle-drop-type structures which were recently physically modeled by the NEORSD and HMM at the University of Iowa, and shown to be superior to Vortex Drop Structures with respect to entrained air and several other factors. Project Design was completed late 2010. Construction NTP was given April 4th, 2011 and will be completed in early 2015.

Deep Tunnel Sewerage Scheme (DTSS), Design/Build Contract T-02, Singapore
Resident Tunnel and Shaft Design Manager and Designer of Record for a multi-disciplined design/build team for a Japanese contractor in Singapore. Directly responsible for all aspects of tunnel and shaft design, as well as hydraulic structures and temporary works. Provided on-call support during construction. The T-02 design/build tunnel contract included four miles of 150-foot deep tunnel, traversing beneath Singapore's Bedok Canal and Pan-Island Expressway. The project included ten shafts, with diameters as large as 60 feet, as well as vortex drop structures, de-aeration chambers and odor control facilities. The tunnel was mined through 'soft ground' with an Earth Pressure Balance Machine (EPBM) using bolted, gasketed, precast-concrete segments for initial support. Portions of the tunnel traversed an unexpected mixed face

consisting of soft ground/hard rock (granite) requiring extensive ground treatment and lining modification. A final, cast-in-place concrete liner was placed inside of the segments (at the owner's request) complete with an integral HDPE liner for corrosion protection.

Western Regional Conveyance Tunnel, Northern Kentucky Sanitation District No. 1 (SD1), Fort Wright, KY
HMM Project Manager, Tunnel/Shaft Design Manager and Engineer of Record for Tunnel and Shaft Designs. Authored the Geotechnical Baseline Report. As HMM Principal-in-Charge during construction, provided construction support to HMM Resident Engineer and inspection staff and provided submittal reviews from the home office. Introduced the SD1 to Underground Risk Management and led the development of the Risk Register used by the team throughout project design and completion. Assisted team with route selection and vertical alignment, as well as evaluation of pump station/force main vs. tunnel option.

This project included seven miles of 12-foot diameter, TBM-excavated tunnel in shale, lined with 8.5-foot ID RCP/T-lock corrosion-resistant pipe. One vortex-type intake shaft was included to drop flows over 150 feet to the tunnel below. Also included were several smaller diameter shafts for access and maintenance. While the tunnel is as deep as 300 feet in the central portion, the westernmost 700 feet of the sewer is constructed on an aerial bridge over Willoughby Creek, which transitions to several thousand feet of open-cut terminating at the new WWTP. HMM provided the engineer's representative and two tunnel inspectors during construction. Construction was fully completed in late 2012, and in the same year the project won an NCE/ITA International Tunnelling Award (Environmental Initiative of the Year).

Elm Road Generating Station Cooling Water Intake Tunnel (Design/Build), Wisconsin Electric Power, Oak Creek, WI
Design Manager for tunnel design, shaft design, and geotechnical engineering for this design/build tunnel project, working directly for the contractor. Mr. Vitale is the Engineer of Record for all tunnel and shaft work. Project included 9,200 feet of 27-foot diameter tunnel in dolomitic limestone, and seven shafts up to 250 feet deep. The purpose of the tunnel is to collect water from Lake Michigan and convey it to the new power plant at a rate of 1.6 million gallons per minute to cool machinery and equipment. Four of the shafts were drilled from barges through the lake bottom to the tunnel below, and were fitted with screens at the intake point on the lake bottom. Responsibilities included preliminary design of initial supports for shafts and tunnel and preparation of the Geotechnical Baseline Report as part of the successful contractor's bid, final design of tunnel and shaft supports, and preparation of the tunnel/shaft-related method statements and specifications for the contractor. Also responsible for supervision of field staff responsible for mapping the tunnel, evaluation of the rock conditions in the tunnel, and selection of areas of the tunnel to be lined, as well as areas which will remain unlined for the 100 year design life. The majority of the tunnel was left unlined in competent rock.

West Area Combined Sewer Overflow (CSO) Storage Tunnel and Pumping Station, City of Atlanta, Atlanta, GA
Tunnel and Shaft Design Manager, and Engineer of Record for tunnels and shafts. Project included 8.5 miles of 27-foot diameter hard rock TBM tunnel, which was partially lined with a cast-in-place concrete final liner. The balance of the tunnel remains unlined in competent rock for the 100-year design life. Total system provided 150 MG of CSO storage with peak inflows in excess of 10,000 cfs. Three vortex-type intake shafts are included with the largest shaft capable of handling inflows in excess of 5,000 cfs. Also included were a 200-foot deep, 100 MGD pump station, several smaller diameter shafts for venting air from the system during filling, and an overflow shaft to accommodate transient pressure waves. In addition, approximately 1,600 linear feet of smaller diameter connecting tunnels and four large underground chambers was excavated using drill and blast techniques for tunnel connections and deaeration at the base of the intake shafts. As HMM Project Manager/Director, provided home office support and submittal reviews to the HMM Resident Engineer and Inspection staff through the end of construction in 2009.

Beniamino D. DiFiore, PE, LEED® AP

Education
BS, Civil Engineering, Cleveland State University, 2005

Registrations
Professional Engineer:
OH, #E-74333, 2009

Leadership in Energy and Environmental Design Accredited Professional (LEED AP BD+C), #10210529, 2009

Years in Practice – 11

Experience Summary

Mr. DiFiore is an HMM Associate and Senior Project Manager in the Cleveland Office who joined Hatch Mott MacDonald in June of 2007. Prior to HMM, Mr. DiFiore was in the construction industry, working with multiple underground contractors in Northeast Ohio. His experience includes construction management, contract procurement, construction cost/schedule estimating, extensive fieldwork in the construction and rehabilitation of water/wastewater systems, design of large tunnel systems, construction feasibility analysis, data analysis, report writing, and AutoCAD design. Mr. Difiore's extensive tunnel design experience coupled with his construction contracting background serve him a great all-around tunnel practitioner with a very practical eye towards construction management of tunnels.

Select Project Experience

Dugway Storage Tunnel (DST), Northeast Ohio Regional Sewer District (NEORSD), Cleveland, OH
HMM Project Manager responsible for the design of this storage tunnel that will reduce CSOs to Lake Erie and its tributaries. Design services for this project consist of approximately 2.8 miles of 24-ft diameter precast segmentally lined tunnel in shale, six tunnel access shafts (including four baffle drop structures and a multi-purpose 50-ft diameter shaft that will function as a baffle drop structure, TBM retrieval shaft, and provide surge attenuation), multiple gated diversion structures to regulate flow entering the tunnel, and near-surface consolidation sewers to be installed by trenchless and open cut methods. Estimated construction value is $179M.

Mid-Halton WWTP Phase IV/V Expansion, Region of Halton, ON, Canada (2011-)
Project Engineer responsible for the effluent outfall tunnel that will convey flow from the newly-expanded treatment plant to Lake Ontario. The tunnel will have a finished inside diameter of 8.5-ft and will be approximately 21,000-ft long. The TBM-mined tunnel will be constructed in the Georgian Bay Formation and lined with CIP concrete. Work includes a baffle drop structure to convey flow from the treatment plant to tunnel elevation, and time/quality-sensitive overwater work to sequence and construct the diffusers through almost 100-ft of water in Lake Ontario. Estimated construction value is $89M.

Euclid Creek Pump Station/Lakeshore Blvd. Relief Sewer (ECPS-LBRS), Northeast Ohio Regional Sewer District (NEORSD), Cleveland, OH
Project Engineer responsible for design of over 7,000-ft of sewer ranging in diameter from 18 to 66 inches; consisting of open-cut sewer construction to replace the existing interceptor, as well as parallel relief sewer and lateral (dry weather outlet) improvements. The LBRS passes beneath Euclid Creek along the downstream portion of the alignment where the construction transitions to trenchless installation in the Chagrin Shale. A baffle drop structure will be constructed to convey the flow to this deeper trenchless reach prior to terminating the LBRS tunnel at an existing baffle drop structure for the Euclid Creek Tunnel (ECT). Estimated construction value is $21M.

Euclid Creek Tunnel (ECT), Northeast Ohio Regional Sewer District (NEORSD), Cleveland, OH
Lead Project Engineer responsible for design of this tunnel system that will provide over 65 million gallons of CSO storage, tremendously reducing CSOs to both Euclid Creek and Lake Erie. After storms subside, sewage from this storage tunnel will be pumped by the Tunnel Dewatering Pump Station (TDPS) to the Easterly Wastewater Treatment Plant for treatment and eventual discharge into Lake Erie. Design services for this project consist of approximately 3.4 miles of 24-ft diameter precast segmentally lined tunnel in shale, five tunnel access shafts (including a 50-ft diameter mining/baffle shaft and 50-ft diameter surge chamber, and three baffle drop structures) to convey flow from the surface to the tunnel, multiple diversion structures, and over 5,200 ft. of near-surface consolidation sewers to be installed by trenchless and open cut methods. Construction value is $198M.

Western Regional Conveyance Tunnel, Northern Kentucky Sanitation District No. 1 (SD1), Fort Wright, KY
Deputy Project Manager and Lead Project Engineer responsible for tunnel design of this sanitary sewage conveyance tunnel in Northern Kentucky, connecting developing communities in eastern Boone County with a new wastewater treatment plant on the Ohio River. Assisted with submittal review and RFI responses during construction. The project included seven miles of 12-ft diameter shale TBM-excavated tunnel, which was lined with corrosion resistant pipe. One drop structure is included to convey flows down the 100+ ft. shaft to the tunnel below. Also included are several smaller diameter shafts for access and maintenance and a 50-ft diameter cast-in-place hydraulic control structure containing a quadruple gate system. While the tunnel reaches depths of 300 ft., the westernmost portion of the sewer is an aerial bridge constructed over Willoughby Creek, which transitions to open cut construction for the lower conveyance portion of the alignment. Construction value is $110M.

North Hartford Conveyance Tunnel, Metropolitan District Commission, Hartford, CT
Project Engineer on the Program Management team responsible for developing conceptual alignments for the North Tunnel system and performing ensuing feasibility analyses based on construction methodology, route efficiency, and cost evaluations. Project includes almost six miles of 18 foot diameter conveyance tunnel in rock, over four miles of near surface trenchless sewer, and over one mile of open-cut sewer ranging in diameter from four to six feet. Preliminary budgetary construction value is in excess of $500M.

Backup Tunnel Project, Rio Tinto Alcan, Kemano, BC, Canada
Project Engineer responsible for developing tender documents, including construction sequences for excavating and exposing two 11-ft operational penstocks on a 48 degree incline, as well as making the penstock connection during a time-critical outage period.

Parallel Interceptors Routing Study, City of Fort Wayne, Fort Wayne, IN
Lead Project Engineer responsible for performing the routing study of the Parallel Interceptor required to provide additional conveyance capacity for the St. Mary's Interceptor and Wayne Street Interceptor. Scope of work includes alignment alternatives evaluation of approximately 47,000 LF of sewer traversing through the city of Fort Wayne and ranging in diameter from 15 to 132 inches. Construction methodologies anticipated are open cut and soft-ground trenchless, including various river and rail crossings. Preliminary budgetary construction value exceeds $100M.

Third Catskill and Delaware Aqueduct: Rondout-West Branch Bypass Tunnel, New York City Department of Environmental Planning (NYDEP), New York, NY
Project Estimator responsible for construction cost estimate development of the Rondout-West Branch Tunnel (RWBT). Constructed circa 1939 to 1945, the RWBT is a 44.2 mile long, 13.5 ft. diameter, deep rock tunnel (>700-ft). With a nominal design capacity of 890 million gallons per day (MGD), the RWBT accounts for about 50 percent of New York City's total water supply capacity. Due to significant leaks where the tunnel crosses beneath the Hudson River, a bypass of the Roseton area is being considered. Estimated construction value is $930M.

Donald C. Cook Power Plant Cooling Water Intake Tunnel, Indiana and Michigan Power Company, Bridgman, MI
Project Engineer responsible for construction cost estimating services for the DC Cook Power Plant Cooling Water Intake Tunnel. The project includes 13,200 ft. of TBM tunnel lined with 30 ft. finished inside diameter precast concrete segments, 950 ft. of non-TBM tunnel, four 16 ft. inside diameter drilled shafts at the plant intake, four 13 ft. inside diameter drilled shafts below 65 ft. of water at the intake in Lake Michigan, a 50 ft. diameter slurry-wall mining shaft, and a 30 ft. diameter slurry-wall construction shaft. The tunnel will be mined in the Ellsworth Shale Formation. Estimated construction value is $250M.

Strategic Value Solutions, Inc.

John **Robinson**

PE, CVS-Life, FSAVE

Value Engineering Specialist

AREAS OF EXPERTISE

Value Engineering Team Leadership
Value Management
Value Analysis
Partnering
Value Planning
Constructability Reviews
Value Engineering Program Development
Strategic Planning
Value Engineering Training
Risk Management
Value Engineering Change Proposals
Stakeholder Facilitation
Function Analysis Workshops
Programming and Planning
Decision Making Workshops
Planning & Design Charrettes

EDUCATION/REGISTRATION

B.S./Mechanical Engineering
University of Missouri-Rolla, Rolla, MO 1985

Professional Engineer
Missouri – 1991, E24180
Kansas – 1997, 14830
Wisconsin – 2009, 40361-006

CVS-Life, SAVE International – 2002, 900701

PROFESSIONAL HISTORY

Owner, Strategic Value Solutions, Inc. (2005-present)

Partner, Robinson, Stafford & Rude, Inc. (1997-2005)

Office Manager and Value Engineer, KCM, Inc., Independence, MO (1992-1997)

Value Engineer, US Army Corps of Engineers, Kansas City, MO (1985-1992)

AFFILIATIONS

ASCE

Project Management Institute

SAME

SAVE International

John Robinson is a Principal and Owner of Strategic Value Solutions, Inc. He serves the firm as an Executive Vice President, Senior Project Manager, and Senior CVS Team Leader.

John's experience includes planning, design, value engineering, and construction of public and private capital projects across the Continent. For more than 28 years, his career has been dedicated to leading value engineering studies. He has in excess of 500 VE studies to his credit on a very wide range of project types. His education includes an engineering degree from the University of Missouri at Rolla and advanced training in value engineering. He is a registered professional engineer and a life Certified Value Specialist (the highest level of certification in value engineering).

John's value engineering study experience on water resources projects includes flood control, river and stream restoration, ecosystem restoration, wetlands, salt marsh restorations, harbor deepening, marine, coastal, and water front structures, spillways, intake and discharge structures, dams, levees, floodwalls, hydroelectric, pump stations, pipelines, tunnels, and much more. The sizes of the projects and programs that John has conducted various VE studies, risk management, constructability reviews, and other facilitated workshops/meetings on have ranged from a few hundred thousand dollars in capital costs to as high as $50 billion.

The true measure of John's capability as a value professional is his record of savings and value improvement for his clients. His studies typically average a return on investment of more than five times the value engineering industry's average. John's work has been recognized as industry-leading and has resulted in multiple awards and other recognition for our clients and for SVS. His effectiveness as a Value Team Leader was recognized by the Department of Defense when he was awarded the Outstanding Value Engineering Consultant of the Year for 2009; as well he was recognized when a previous company he co-founded was awarded the Outstanding Value Engineering Consultant of the Year for 2002 as a result of John's achievements.

John is also a major contributor to SAVE International® (formerly Society of American Value Engineers). He has served multiple times on the SAVE International Board of Directors and has served on numerous committees for the Society. His most recent service was as President of the organization. During his term as president, he was instrumental in many enhancements to the organization, including the initiation of a major overhaul of the Value Methodology Standard. He also led the efforts to create a more global Value Society by establishing and strengthening affiliations with over a dozen value societies in other countries. After his term as president, John chaired a committee to finalize the updated VM Standard which is the only internationally recognized standard for value engineering. Currently, John is serving as the Chairman of the SAVE International Certification Board. Additionally, John is a member of ASTM and served on the committee responsible for the most recent update of ASTM E1699 *Standard Practice for Performing Value Engineering (VE)/Value Analysis (VA) of Projects, Products and Processes* and is the task chair for updating ASTM E2013 *Standard Practice for Constructing FAST Diagrams and Performing Function Analysis During Value Analysis Study* as well as the development of two new ASTM standards on Function Analysis and Function Cost.

Strategic Value Solutions, Inc.
19201 E. Valley View Parkway, Suite H, Independence, MO 64055
816.795.0700 main | www.SVS-inc.com

Lackawanna River Flood Risk Management Project	**Scranton, PA**

Project Manager and CVS VE Team Leader for this VE study of athis levee project which is divided into three flood risk reduction systems and extends a total length of approximately 4 miles along the Lackawanna River through the City of Scranton, PA. ECC: $25.7 million. The current design consists of raising the existing levees from 0 to 3.9 ft. with steel sheet pile driven along the riverside crest, modifying or replacing ten closure structures, constructing three new closure structures, increasing the height of three H-Pile walls, constructing concrete walls around 65 drainage structures, removal of high fences from three bridges and paving the crest for improved maintenance. The changes to the closure structures range from limited modifications of the gates and extending abutment walls to complete replacement. The project features must lie within the existing project 'footprint' with no additional real estate needs required for the levee raising. The project had a very low Benefit to Cost ratio of 0.21 to 1 as of the start of the VE study. The VE team recommended over $7.5 million savings including providing 1-3.9 ft. gravity brick walls in lieu of sheet pile walls on the existing levees, modifying existing closure gates in lieu of providing new closure gates, and developing a new HEC-RAS model that has been run under unsteady inflow conditions in lieu of steady flow conditions. Based on analysis in the workshop, this substantially reduced the projected water surface elevation.

GLMRIS Hydrologic Separation Design (Asian Carp Strategy)	**Chicago, IL**

Facilitator for a group of over 60 people representing 20-plus local, state and federal agencies, with the purpose of exploring the opportunities and constraints that may be realized by a hydrologic separation scenario to mitigate aquatic nuisance species migration within the Chicago Area Waterways System. Specifically, this group is concerned about the migration of the Asian Carp up the Missouri River system into the Illinois River system and ultimately into the Great Lakes. During the two-day session, SVS led the group through a decision analysis including an evaluation and optimization session to narrow down the list of potential separation scenarios to potentially one to two hydrologic separation sites that have the least potential impacts, but still provide a high level of risk reduction from interbasin transfer. The workshop session also included evaluating the risks associated with each set of solutions and determining the mitigating factors. SVS prepared the report summarizing the discussions of potential separation sites, the associated impacts as described by the attendees, and the basis for selection of the potential sites selected.

Licking River Flood Damage Reduction Feasibility Study	**Cynthiana, KY**

Project Manager and Team Leader for a value engineering study on a $12 million project to construct two online detention basins using roller compacted concrete (RCC) dams and spillways. Each dam was nominally 21,000 cy. Each dam included a 12 ft by 18 ft box culvert to pass the ordinary high water flows and an articulated concrete block (ACB) mat downstream for erosion protection from spillway and overtopping flows. The project also included nearly 5,000 feet of new roadway for maintenance access. The value study developed two scenarios; one that founded the RCC gravity dam on the stiff in-situ clay instead of excavating to a poor quality rock layer and another to use an earth-filled dam with ACB armoring to accommodate overtopping flows. Other alternatives were developed to allow the existing creek to remain in their natural channel without being diverted for construction. The implemented recommendations resulted in $7.4 million in savings (over 60% savings).

Nido de Aguila and Las Lenas Hydro Projects	**Santiago, Chile**

Value Engineering Team Leader and Project Manager for this unique Value Study on a $660 million (US) hydroelectric development project consisting of five high mountain river diversions, 33 km of 3.8 m to 4.5 m diameter tunnels, two 4 m diameter vertical shafts (450 m and 900 m), 4 m diameter steel penstocks feeding four turbine/generator units (282 MW) in a surface powerhouse. The study team included the planning and design team, the construction contractor and final design engineer, and various consultants from all over the world. Implemented changes from the value study included reducing tunnel diameters to 3.5 m since the size was driven by constructability and not hydraulics, use a 45° inclined power shaft instead of vertical shaft, revised rock support based on rock classifications, and moved the powerhouse underground for better protection from rock

falls and avalanches. The team also provided suggestions to bring the plant online quicker and to save the project over $72 million.

Fall Creek/White River Tunnel System **Indianapolis, IN**

Project manager and CVS team leader for a value engineering study on a $463 million project to construct a deep rock tunnel system to store combined sewer overflows (CSOs). The project included 9 miles of 18-foot finished diameter, concrete lined tunnel, 20 drop shafts over 200 feet deep, and over 10,000 feet of consolidation sewers ranging in size from 24-inch to 108-inch. The VE study was conducted at the 60% design. As such, many design decisions had been made including all of the major variables with tunnel configuration. With a focus on the consolidation sewers and the drop structures, VE alternatives included reducing the length of the approach channels for the vortex drop structures based on experience from projects other than Milwaukee. In several locations there were opportunities to extend cut and cover consolidation sewers to reduce the length of the substantially more expensive tunnel adits. The study resulted in $34.5 million in potential savings.

Missouri Hillside Interceptors **Kansas City, MO**

Project Manager and Team Leader on a value engineering study of the feasibility plan for constructing three new stormwater interceptors in a highly urbanized area of Kansas City, Missouri. The interceptors will convey up to 3,300 cfs through a series of RCP pipes ranging in size from 30-inch to 168-inch. The value study presented three possible scenarios to the City of Kansas City and the Corps of Engineers; one to use a detention based solution that would save $9.2 million, one to use a tunnel based solution that would save $3 million but would increase the level of protection from a 15-year storm to a 100-year storm, and then a combination of ideas to optimize the original piped solution that saved $7.3 million. The City and the Corps opted to stay with the original pipeline concept and accepted several recommendations for a savings of $2.5 million.

Kansas Hillside Interceptors **Kansas City, KS**

Project Manager and Study Team Leader on a $9 million stormwater interceptor project which is part of a much larger flood control project. There are three stormwater interceptors in this system. The Mission Road Interceptor uses 520 feet of 60-inch RCP and 1,135 feet of 78-inch RCP. The Cherokee Street Interceptor uses 1,863 feet of 72-inch RCP. The Rainbow Boulevard Interceptor uses 106 feet of 78-inch RCP and 763 feet of 96-inch RCP. These interceptors are designed to capture the 25-year stormwater runoff from a steep hillside that generates velocities approaching 22 fps. The alignments are through an urbanized area with numerous utility conflicts, roadway crossings, and railroad crossings. The value study optimized the design and made recommendations to incorporate detention with an implemented savings of $1.9 million (20%).

Newtown Creek Bending Weirs and Floatable Controls **New York, NY**

Project Manager and CVS Team Leader on a value engineering study of a $30 million project to reduce average annual combined sewer overflow volumes (AAOV) to Newtown Creek by 15% and to provide some level of floatables control. To reduce the AAOV, four specific outfall structures are to be modified with bending weirs to maximize the diversion of flow to the sewer interceptor and to increase the storage in the trunk sewer system without increasing the maximum hydraulic grade line in the system and without decreasing the discharge capacity of the outfall for high flow events. The Value Team addressed constructability issues resulting in more cost effective concepts to handle temporary bypass flows. Other concepts looked at changing the bending weirs to fixed weirs recognizing that there would be some reduction in performance; however, the project would still meet the Consent Order while achieving significant savings. The Value Team also recommended the elimination of any work on two of the structures since the project objectives could be accomplished with the other two structures. Implemented savings resulted in nearly $5 million in construction savings.

Section 4
Relevant Experience

Stormwater Master Plan for Roberts Road Drainage Area

Client: Metropolitan Water Reclamation District of Greater Chicago

V3 Services

- Constructability Reviews
- Construction Cost Estimating
- County Permitting Assistance
- Feasibility Studies
- Floodplain & Floodway Mapping
- GIS Services
- Hydrologic & Hydraulic Analysis
- Land Planning Services
- Flood Damage Mitigation Services
- Public Relations
- Stormwater Management Design & Permitting Assistance
- Sustainable Site Design Services
- Topographic Mapping
- Watershed Planning & Management
- Wetland Mitigation Design & Permitting Assistance

Project Details

- Location: Justice, Palos Hills, Hickory, Illinois
- Completion Date: On-Going
- Reference: Jim Yurik 312-751-5600

- V3 is providing engineering services for a stormwater study and master plan for a 12-square-mile area in the Cal-Sag Watershed of southern Cook County, including five separate sub-watersheds. The project goal is to identify and evaluate drainage and flooding problem areas within the study area and recommend alternatives that can provide a 100-year level of protection to all structures, including protection against basement flooding.
- The project includes high-level, conceptual modeling with HEC-RAS and XP-SWMM. One challenge was proper representation of the Lucas Ditch and Lucas Diversion Ditch sub-watersheds, as water crosses back and forth between the watersheds during flood events resulting in "fingers" of floodway that follow the streets through a residential neighborhood.
- The storm sewer systems and other conveyance systems are undersized and there is a lack of storage. Regional flooding associated with the open channels was studied by the Metropolitan Water Reclamation District of Greater Chicago in the 2009 Detailed Watershed Plan. V3 was tasked with reviewing and validating the prior studies, expanding upon the previous studies to achieve a 100-year level of flood protection and developing new alternatives to reach the desired 100-year level of protection
- Alternatives include traditional engineering approaches, and creative green infrastructure and planning recommendations, such as creation of new green space along a corridor with high flood frequency, to provide public recreation and open space in a heavily urban / suburban area and remove the most likely-to-flood properties from the flooding area, with new high density housing elevated beyond the flood fringe
- The stormwater master plan is unique in that it also seeks alternatives on private property. These alternatives included green infrastructure on residential properties, such as rain cisterns and rain gardens; underground storage on commercial, industrial, and institutional properties; and redevelopment of vacant / underutilized properties to create additional opportunities for flood storage
- The project involves public relations and community engagement to encourage the public to be part of the flooding solution, including use of green infrastructure on private properties to reduce stormwater runoff

Oak Park Country Club Stormwater Peer Review

Client: Oak Park Country Club/Village of Elmwood Park

V3 Services

- Hydrologic & Hydraulic Analysis
- Stormwater Peer Review

Project Details

- Location: Elmwood Park, Illinois
- Completion Date: September, 2013
- Reference: Alan Fierst 708-453-7525

- The Village of Elmwood Park and their consultant Christopher B. Burke Engineering, Ltd. developed a village-wide sewer separation plan which included significant storm sewer improvements and storage requirements through the Oak Park County Club. The estimated cost for stormwater improvements on the golf course was $10 million, including pump station, storage excavation, large box culverts and restoration
- The Oak Park Country Club engagedV3 to provide technical review and assistance to represent the rights and concerns of the golf course associated with the stormwater changes
- V3 also assisted with review of construction documents and specifications to confirm that contractors engaged in this project would have the agreed upon restrictions in place for limited use and access to the golf course property
- Original plans for this project included enlarging the golf course tributary to convey runoff through the site during large storm events. This design would have increased flow rates and innundations on the golf course, therefore this design was abandoned and dual three-foot by six-foot box culverts were designed for storm conveyance. A large pump station and storage basin was proposed for the far southeast corner of the golf course property
- V3 worked with the golf course to confirm that the improvements were not an impact to playability, maintenance or aesthetics of the golf course in the long term
- In addition, the Village of Elmwood Park engaged V3 directly to perform a peer review of the Des Plaines River HEC-RAS unsteady flow modeling associated with this project, given concerns of the potential to increase flows and elevations within the Des Plaines River due to this signficant change in current stormwater patterns. V3 performed this detailed review and made various recommendations to consider potential modeling instabilities which appeared in the output. We ultimately confirmed that the impact of this Oak Park Country Club storage and pump station project would have negligible affect on the Des Plaines River

Melvina Ditch Reservoir Expansion

Client: Metropolitan Water Reclamation District of Greater Chicago

V3 Services

- County Permitting Assistance
- Groundwater Studies
- Hydrologic & Hydraulic Analysis
- IDNR-OWR Floodway Permitting Assistance
- Natural Area Planting Design, Specification, Construction & Monitoring
- Pump Station Retrofit
- Drainage Remediation Alternatives Analysis
- Site Investigations
- Alternatives Analysis & Cleanup Strategies
- Stormwater Management Design & Permitting Assistance

Project Details

- Location: Bedford Park, Burbank, Illinois
- Completion Date: On-Going
- Reference: John Murray 312-751-7918

- V3 was selected by the Metropolitan Water Reclamation District of Greater Chicago to perform drainage remediation alternatives analysis for this highly-impacted area of Bedford Park and Burbank
- These communities, totaling an eight-square-mile watershed, had received severe flooding for three consecutive years which caused structural flooding of many residents and businesses. The August 22, 2014 storm event produced 3.6 inches of rain within 40 minutes in this watershed. Existing stormwater storage facilities; Bedford Park Reservoir and Melvina Ditch Reservoir; were overtopped and up to five feet of ponding depth occurred in some of the hardest impacted areas
- V3 provided creative engineering and technology solutions to address the problems, including vertical expansion of the Melvina Ditch Reservoir by retrofitting the existing pump station which minimized the footprint of resident buyouts and created cost effective storage solutions in this urbanized community that has limited open space
- The watershed modeling was completed in XP-SWMM to evaluate the complex flow between surface conveyance throughout the streets and sub-surface flow through the large diameter storm sewers (up to 10-inch). This complex modeling allowed V3 to evaluate timing differences through the watershed and also between the two existing reservoirs to fully evaluate the opportunities and constraints of the system
- V3 identified pump in-efficiencies during peak storm events. The lift station experienced power failure in recent storms, which could potentially be due to these pump in-efficiencies and the draw required to run at peak rates. V3 recommended a gravity outlet structure from the Melvina Ditch Reservoir to handle the peak discharge requirements when water elevations reached a topping level for events which exceed the pump curve for the lift station

Golf Club of Illinois Stormwater Peer Review

Client: Golf Club of Illinois/Village of Algonquin

V3 Services

- Hydrologic & Hydraulic Analysis
- Stormwater Peer Review

Project Details

- Location: Algonquin, Illinois
- Completion Date: February 2014
- Reference: Michael Kerr 847-823-0500

- The Highlands of Algonquin development is adjacent to the Golf Club of Illinois in Algonquin. Due to proposed stormwater modifications in the existing drainage system associated with the roadways next to the golf course and associated with the golf course ponds, the Golf Club of Illinois requested a Stormwater Peer Review be performed by an independent technical consultant
- V3 was contacted by Christopher B. Burke Engineering, Ltd. to provide this stormwater peer review
- V3 performed hydrologic and hydraulic modeling verification, evaluated the construction documents to confirm plans and modeling matched and had two conference calls with the design team and golf club
- Minor modifications to the modeling and construction plans were suggested and V3 ultimately confirmed that the proposed design for the approximately $1 million dollar project met the goals of the project and protected the rights and interests of the Golf Club of Illinois

Elmhurst Stormwater Peer Review

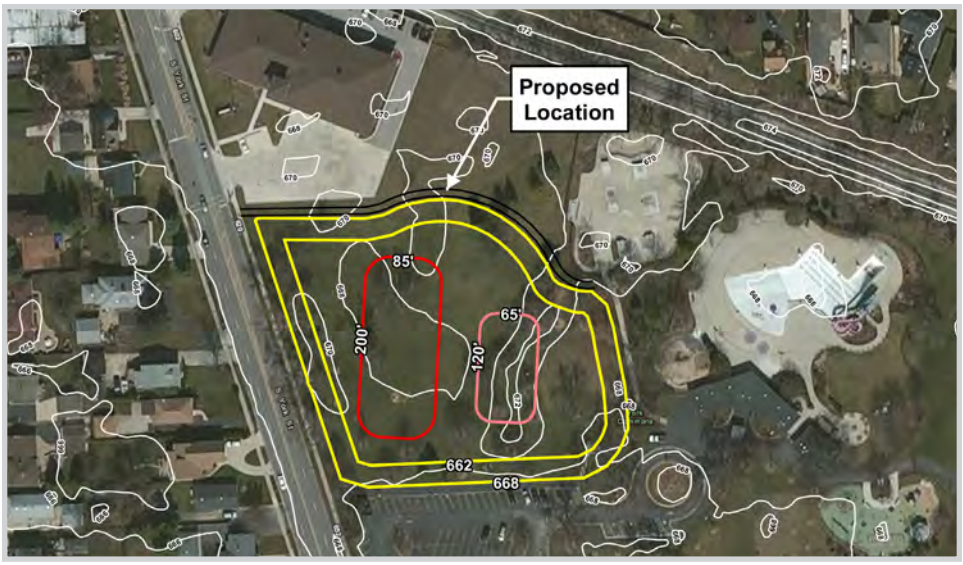
Client: Elmhurst Park District

V3 Services

- Hydrologic & Hydraulic Analysis
- Stormwater Peer Review

Project Details

- Location: Elmhurst, Illinois
- Completion Date: On-Going
- Reference: James Rogers 630-993-8930



- The City of Elmhurst completed a comprehensive flooding plan and storm sewer system analysis (Plan) in 2012. The preferred alternatives of the Plan were estimated to cost between $30-$45 million to implement. A significant portion of the surface storage to accomplish the Plan was located within the open spaces owned and operated by the Elmhurst Park District and the Elmhurst School Distict 205
- V3 was contacted by the Elmhurst Park District to provide stormwater peer review services on behalf of the Park District. The goal of the peer review was to perform a detailed technical review of the proposed modeling and methodology created by Christopher B. Burke Engineering, Ltd. and determine whether the proposed storage improvements in the Park District properties would cause detrimental impacts to the short term and long term core values held by the Park District
- V3 performed technical review of the entire Plan, with specific attention given to the parks where proposed stormwater improvements and storage was proposed by the City. V3 suggested various modifications to the design and function of the storage systems to protect the parks during low flow storm events and achieve drain down of the facilities within 24 hours after a severe storm event
- V3 assisted in interpreting the technical data which was presented by the City and their consultant in a manner that was meaningful to the Park District Board. The cost opinions, which were provided by the City to the Park Distict, were also reviewed and evaluated to provide a clear and distinct comparison of the costs and benefits of the proposed stormwater improvements in each park and for each proposed alternative
- V3 was also recently engaged by the Elmhurst School District 205 to assist in a similar evaluation and technical review of the proposed stormwater alternatives within the School District properties

Elm Road Generating Station
Water Intake Tunnel

Location
Oak Creek, WI

Client
Kenny/Shea, JV
WePower, LLC (Owner)

Project Type
Water Intake Tunnel
Design/Build

Services
Tunnel Design
Geotechnical Design
Hydraulics Design
Structural Design
Construction Inspection

Duration
Start Date: 11/2004
End Date: 8/2008

Construction Cost
$105 million

Owner Reference
Joseph Presser
WE Power, LLC
301 W. Wisconsin Avenue
Suite 600
Milwaukee, WI 53203
T 414.766.7860

Project Description

The Elm Road Generating Station (ERGS) Cooling Water Intake System was part of the design/build subcontract for Bechtel Corporation who is the design/build contractor for the new $2.2 billion We Energies' *Power the Future Program*. The ERGS Cooling Water Intake System was constructed by Kenny/Shea, JV and consists of a lakewater intake tunnel excavated in rock 9,226-foot long, 27'-4" in diameter, of which approximately 2,000 feet is lined to a finished diameter of 25 feet. Also included are two land-based shafts at 26-foot and 18-foot finished diameters as well as a temporary construction shaft at a 30-foot diameter.

In addition, there are four 12-foot diameter steel-lined intake shafts located one mile away from the Lake Michigan shoreline. Each intake shaft is connected to its own 9-foot diameter horizontal steel intake piping and manifold system, including twenty-four 23-foot long by 8-foot diameter zebra-mussel-resistant wedge wire screens. The new water intake tunnel is capable of supplying a total of 2.2 billion gallons per day of cooling water to the existing Oak Creek and new Elm Road power plants.

HMM Role

The Design/Build Team was responsible for all engineering, procurement, and construction necessary to provide the Intake Water Tunnel System. Hatch Mott MacDonald was the designer for the following project elements:

- Shafts and Tunnel
- System Hydraulics
- Vortex Breakers
- Emergency Bypass Dike Wall Structure Stability Analysis
- Emergency Bypass Dike Wall Structure and Gates
- Rip Rap Design for Scour Protection of Intake Screens, Connection Piping, and Dike Wall Structure
- Geotechnical Baseline Report
- Evaluation of Existing Retention Wall
- Evaluation of Water Intake Manifold System Structural Integrity
- Tunnel Lining Assessment

Highlights

- 27'-4" diameter primarily unlined tunnel in hard rock below Lake Michigan
- Combination of drill and blast and TBM for tunnel mining operation
- Tunnel sized to deliver peak capacity of 2.2 billion gallons per day of cooling water
- Dike Wall Stability Analysis for 18 different load cases
- Dike wall structure approximately 250 feet long which contains nine gates to provide cooling water under emergency tunnel bypass conditions
- Difficult marine construction involving dredging, cofferdam construction and underwater work while maintaining cooling water supply to existing Oak Creek Power Plant (OCPP)
- Sunken caisson construction for on-shore mining and OCPP shafts
- After completion of tunnel mining, TBM machine was disassembled underneath Lake Michigan and carried in pieces back to beginning of tunnel for removal.

Mid-Halton WWTP Phase IV-V Expansion Project (Outfall Task)

Location
Oakville, ON

Client
Regional Municipality of Halton

Project Type
Outfall

Services
Preliminary Design
Detailed Design
Construction Administration

Duration
Start Date: April 2010
End Date: August 2017 (estimated)

Construction Cost
$80 million

Owner's Reference
Brenda Kingsmill
Project Manager,
Wastewater Planning
Wastewater Services,
Public Works
1151 Bronte Road,
Oakville, ON L6M 3L1
Tel: 905-825-6000
Ext. 7622
Fax: 905-825-8822
brenda.kingsmill@halton.ca

Project Description

The Region of Halton (Region) engaged the services of Hatch Mott MacDonald (HMM) to provide design and construction services for the Mid-Halton WWTP Phase IV-V Expansion Project in the Town of Oakville Ontario (Town). As part of the project, a new dedicated effluent sewer and outfall pipeline (outfall) will be constructed. The outfall will convey treated effluent from the Mid-Halton WWTP to a diffuser field in Lake Ontario.

The overall length of the outfall will be approximately 6.4km, of which 4.3km will be on-shore, and 2.1km will be offshore. The outfall will be constructed entirely within bedrock by tunnelling methods (tunnel boring machine) and will have a finished internal diameter of approximately 2.6m. At the WWTP, the project will involve construction of a 60m deep drop structure which will also incorporate a micro-hydro installation. The on-shore portion of the outfall will cross under a major highway, the Queen Elizabeth Way (QEW), and traverse environmentally sensitive, developed urban areas within the Town. The diffuser field will be located within the final 300m of the offshore portion of the outfall, under water depths ranging from 26m to 30m.

HMM Role

HMM is the prime consultant for the design and construction administration of this project. Our role encompasses preliminary and detailed design of the outfall, including: coordination of onshore and offshore geotechnical, geophysical and hydrogeological investigations, coordination of archaeological investigations, coordination of assimilative capacity studies, development and selection of outfall plan and profile alignments, development and selection of tunnel shaft and staging areas, coordination of permits and approvals, and preparation of contract documents and drawings, including a geotechnical baseline report. Other services provided by HMM include project management, QA/QC, scheduling control, constructability assessment and cost estimating.

Project Highlights

- HMM's extensive experience in managing complex tunnel projects was of significant benefit to this project
- HMM evaluated several alternative tunnel plan and profile alignments, as well as alternative tunnel shaft sites and staging areas
- Using HMM's expertise in computer modelling, accurate, defensible tunnel infiltration estimates were developed which were key in obtaining approval for the preferred tunnel alignment (which crossed habitat for an endangered species) from regulatory agencies
- Offshore geophysics and bathymetry was used to determine lake bottom conditions and assist in the evaluation of alternative tunnel riser/diffuser construction methods
- HMM supervised project geotechnical investigations, including deep offshore borings in 26m (85ft) to 30m (98ft) water depths
- HMM completed detailed analyses of outfall and diffuser hydraulics, including head losses and CORMIX set up and calibration for dilution modeling/assimilative capacity study
- HMM was responsible for all permitting and regulatory agency negotiations

Sustainability

Euclid Creek Tunnel

Location
Cleveland, OH

Client
Northeast Ohio Regional Sewer District (NEORSD)

Project Type
Combined Sewer Overflow (CSO) Tunnel

Services
Tunnel and Shaft Design, Construction Management

Duration
Start Date: 1/2006
End Date: 4/2015

Construction Cost
Actual: $198,700,000
Planned: $217,000,000

Owner Reference
Mrs. Kellie Rotunno
NEORSD
3900 Euclid Ave.
Cleveland, OH 44115
216.881.6600

Project Description

The Northeast Ohio Regional Sewer District has embarked upon a comprehensive Combined Sewer Overflow (CSO) program totaling approximately $3.0 billion in projects to dramatically reduce the overflows from combined sewers in the entire District service area. The Euclid Creek Tunnel is the first tunnel of the deep storage and conveyance system planned for the Easterly service area. Located on the east side of Cleveland, this project consists of approximately 3.4 miles of 24-foot diameter tunnel constructed with precast concrete segments in shale, five tunnel access shafts (including a 50-ft diameter mining shaft and 50-ft diameter surge chamber), five tunnel flow drop shafts, multiple diversion structures, regulators, gate and gate control structures and 6,300 feet of near-surface consolidation sewers constructed by a combination of microtunneling, open-shield TBM and hand mine tunneling, and open-cut. The project includes detailed surge and steady-state hydraulic modeling, physical modeling of flow drop structures and diversion structures, and associated active inflow controls. Providing over 65 million gallons of storage, this combined sewer overflow (CSO) project will tremendously reduce CSOs to both Euclid Creek and Lake Erie. After storms subside, combined sewer flow from this storage tunnel will be pumped by the Tunnel Dewatering Pump Station (TDPS) to the Easterly Wastewater Treatment Plant for treatment and eventual discharge into Lake Erie.

HMM Role

HMM is the lead consultant responsible for:

- Overall project management
- Overall project administration
- Design of the tunnel lining
- Shafts and adit-to-tunnel design
- Tunnel ventilation design
- Cost estimation
- Risk analysis
- Tunnel Boring Machine (TBM) specifications
- Geotechnical Data and Baseline Reports
- Drawings and Technical Specifications for HMM Designs
- Resident Project Representation and Construction Administration
- Coordination and phasing of work to accommodate shared site use for future pump station, power substation, and future tunnel project

Project Highlights

- Approximately 3.5 miles of 24-ft diameter tunnel 200 feet below grade in bedrock
- Annular grouting through TBM tailshield in bedrock
- 6,300 feet of near-surface consolidation sewers (Microtunneling, Open-shield TBM Tunneling, Hand Mine and Open-cut)
- 40 ft. and 50 ft. Diameter finished tunnel access and surge suppression shafts
- Three additional tunnel access shafts and shaft-to-tunnel adits
- Diversion structures, CSO connection structures, regulators, gate and gate control structures
- Five Baffle-type drop structures (one of which is 32-ft diameter – largest of its kind)

Dugway Storage Tunnel

Location
Cleveland, OH

Client
Northeast Ohio Regional Sewer District (NEORSD)

Project Type
Combined Sewer Overflow (CSO) Tunnel

Services
Tunnel and Shaft Design, Construction Management

Duration
Start date: 2/2013(Design)
End date: 1/2019(Constr.)

Construction Cost
Actual: TBD in 2018
Planned: $196M

Reference
Mrs. Kellie Rotunno
Northeast Ohio Regional Sewer District
3900 Euclid Avenue
Cleveland, OH 44115
T: 216.881.6600

Project Description

The Northeast Ohio Regional Sewer District has embarked upon a comprehensive Combined Sewer Overflow (CSO) program totaling approximately $3.0billion in projects to dramatically reduce the overflows from combined sewers in the entire District service area. The Dugway Storage Tunnel (DST) is the second tunnel of the deep storage and conveyance tunnel system planned for the Easterly service area; with the first being the HMM-designed Euclid Creek Tunnel.

The DST is a combined sewer overflow (CSO) storage tunnel that will reduce CSOs to Lake Erie and its tributaries by providing over 55 million gallons of storage. After storms subside, combined sewer flow from the tunnel will be pumped by the Tunnel Dewatering Pump Station (TDPS) to the Easterly Wastewater Treatment Plant for treatment and eventual discharge into Lake Erie.

Located on the east side of Cleveland, this project consists of approximately 14,800-ft. of 24-ft. diameter tunnel in shale that will be lined with precast concrete segments. The project includes design of seven shafts, with depths up to 240-ft., and ranging in finished diameters from 16- to 50-ft. Five of these shafts will be finished as baffle drop structures to convey flow from the near surface collections system to the tunnel. The near-surface consolidation sewers, with depths ranging from 25- to 55-feet, will be installed via trenchless and open cut methods. Additional near surface facilities includes four gated structures that serve a dual purpose: 1) to regulate flow entering the tunnel, and 2) to screen grit, debris and floatables at the surface prior to entering the deep tunnel.

HMM Role

HMM is working in a Joint Venture with MWH Americas on this project. HMM responsibilities on the JV include:

- Shared project management/administration with JV partner
- Design of the tunnel lining, precast segments and hand-mined sections
- Design of shafts and adit-to-tunnel design
- Tunnel ventilation design
- Cost estimation and scheduling
- Risk analysis
- Drawings and Technical Specifications for HMM Designs
- Coordination and sequencing of work to connect DST tunnel to in-service Euclid Creek Tunnel and Tunnel Dewatering Pump Station
- Geotechnical drilling program development and field logging of data
- Construction administration services

Project Highlights

- Approximately 2.8 miles of 24-ft. diameter tunnel 200 ft. below grade in shale
- Annular grouting through TBM tailshield in bedrock
- Seven deep tunnel shafts, of which five are baffle drop structures
- Hand mined adits ranging in length from 30-ft. to 850-ft.
- Gate structures with solid-capturing capabilities, gate control structures
- Open cut and trenchless near surface sewers ranging in diameter from 42- to 84-inch

37th Street Sewer Improvement

Location
City of Chicago

Client
V3 Companies

Owner
City of Chicago
Dept. of Water Management

Project Type
Wastewater / Water / Trenchless

Services
Construction Management

Duration
Start Date: 5/2014
End Date: 11/2014

Construction Cost
$11,200,000

Construction Completion Date
Anticipated 11/2014

Reference
Martha Ybarra, RE
V3 Companies
7325 Janes Ave.
Woodridge, IL, 60517
T: 630.724.9200
F: 630.724.9202
mybarra@v3co.com

Project Description

The City of Chicago Department of Water Management operates and maintains the supply of water and manages waste and stormwater in Chicago. The 37th Street Sewer Improvement Project increases the combined sewer capacity around the neighborhood on the north side of McKinley Park to reduce the number of storm overflows. Additionally, existing sewers are being relined and new water mains installed. This project is part of the greater $7 billion "Building a New Chicago" project to improve Chicago's overall infrastructure and create jobs.

The project includes trenchless and open-cut construction in heavily trafficked intersections and along narrow streets in residential neighborhoods. At the downstream outlet for the new 84" sewer, the project creates a new connection structure into an existing 100-year old, unreinforced, 12'x14' overflow tunnel.

HMM Role

The scope of the work includes full-time inspection during construction and consulting on the trenchless aspects of the project. During the pre-construction stage, HMM reviewed trenchless submittals and helped to identify project risks. During construction, HMM staff members were key contributors regarding technical aspects associated with the tunnel methods.

Highlights

- Large diameter sewer construction through residential streets and congested commercial areas.
- Sewer connection into an active combined sewer overflow (CSO) tunnel during heavy rain events; surge events happened without warning and increased flow levels from stagnant conditions to 12 feet of water flow
- Pipe jacking 101.5" outside diameter RCP in stiff glacial soils with boulders
- Open-cut and tunneling alongside fragile water lines over 120 years old
- CIPP lining of existing brick sewers
- Open-cut trench installation of 42" to 84" inside diameter RCP up to 35 feet deep
- Street resurfacing
- Water main replacement

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West Branch Muddy Creek, Cincinnati, OH

The Metropolitan Sewer District of Greater Cincinnati (MSDGC) has been engaged in combined sewer overflow (CSO) management virtually since its inception. In 1996, MSDGC completed a CSO Long Term Control Plan (LTCP) fully meeting federal and state requirements. Subsequently, MSDGC entered into negotiations with the government aimed at developing a comprehensive agreement addressing key wet weather issues within its service area. The intent was to produce a fully integrated master Wet Weather Improvement Program (WWIP) including an update of the 1996 CSO LTCP, a Capacity Assurance Program Plan (CAPP) focused on sanitary sewer overflow (SSO) control, sanitary system capacity, and a Water-in-Basement (WIB) Program. With this purpose in mind MSDGC entered into a Partial Consent Decree (Partial CD) in 2002 and a Global Consent Decree (GCD) in 2004 with the federal government, the State of Ohio and with the Ohio River Valley Water Sanitation Commission (ORSANCO). The WWIP identified a bundle of projects, 3WBMU – West Branch Muddy Creek Project Bundle, to eliminate sanitary sewer overflows and control combined sewer overflows tributary to the West Branch Muddy Creek Interceptor and Muddy Creek Interceptor systems. The projects also complement the control of combined sewer overflows tributary to the East Branch Muddy Creek Interceptor and Bender Express Sewer systems.

In December 2008, further data collection and study of the project bundle commenced and culminated in a Final Alternative Analysis Report (AAR) in May 2010 that recommended 24 projects to be constructed over a 15-year period to meet the objectives described above. The total estimated construction cost (2010 dollars) of these projects is $246 million. The projects include the construction of:

- 8.5-foot diameter Conveyance/Storage Tunnel and Pump Station
- Muddy Creek Pump Station Upgrade
- CSO 402 through 406 Regulator Improvements
- West Branch Muddy Creek Interceptor Upgrade
- Muddy Creek Interceptor Rehabilitation and Upsizing
- Addyston Pump Station Elimination
- Extraneous Storm Water Removal at Addyston and Hillside Avenue
- Sustainable Infrastructure in Saylor Park
- CSOs 198, 518, 522 and 523 Dynamic Underflow Control
- Storage at CSO 518

Strategic Value Solutions, Inc.
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Several key agreements and assumptions were fundamental to these projects. The Muddy Creek Interceptor upgrade was sized based on the 2-year, 24-hour design storm flow from the separate sanitary sewers and underflow from CSOs 518, 198 and 522 up to 3.5 times the dry weather flow rate. The proposed dynamic underflow control on the Muddy Creek Interceptor will allow for throttling the underflow from the CSOs to below 3.5 times dry weather flow during extreme events thereby providing more interceptor capacity for tributary flows from the separate sanitary sewer areas above a 2-year, 24-hour design storm.

The West Branch Muddy Creek Interceptor upgrade was sized based upon a peak discharge of 10 MGD from the Muddy Creek Pump Station and the peak underflow from CSOs 402, 403, 404, 405 and 406. Other system components such as pump stations and treatment facilities are also sized based on the 2-year, 24-hour design storm.

The value team generated 68 ideas and developed 13 of these ideas into value alternatives. After developing these ideas, the team found what they thought to be the optimum combination of alternatives. Since some alternatives could not work in combination with the others, four combinations of alternatives were presented. Option 1 optimizes alternatives based on the tunnel from Muddy Creek to the Plant. Option 2 optimizes the use and consolidation of CEHRTs. Option 3 develops an alternative to replace the Upper Muddy Creek Interceptor Upgrade with a tunnel. Option 4 optimizes a revised tunnel alignment and replaces the West Branch Muddy Creek Interceptor Upsizing with a tunnel. These combinations resulted in savings of $12 million, $70 million, $23 million, and $7 million, respectively.

Reference Information: Ali Bahar 513-557-7165

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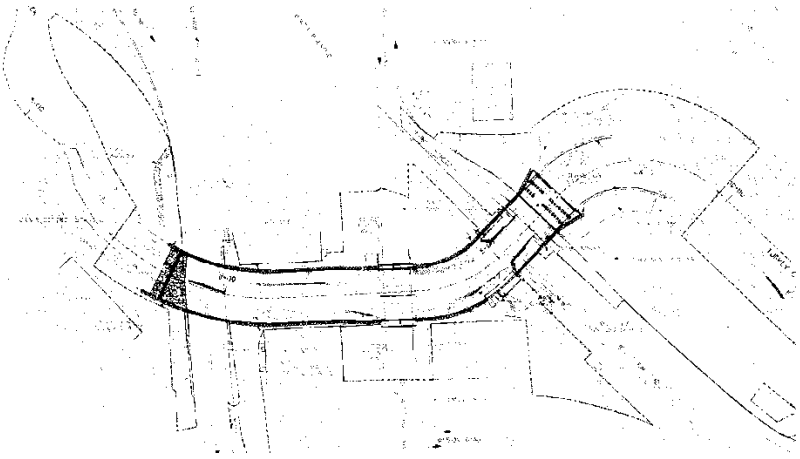
Hillside Interceptors, Kansas City, MO

SVS conducted two value engineering studies on the Kansas and Missouri Hillside Interceptors which are part of the larger Turkey Creek Flood Damage Reduction Program. Both studies were conducted on the Locally Preferred Plan presented in the Feasibility Study. These projects are designed to capture runoff in the upper portion of the watershed before it can flood commercial and residential development in the western portion of downtown Kansas City, Missouri.

The first study was conducted on the Kansas Hillside Interceptor system which is comprised of three stormwater interceptors to be constructed at an estimated cost of $9 million. The Mission Road Interceptor uses 520 feet of 60-inch RCP and 1,135 feet of 78-inch RCP. The Cherokee Street Interceptor uses 1,863 feet of 72-inch RCP. The Rainbow Boulevard Interceptor uses 106 feet of 78-inch RCP and 763 feet of 96-inch RCP. These interceptors are designed to capture the 25-year stormwater runoff from a steep hillside that generates velocities approaching 22 fps. The alignments are through an urbanized area with numerous utility conflicts, roadway crossings, and railroad crossings. The value study resulted in recommendations to create detention on the upper ends of the interceptors and to improve inlet conditions on existing conveyance systems resulting in potentially $7 million in savings.

The second study was conducted on the $21.6 million Missouri Hillside Interceptor system which is comprised of three new stormwater interceptors that will convey up to 3,300 cfs through a series of RCP pipes ranging in size from 30-inch to 168-inch. The value study presented three possible scenarios to the City of Kansas City and the Corps of Engineers; one to use a detention based solution that would save $9.2 million, one to use a tunnel based solution that would save $3 million but would increase the level of protection from a 15-year storm to a 100-year storm, and then a combination of ideas to optimize the original piped solution that would save $7.5 million.



Reference: Melissa Corkill 816-389-3697

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Fall Creek / White River Tunnel System, Indianapolis, IN

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In the central part of Indianapolis, within the combined sewer system, even a light rain storm can cause raw sewage to overflow and pollute Indianapolis waterways. Citizens Water is working to reduce raw sewage overflows to neighborhood streams. The backbone of Citizens' plan is the Fall Creek/White River Deep Storage Tunnel.

Citizens will extend the deep underground tunnel along Fall Creek and White River to capture combined sewer overflows and carry raw sewage and polluted stormwater to Citizens' Southport Advanced Wastewater Treatment Plant in southern Marion County.

New sewers along White River, Fall Creek, Pogues Run, Pleasant Run, and Bean Creek will connect with the tunnel, enabling Indianapolis to substantially reduce sewage overflows in all affected neighborhoods.

At more than 200 feet below ground, the entire 18-foot diameter deep tunnel will store more than 200 million gallons of sewage during and after wet weather, then slowly release the sewage to the wastewater treatment plant when capacity becomes available.

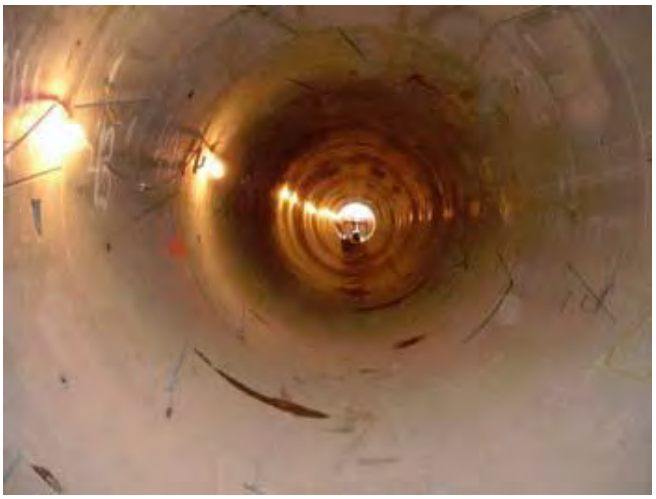
The tunnel system will be built in bedrock below the city using a specialized piece of equipment called a tunnel-boring machine. After the boring is complete a concrete liner will be installed in the tunnel. The lining will help keep groundwater out and keep sewage in the tunnel. By using the deep tunnel technology, disturbances to neighborhoods along the project route will be reduced.

The Fall Creek/White River deep tunnel will extend approximately 8.6 miles, beginning near the Indiana State Fairgrounds on the north, generally running parallel to Fall Creek and White River, and ending near the intersection of West Street and White River Parkway where it will join the Deep Rock Tunnel Connector project. The exact route of the tunnel is being determined during the design of the project to ensure long-term environmental and economic benefits.

The Fall Creek/White River Tunnel project will connect to the Deep Rock Tunnel Connector, which is the first phase of the tunnel system and is currently under construction. Recent negotiations with the U.S. Environmental Protection Agency

Fall Creek / White River Tunnel System, Indianapolis, IN

(EPA) and Indiana Department of Environmental Management (IDEM) will allow Citizens Water to save more than $700 million on the consent decree, and projects also will be constructed years ahead of the original schedule.



Facility planning for the Fall Creek/White River tunnel concluded in November 2009. During this phase, additional geotechnical studies were conducted to evaluate the bedrock and other groundwater conditions.

The project design phase is underway using all the findings of the facility planning process.

Construction of the Fall Creek/White River Tunnel is expected to begin by 2016 and be completed by 2025.

For more information, visit our Web site at www.CitizensWater.com and click on Projects/Indianapolis Storage Tunnel in the upper menu.

Deep tunnels are a proven technology. A number of large cities have built or are planning deep tunnels to reduce sewage overflows, including Chicago, Milwaukee, Cleveland and Columbus, Ohio.

Total savings is pending for the project cost savings.

Reference: Maceo Lewis 317-570-8331

Grade Control Structure-Blue River Channel, Kansas City, MO

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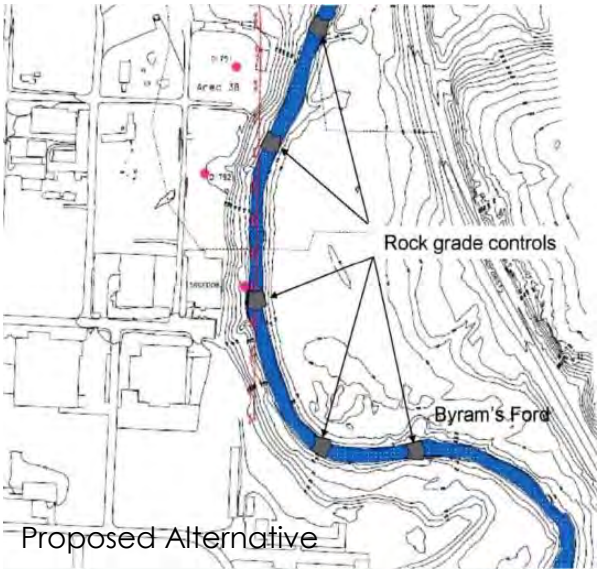
The Blue River Grade Control Value Engineering Study is the winner of the Alphonse J. Dell'Isola Award for Outstanding Accomplishment in Construction. The study was undertaken at 90 percent Design for the US Army Corps of Engineers, Kansas City District. A grade control structure (GCS) was needed to control the hydraulic gradeline between the improved and the unimproved channel. The City of Kansas City, the Corps of Engineers, the Monnett Battle of Westport Fund, Inc., and the Byram's Ford Industrial Park agreed through Alternative Disputes Resolution that the flow of water through Byram's Ford will be restored to pre-project conditions.



Proposed Alternative

The original concept was a large concrete weir that cascades the flow in a controlled manner by dissipating energy within a concrete stilling basin and reduces the flow downstream thereby preventing erosion. The upstream headwall was a 160-foot long weir. The stilling basin was 160 feet long and contained ten 8-foot x 8-foot baffle blocks. The stilling basin sidewalls were 56.4 feet tall by 127.5 feet long and 7 feet thick at the base. The upstream tie-back walls extended out from each side of the structure 152 feet. The channel was 160 feet wide from the end sill wall of the GCS and extended 160 feet downstream from the sill wall with both 24-inch and 18-inch thick riprap. The channel then transitioned from 160 feet to 24 feet wide over 260 feet. The project continued with an improved channel for the next 696 feet where it transitioned back to the original low-flow channel bottom width.


Concept at Original 90 percent design

Using Function Analysis System Technique (FAST) diagramming, the value team defined the higher order functions as preserve battlefield and protect channel. The basic functions of this project are managing scour, managing headcutting and stabilizing bank. The key secondary function that supported these basic functions included controlling velocity and resist erosion. Analysis of the required functions helped the team focus on the mission of the project and, consequently, to identify alternative concepts that would meet the mission while exploring opportunities for

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value enhancement.
Analyzing the functions of this project revealed the following insights:

- The structure was designed to control velocity upstream to pre-project conditions which, in turn, aided in managing the headcutting at the battlefield location and managing scour along the river banks. However, it would have caused flooding in areas previously dry since the headcut.
- Overbank scouring is not a concern. Undercutting the toe of the banks is the chief concern.
- The project had two missions: to preserve the battlefield and protect the channel.

The breakthrough for this project came from a complete understanding of the project from the higher order functions through the secondary functions.

Once the functional requirements were clear, the Value Team transitioned to the Creative Phase of the workshop and brainstormed on all of the possible ways to accomplish each of those functions. The team generated 121 ideas for potential changes to the current design. Ten of these ideas were selected for development into Value Alternatives.

The concept proposed by the Value Team was to replace the large concrete GCS with 19 small rock grade control structures, changing channel geometry and selected bank protection from 63rd Street to Brush Creek by using applied fluvial geomorphology to mimic the natural methods for distributing and dissipating energy and use soil bioengineering and other bank strengthening methods to limit erosion and damage in the Byram's Ford Battlefield area. The team analyzed the proposed changes to the channel during the workshop.

The team performed a preliminary fluvial geomorphic analysis based on aerial photographs from Google Earth, the results from the designers' HEC-RAS analysis, information from project documents and personal experience in the Kansas City region. The USACE and the project stakeholders accepted the Value Team's recommendations, pulled the project at 90 percent design completion, and redesigned the project using the VE recommendations as a starting point.

The original design had an estimated construction cost of $40,270,000. The awarded amount for the redesigned grade controls design based on the VE recommendations was $5,528,550, a savings of 86 percent. Additionally, the rock grade controls improved river recreation, improved river ecology, enhanced the historic battlefield site and lowered risk and maintenance for the project's sponsor by eliminating concrete walls over 50 feet high. Reference: John Holm 816-389-3111

Section 5
Project Understanding & Approach

PROJECT UNDERSTANDING & APPROACH

V3 has assembled a team of experts in the field of hydrology & hydraulics, tunneling, cost estimating and Value Engineering to assist the Village of Winnetka with the Willow Road Stormwater Tunnel and Area Drainage Improvement (STADI) project. V3 will be the prime consultant for this project and lead the technical review of the stormwater reports, preliminary construction plans and cost estimates. Hatch Mott McDonald will bring their tunneling expertise to the V3 team and be responsible for the tunneling technical review and cost estimating. In addition, Strategic Value Solutions will provide certified Value Engineering expertise and lead the certified workshop under the practices as identified by S.A.V.E. International. The following is the V3 Team's understanding and approach for the Willow Road STADI project.

In addition to providing expertise in hydrology and hydraulics, V3 Companies self-performs earthwork and underground contracting. Therefore, our professional construction experts will work directly with the technical review team on this project evaluation.

Project Understanding

The V3 team understands that the Village of Winnetka had engaged Christopher B. Burke Engineering, Ltd (CBBEL) to perform a concept analysis and flood reduction study in 2011. This study provided various options for remediating 100-year drainage problems within the Village and identified preferred solutions for five problem areas including North Willow Road, South Willow Road, Provident Avenue, Cherry Street Outlet and Winnetka Avenue Underpass. The preferred solutions were estimated to cost approximately $35 million. In a subsequent phase of the project, the Village engaged Montgomery Watson Harza (MWH) to complete a technical review of the CBBEL concept study and preferred solutions, develop a preliminary design report and prepare supporting 30% construction documents. The MWW deliverables were completed in April, 2015 and the cost for the Willow Road STADI project at this stage is estimated at approximately $59 million.

Given the $24 million discrepancy in costs between the CBBEL and MWH designs and cost opinions, the Village of Winnetka is requesting proposals from qualified independent consultants to complete a thorough review of the technical basis for the project, the resulting preferred solutions, and updated project cost estimates. In addition, the Village would like to perform a Value Engineering workshop, under the guidelines of S.A.V.E. International, to creatively evaluate different options to provide desired level of flood protection for these five problem areas in the Village of Winnetka.

Project Approach

Technical & Cost Review: As demonstrated within the project team section of this response, the V3 team has completed similar design review and Value Engineering projects, and can perform these similar services for the Village of Winnetka. Technical experts in each field (hydrology & hydraulics, tunneling, cost estimating, etc.) will be applied to each work task of this Value Engineering project. These technical experts may be supported by additional staff, but the primary evaluation and review will occur at the professional expert level. The goal of this technical review is to confirm/deny design technical and cost aspects of the project, and prepare fully for the value engineering workshop, if the Village decides to proceed to Phase II. The V3 team Project Manager will be responsible for allocating work tasks and resources to achieve the goals of this project and for completing a thorough evaluation of key project issues.

Value Engineering: The V3 team will utilize our knowledge of hydrology, hydraulics and tunneling to look at various creative storage and conveyance alternatives that may be available to the Village. These alternatives will look at all aspects of local stormwater solutions (storage and conveyance), along with regional solutions (conveyance and tunneling), to look at remediating the specific issues within the five identified problem areas in the Village. The V3 team and the Value Engineering leader will engage the Village staff and design team to challenge assumptions, push the limits of analysis, think creatively and develop unique solutions that will address the goals of the project.

PROJECT UNDERSTANDING & APPROACH

The V3 Team will perform the following for the Village of Winnetka:

PHASE I – TECHNICAL AND COST OPINION REVIEW

1. Review of Previous Engineering and Supporting Data

    a. V3 will perform cursory review of Items 1, 2 and 4 on Page 5 and Page 6 of the RFP to evaluate the previously completed work product for key decision points, resulting solutions and estimated costs. These Items provide the starting point for the MWH contract and form the basis for the project.
    b. Potential solutions that were identified in the concept stage and could bring value to the Village, but were excluded from further investigation will be reviewed.
    c. The V3 team will provide a memorandum for this technical review of the concept stage of the Willow Road STADI project which identifies key design decisions.

2. Review of Preliminary Design Report and Technical Memoranda

    a. Items 5, 6 and 7 of Page 5 and Page 6 of the RFP will be reviewed by the V3 team to evaluate the 30% design stage of the project and the cost estimates.
    b. The V3 team will provide a memorandum for this technical review of the 30% stage of the Willow Road STADI project which identifies all key technical assumptions, critical design decisions and any obvious discrepancies or oversights identified.

3. Cost Estimate Analysis and Conclusions

    a. The professional estimators at V3 will provide independent review of the cost estimates prepared to date for the Willow Road STADI project. The V3 professional estimators are involved in contractor level bid preparation of over $100 million in construction bids each year.

    b. The HMM team will utilize their industry leading tunnel estimating information for this project. TED (Tunnel Estimating Database) is a tunnel and shaft construction cost estimating system which is unique to HMM, and which has an excellent track record of producing estimates close to the winning bid on many projects. All estimates produced on TED, are available to our clients in the form of summary sheets which list labor, equipment, consumables, materials, unit rates, advance rates, and the associated cost of each element of work.

    c. The V3 team will provide a summary of assumptions, quantities, calculations, productivity rates, materials, labor and other costs and will provide a narrative describing areas where additional data may be needed to refine the cost estimate for the Willow Road STADI project.

Deliverables

a. Technical review memoranda of all Village provided documents
b. Detailed cost estimates
c. Work product developed by V3 team
d. Digital data of all files in source file and PDF format

PHASE II – VALUE ENGINEERING STUDY

1. Pre-Workshop Activities

    a. The team leader will work with the V3 team, the Village and the design team to distribute the required documents for review in advance of the workshop and schedule tasks and meetings to review technical questions and concerns.
    b. The technical review by workshop participants shall match the anticipated time of 10-12 hours and the cost review by workshop participants shall match the anticipated time of 20-24 hours.

2. Value Engineering Workshop

    a. A five day workshop will be conducted under the principles of the S.A.V.E. International.
    b. The workshop will focus on developing creative strategies to achieving the project goals, while minimizing cost of the project.
    c. The Village will describe the goals of the project and any constraints on the design
    d. The design team will present the design and how it meets the goals of the project.
    e. The Value Engineering workshop will engage the independent review team with the Village and design teams to achieve creative solutions for addressing the flooding problems in the five impacted areas.
    f. Key Village decision makers will provide input before development of recommendations.
    g. A final presentation will be given on the last day of the workshop with recommendations.

3. Post-Workshop Activities
    a. The V3 team will conduct a post-workshop study session with the Village decision makers to evaluate the designer responses. The V3 team will assist the Village in accepting or rejecting individual solutions and value propositions.

Deliverables

a. Preliminary Value Engineering Workshop Report
b. Draft Final Value Engineering Report
c. Final Value Engineering Report
d. Work product developed by V3 team
e. Digital data of all files in source file and PDF format

SCHEDULE

1. Notice to Proceed	June 1, 2015
PHASE I	
2. Task 1 – Review of Concept Design Data	June 1 – June 12, 2015
3. Task 2 – Review of 30% Preliminary Design Reports	June 15 – June 26, 2015
4. Task 3 – Cost Estimate Analysis and Conclusions	June 1 – June 26, 2015
PHASE II	
5. Task 1 – Pre-Workshop Activities	June 29 – July 10, 2015
6. Task 2 – Value Engineering Workshop	July 13 – July 17, 2015 (TBD)
7. Task 3 – Post Workshop Activities	July 20 – July 31, 2015
8. Task 3 – Post Workshop Decision Meeting	July 29 (TBD)
9. Task 4 – VE Summary and Conclusions	July 30 – Aug 21, 2015

Section 6
Affidavit

ATTACHMENT 1

COMPLIANCE AFFIDAVIT

As a condition of entering into a contract with the Village of Winnetka, and under oath and penalty of perjury and possible termination of contract rights and debarment, the undersigned deposes and states that he has the authority to make any certifications required by this Affidavit on behalf of the bidder, and that all information contained in this Affidavit is true and correct in both substance and fact.

Section 1: BID RIGGING AND ROTATING

1. This bid is not made in the interest of, or on behalf of an undisclosed person, partnership, company, association, organization or corporation;

2. The bidder has not in any manner directly or indirectly sought by communication, consultation or agreement with anyone to fix the bid price of any bidder, or to fix any overhead profit or cost element of their bid price or that of any other bidder, or to secure any advantage against the Village of Winnetka or anyone interested in the proper contract;

3. This bid is genuine and not collusive or sham;

4. The prices, breakdowns of prices and all the contents quoted in this bid have not knowingly been disclosed by the bidder directly or indirectly to any other bidder or any competitor prior to the bid opening;

5. All statements contained in this bid are true;

6. No attempt has been or will be made by the bidder to induce any other person or firm to submit a false or sham bid;

7. No attempt has been or will be made by the bidder to induce any other person or firm to submit or not submit a bid for the purpose of restricting competition;

8. The undersigned on behalf of the entity making this proposal or bid certifies the bidder has never been convicted for a violation of State laws prohibiting bid rigging or rotating.

Section 2: TAX COMPLIANCE

1. The undersigned on behalf of the entity making this proposal or bid certifies that neither the undersigned nor the entity is barred from contracting with the Village of Winnetka because of any delinquency in the payment of any tax administered by the State of Illinois, Department of Revenue, unless the undersigned or the entity is contesting, in accordance with the procedures established by the appropriate revenue

act, liability of the tax or the amount of tax;

2. The undersigned or the entity making this proposal or bid understands that making a false statement regarding delinquency of taxes is a Class A Misdemeanor and in addition voids the contract and allows the municipality to recover all amounts paid to the entity under the contract in civil action.

Section 3: EQUAL EMPLOYMENT OPPORTUNITY

This EQUAL OPPORTUNITY CLAUSE is required by the Illinois Human Rights Act, 775 ILCS 5/101 et seq.

In the event of the contractor's non-compliance with any provision of the Equal Employment Opportunity Clause, the Illinois Human Rights Act, or the Rules and Regulations for Public Contracts of the Department of Human Rights, the contractor may be declared non-responsive and therefore ineligible for future contractor subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be canceled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies involved as provided by statute or regulations.

During the performance of this contract, the contractor agrees:

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or woman are underutilized and will take appropriate action to rectify any such underutilization;

2. That, if it hires additional employees in order to perform this contract, or any portion hereof, it will determine the availability (in accordance with the Department's Rules and Regulations for Public Contract's) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized;

3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, marital status, national origin or ancestry, age, physical or mental handicap unrelated to ability, or an unfavorable discharge from military service.

4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other such agreement or understanding, a notice advising such labor organization or representative of the contractor's obligation under the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contract. If any such labor organization or representative fails or refuses to cooperate with the contractor in its efforts to comply with such Act and Rules and Regulations, the contractor will promptly so notify the Department and

contracting agency will recruit employees from other sources when needed to fulfill its obligation hereunder.

5. That it will submit reports as required by the Department's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Department or contracting agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations for Public Contracts.

6. That it will permit access to all relevant books, records, accounts, and work sites by personnel of the contracting agency and the Department for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Departments Rules and Regulations for Public Contracts.

7. That it will include verbatim or by reference the provisions of this Equal Opportunity Clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so such provisions will be binding upon such subcontractor. In the same manner as the other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by such subcontractors; and further it will promptly notify the Department in the event any subcontractor fails or refuses to comply therewith. In addition, the contractor will not utilize any subcontractor declared by the Illinois Human Rights Department to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

Section 4: ILLINOIS DRUG FREE WORK PLACE ACT

The undersigned will publish a statement:

1. Notifying employees that the unlawful manufacture, distribution, dispensation, possession, or a use of a controlled substance is prohibited in the work place;

2. Specifying the actions that will be taken against employees for violating this provision;

3. Notifying the employees that, as a condition of their employment to do work under the contract with the Village of Winnetka, the employee will:

    A. Abide by the terms of the statement;

    B. Notify the undersigned of any criminal drug statute conviction for a violation occurring in the work place not later than five (5) days after such a conviction.

4. Establishing a drug free awareness program to inform employees about:

    A. The dangers of drug abuse in the work place;

B. The policy of maintaining a drug-free work place;

C. Any available drug counseling, rehabilitation or employee assistance programs;

D. The penalties that may be imposed upon an employee for drug violations.

5. The undersigned shall provide a copy of the required statement to each employee engaged in the performance of the contract with the Village of Winnetka, and shall post the statement in a prominent place in the work place.

6. The undersigned will notify the Village of Winnetka within ten (10) days of receiving notice of an employee's conviction.

7. Make a good faith effort to maintain a drug free work place through the implementation of these policies.

8. The undersigned further affirms that within thirty (30) days after receiving notice of a conviction of a violation of the criminal drug statute occurring in the work place he shall:

A. Take appropriate action against such employee up to and including termination; or

B. Require the employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.

Section 5: SEXUAL HARRASSMENT POLICY

The undersigned on behalf of the entity making this proposal or bid certifies that a written sexual harassment policy is in place pursuant to Public Act 87-1257, effective July 1, 1993, 775 ILCS 5/2-105 (A).

This Act has been amended to provide that every party to a public contract must have written sexual harassment policies that include, at a minimum, the following information:

1. The illegality of sexual harassment;

2. The definition of sexual harassment under State law;

3. A description of sexual harassment, utilizing examples;

4. The vendor's internal complaint process, including penalties;

5. The legal recourse, investigative and complaint process available through the Department of Human Rights, and the Human Rights Commission;

6. Directions on how to contact the Department and Commission;

7. Protection against retaliation as provided by 6-101 of the Act.

Section 6: VENDOR INFORMATION

1. Is the bidder a publicly traded company? (yes or no) No
If the answer is yes, state the number of outstanding shares in each class of stock. Provide the name of the market or exchange on which the company's stock is traded.

_____

_____

_____

_____

2. Is the bidder 50% or more owned by a publicly traded company? (yes or no) No

If the answer to the above question is yes, name the publicly traded company or companies owning 50% or more of your stock, state the number of outstanding shares in each class of stock and provide the name of the market or exchange on which the stock of such company or companies is traded.

_____

_____

_____

_____

IT IS EXPRESSLY UNDERSTOOD THAT THE FOREGOING STATEMENTS AND REPRESENTATIONS AND PROMISES ARE MADE AS A CONDITION TO THE RIGHT OF THE BIDDER TO RECEIVE PAYMENT UNDER ANY AWARD MADE UNDER THE TERMS AND PROVISIONS OF THIS BID.

SIGNATURE: _____

NAME: Robin L. Petroelje TITLE: President
(print or type)

Subscribed and sworn to me this 18 day of May, ~~2012~~ 2015, A.D.

By: _____
(Notary Public)

OFFICIAL SEAL
KATHY JO FYTEN
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 02/23/2018

State of Illinois
County of DuPage

UNITED STATES | HAITI | CANADA

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Village of Winnetka

Independent Cost and Value Engineering
Review of Stormwater Improvement Program
Willow Tunnel Area Drainage

Improvement Project

Project Fee

		Labor Hours											Total By Task	
		V3 Companies						HMM		SVS				
	Task	Admin. Assistant	Greg Walterstorff, Project Manager & Hydrology/Hydraulics Expert	Christian Smith, Water Resources Expert	Chris Hanchett, Project Engineer	Tom Foster & Mike Warning, Cost Estimators	CADD Tech. I	Mike Vitale, Tunnel Design/Construction Expert	Ben DiFiore, Trenched/Trenchless Sewer Design/Construction Expert/Cost Estimator	John Robinson, VE Team Leader	Shawna Chaney, VE Team Administrative Assistant	Direct Costs (Travel, Per Diem, Printing...)	Man-hours	Labor Cost
	Phase I													
1.1	Review Previous Engineering and Supporting Data		1	8				1	4				14	$ 2,692.00
1.2	Review of Preliminary Design Report and Technical Memoranda	8	8	20	20		8	4	8				76	$ 11,608.00
1.3	Independent Cost Estimate, Conclusions and Report		16		16	56		4	56			$1,000.00	148	$ 18,408.00
	Phase I Subtotal	8	25	28	36	56	8	9	68			$1,000.00	238	$ 32,708.00
	Phase II													
2.1	Pre-Workshop Activities		10			10		10	10	16	16	$1,000.00	72	$ 12,102.00
2.2	VE Workshop		44			44		44	44	48	48	$9,000.00	272	$ 46,484.00
2.3	Post Workshop Activities		8					8				$3,000.00	16	$ 4,096.00
2.4	Summary of Value Engineering and Conclusions		8							38	32		78	$ 12,614.00
	Phase II Subtotal	0	70	0	0	54	0	62	54	102	96	$13,000.00	438	$ 75,296.00
	Phase I & Phase II Totals	**8**	**95**	**28**	**36**	**110**	**8**	**71**	**122**	**102**	**96**	**$14,000.00**	**676**	$ 108,004.00
	Hourly Billing Rate:	$65.00	$200.00	$190.00	$120.00	$50.00	$90.00	$312.00	$165.00	$225.00	$77.00			
	Total:	$520	$19,000	$5,320	$4,320	$5,500	$720	$22,152	$20,130	$22,950	$7,392	$108,004		
		$35,380						$42,282		$30,342				
												Salary Cost		$108,004.00
												Direct Costs		$14,000.00
												Total Cost		$122,004.00

5/27/2015