Professional

Engineering

Services

Stormwater Management Study:

Evaluation of Stormwater Management Improvements and Alternatives for Western and Southwestern Winnetka

RFP #015-013

Proposal for

Village of Winnetka

August 7, 2015

STRAND ASSOCIATES®

Strand Associates, Inc.®
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August 7, 2015

Nicholas Mostardo
Financial Services Coordinator
Village of Winnetka
510 Green Bay Road
Winnetka, IL 60093

Re: Proposal for Stormwater Management Study: Evaluation of Stormwater Management Improvements and Alternatives for Western and Southwestern Winnetka

Dear Mr. Mostardo:

We are very excited about this opportunity to submit our proposal for Winnetka's Stormwater Management Study. We have been following Winnetka's stormwater and flood control efforts for several years now and are confident that our unique experience and proven approach will successfully align with the goals and objectives of the Village Staff and Council.

The Strand Team works collaboratively with stormwater clients across the Midwest to develop creative and unique solutions to stormwater management issues. We have assembled a team of highly qualified experts who have a history of successfully evaluating and developing appropriate stormwater management measures for communities similar to Winnetka.

We are confident that through implementation of our proposed approach, our team will identify reliable and community specific alternatives to achieve Winnetka's stormwater management goals and maximize community benefits.

Thank you for your consideration of this proposal.

Sincerely,

STRAND ASSOCIATES, INC. ®

Michael R. Waldron, P.E.
Senior Associate

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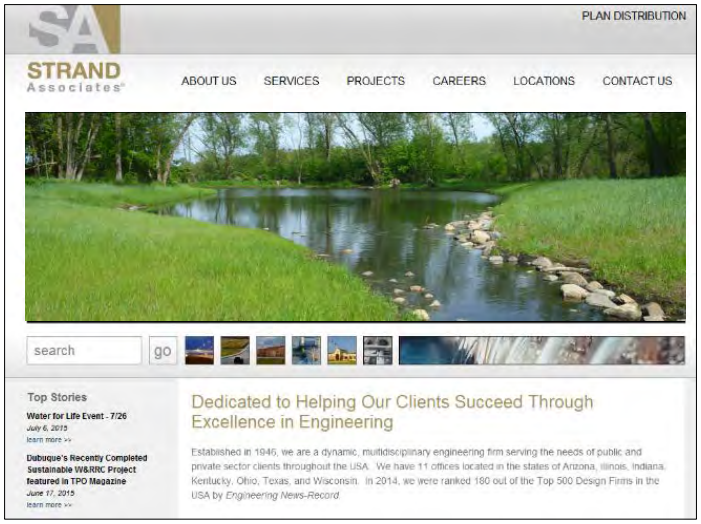
A. CONSULTANT INFORMATION

A. CONSULTANT INFORMATION

More Than 69 Years of Engineering Service Signifies Our Organizational Strength and Commitment to Quality

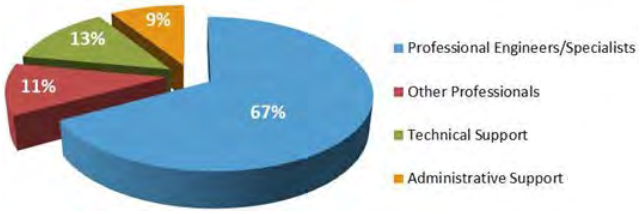
The Strand consultancy provides specialized services in the fields of civil and environmental engineering. Since 1946, we have been helping clients resolve their complex needs in the areas of transportation, municipal, wastewater, and water supply engineering. This has enabled us to build a solid reputation for quality people and engineering that extends throughout the Midwest. We attribute our organizational strength to effective management with our talented engineers and scientists, and most of all, commitment to nurturing long-term client relationships. Reflecting back on 69 years of operation, however, we understand that it is the confidence our clients place in us that has made us successful.



Additional information can be found on our web site at:
www.strand.com

Our Corporate Mission states that we are *"dedicated to helping our clients succeed through excellence in engineering"*. In accordance with this mission, we are continually expanding our staff and service offerings to broaden our base of experience and knowledge so that we can provide more creative and comprehensive solutions to meet our clients' ever changing needs.

Our expertise covers the full spectrum of elements included in today's more complex civil and environmental projects, such as planning and feasibility studies, environmental assessments and impact statements, public outreach programs, regulatory agency coordination, construction engineering and administration, and overall project management. These skillsets enable us to easily adapt our services in accordance with the unique circumstances each project presents.



To serve our national client-base effectively, we have 11 offices throughout the country including offices in Columbus, and Cincinnati, Ohio; Indianapolis and Columbus, Indiana; Lexington and Louisville, Kentucky; Joliet, Illinois; Madison and Milwaukee, Wisconsin; and Phoenix, Arizona. Our expert staff of 380 employees represents the academic backgrounds and experience of all disciplines normally necessary to successfully complete a project. More than 60 colleges and universities are represented on our staff. Impressively, our engineers have an average of more than 10 years of experience and the majority are licensed and/or have advanced degrees.

Human Nature, Inc. has worked with Strand in numerous communities on identifying, designing, evaluating, and constructing sustainable solutions to provide urban stormwater management. These clients include the City of Springfield, the Northeast Ohio Regional Sewer District, the Metropolitan Sewer District of Greater Cincinnati, the City of Springfield, Sanitation District No. 1 of Northern Kentucky, the City of Blue Ash, the University of Cincinnati, the City of Euclid and the Louisville Metropolitan Sewer District. Human Nature's diverse planning and place-specific design experience allows them to approach projects in non-traditional ways. They help clients develop a vision of ecological health and culturally expressive landscapes. In this context, they encourage collaborative partnerships between man and nature, among allied professionals, and among consultants and clients. The experience of Human Nature's multi-disciplinary design team represents tremendous value to the Village and allows us to provide a full spectrum of professional planning and design services that we believe is unique from other engineering firms.

Human Nature provides analysis, planning, design, and management services to our client base of municipal, institutional, commercial and private clients. They employ these services in a variety of public projects – including regional and watershed planning; green infrastructure planning and design; sustainable development; parks and open space design; public art; natural resource preservation and restoration. They utilize planning, GIS mapping, data management and analysis, and graphic design to enhance the quality of products and services. Human Nature has led and provided a supporting role in Public Engagement as one of the hallmarks of their firm. By fully engaging the public and stakeholders through the planning and design process the solutions are better supported by the constituents therefore leading to implementation and funding. They are very adept at producing clear graphic representations of often complex engineering problems and solutions. Clients depend on the Strand and Human Nature team for our creativity, technical expertise, our emphasis on community interaction and participation, our leading edge technologies, and perhaps most importantly, our holistic approach to site design.

Also joining our team is **Upland Design. Ltd**. Upland Design staff is made up of landscape architects and horticulturists with expertise in public parks, forest preserves, and site planning. The expertise they bring to the Strand team is in their relevant experience and relationship with the Forest Preserve District of Cook County and the Winnetka Park District. Upland Design is currently providing design services to the Forest Preserve and have a strong relationship with Chris Slattery, the District Director of Planning and Development. Upland Design staff are also familiar to the Winnetka Park District and have a good relationship with their Director, Bob Smith. It's their intimate understanding of each agency's values and goals relative to the use and promotion of their preserves and properties that will help our team to identify stormwater and flood control alternatives pleasing to the Districts and in line with their objectives.

COMPANY OFFICES

Our Project Manager/Client Liaison, Michael Waldron, is located in Strand's Joliet, IL office, which will allow us be responsive and prompt in service to the Village of Winnetka's needs. The Project Manager will receive technical and SWMM modeling assistance from our assigned team members located in Madison, WI. Our stormwater planning efforts will be provided by our assigned team members from Joliet, IL and Cincinnati, OH offices. We have pulled our key staff from three of our offices in order to provide Winnetka with our firm's stormwater experts. Our inter-office team members frequently work together efficiently and effectively. Human Nature staff are based out of Cincinnati, Ohio and Upland Design staff are based out of Plainfield, Illinois.

Joliet, IL Office

Madison, WI Office

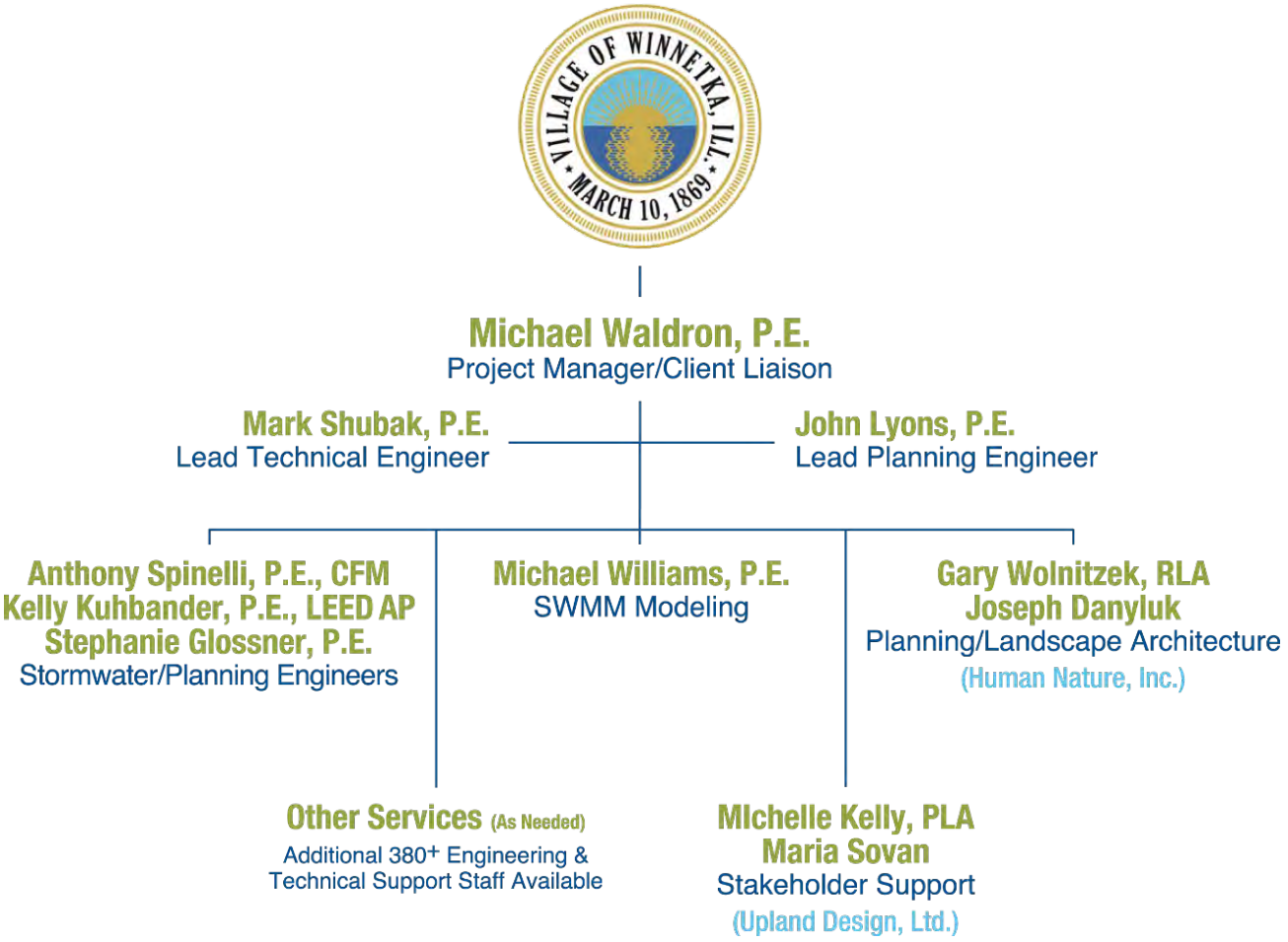
Cincinnati, OH Office

PROJECT TEAM STRUCTURE AND PERSONNEL EXPERIENCE

The organizational chart on the below details our stormwater management Project Team structure, which is composed of leading industry stormwater professionals who are highly experienced and practically minded in each area of specialization. As represented in the following resumes, each member of our Team is well suited for their role through their education, training, and experience.

We have approached the structure of our team in a fairly unique way that will allow our firm experts to collaborate very closely with the Village on this project. Mike Waldron has been identified as the Strand project manager from the standpoint of overseeing the project schedule, budget, and communication plan. Mike will take care of team communication, preparing agendas, organizing meetings, documenting meeting minutes and generally keeping the project running smoothly. Mike is familiar with the Village and has a past history of successful project management for Winnetka. Mike is based in our Joliet office and he can quickly be available for meetings, field visits, and collaboration with stakeholders. Mike has a history of successful project management, and his skills as a project manager will ensure that this project team is well organized and efficient.

To support Mike by leading the technical elements of the project including stormwater management alternatives analysis and modeling, we are bringing in two of our firms most highly qualified stormwater experts: Mark Shubak and John Lyons. John will serve as the Watershed Planning and Sustainable Infrastructure Expert, and Mark will serve as the Technical Stormwater Management and Modeling Expert. Their skillsets complement one another extremely well, and bringing them both into this project provides a team of experts bringing various viewpoints to the Village. Mark and John are both regarded nationally as experts for their work for various clients in multiple states, and they have spent their careers concentrating in the field of stormwater management. Their experience completing complex stormwater projects for a variety of communities makes them both highly qualified to play a key role in this effort.



The below matrix represents the skillsets, experience, and capabilities of our proposed project team. This matrix highlights six categories that we believe encompass the spectrum of services and skills that will be required to successfully complete the Winnetka Stormwater Management Study. The exceptional qualifications of our selected project team provides confidence in the quality and capabilities of the people who will serve the Village on this project.

TEAM MEMBER	Stormwater Management Studies	Sustainable/Green Alternatives Analysis	Traditional/Gray Alternatives Analysis	Hydrologic/ Hydraulic Modeling	Detailed Stormwater Control Sizing and Costing	Public Participation and Stakeholder Outreach
Michael Waldron, P.E. *Project Manager/Client Liaison*	✓	✓	✓	✓	✓	✓
Mark Shubak, P.E. *Lead Technical Engineer*	✓	✓	✓	✓	✓	✓
John Lyons, P.E. *Lead Planning Engineer*	✓	✓	✓		✓	✓
Michael Williams, P.E., LEED AP - *SWMM Modeling*	✓	✓	✓	✓	✓	
Anthony Spinelli, P.E., CFM *Stormwater/Planning Engineer*	✓	✓	✓	✓	✓	
Kelly Kuhbander, P.E., LEED AP *Stormwater/Planning Engineer*	✓	✓	✓	✓	✓	✓
Stephanie Glossner, P.E. *Stormwater/Planning Engineer*	✓	✓	✓	✓	✓	✓
Gary Wolnitzek, RLA *Planning/Landscape Architecture*	✓	✓	✓		✓	✓
Joseph Danyluk *Planning/Landscape Architecture*	✓	✓	✓		✓	✓
Maria Sovan *Stakeholder Support*	✓	✓				✓
Michelle Kelly, PLA *Stakeholder Support*	✓	✓				✓

MICHAEL WALDRON, P.E.

PROJECT ROLE: PROJECT MANAGER/CLIENT LIAISON

EDUCATION:

B.S., Civil Engineering, Bradley University, Illinois, 1991

PROFESSIONAL REGISTRATION:

Professional Engineer in Illinois and Indiana

YEARS OF EXPERIENCE:

24

Mike will serve as the Project Manager/Client Liaison for this project. Mike is currently the Discipline Coordinator of our Joliet Municipal and Stormwater Engineering Department. Mike has 24 years of experience with Strand as project manager and lead project engineer for stormwater management reviews and studies. Mike has been involved in all stormwater management work out of our Joliet office and he has worked with several communities to develop stormwater management planning and has participated on regional stormwater planning commissions.

RELATED PROJECT EXPERIENCE

+ **Ravinia Business District, Ravinia Business District – Highland Park, IL**

  Mike served as the Project Manager leading an evaluation of the condition and capacity of the City-maintained utilities to serve current and projected land use in the business district. Particular attention was made to document areas of recurring flooding, insufficient conveyance, and potential opportunities for water quality improvements. Strand performed a hydrologic study to evaluate the 2-,5-,10-,25-, and 100-year hydrology for the current and projected project conditions. This included evaluating the study area's ability to control the 25-year and 100-year storm events within public rights-of-way without posing impediment to emergency access and response.

+ **Green Infrastructure Rain Garden Program, City of Aurora – Aurora, IL**

  As Project Manager, Mike led the planning and design services for the design of rain gardens at 28 different intersections across the City to reduce the quantity of runoff entering the combined sewer system as well as reducing the pollutant loading in the system. Each rain garden was unique for its location utilizing various hydraulic patterns for feeding the garden. The gardens were landscaped with deep-rooted plantings that were conducive to the urban environment in which they were used and required low in maintenance. These gardens were funded by a $1.2 million grant, received by the City to implement green infrastructure.

+ **Street Detention Project, Village of Wilmette – Wilmette, IL**

  Mike served as the Project Manager for a street flooding study to determine whether relieving pressure in the storm system would reduce exfiltration and influence on sanitary laterals and mainlines. We identified two pilot areas and one control area for the study and modeled infrastructure modifications to restrict flows into the storm sewers and detain runoff in the streets. Our design included review of the watershed characteristics, determination of runoff conditions for various events, hydrologic and hydraulic modeling of the areas, and determination of acceptable flooding and retention of stormwater.

+ **SSES, Village of Winnetka – Winnetka, IL**

  Mike was the Project Manager for the Village's sanitary sewer evaluation study (SSES) that included flow monitoring of the Village's sanitary system, meetings with Metropolitan Water Reclamation District of Chicago (MWRDGC) to discuss the metering program and results, and prioritization of sanitary basins for further investigations. The result was a comprehensive sewer system investigation plan based on sanitary basin prioritization, historic flooding data, and collaboration with Village staff. The investigation plan laid out a 3-year, phased approach aimed at efficiently using available resources such as time and money.

MARK SHUBAK, P.E.

PROJECT ROLE: LEAD TECHNICAL ENGINEER

EDUCATION:

B.S., Civil Engineering, University of Wisconsin-Platteville, 1993

PROFESSIONAL REGISTRATION:

Professional Engineer in Illinois, Wisconsin, and Iowa

YEARS OF EXPERIENCE:

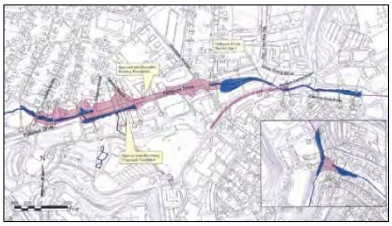
22

Mark will be the Lead Technical Engineer for this project. He has over 22 years of experience as a stormwater and water resource engineer including hydrologic and hydraulic analyses using a variety of software packages; planning, design, and construction administration of stormwater conveyance and storage facilities; floodplain and floodway studies/mapping; Phase I and II NPDES/WPDES stormwater permitting, grant writing; and streambank restoration planning and design.

RELATED PROJECT EXPERIENCE

+ **Bee Branch Channel Restoration, City of Dubuque – Dubuque, IA**
  Mark served as the lead stormwater and hydraulic engineer for the $47 million Bee Branch Creek Restoration Project. This flood mitigation project provided flood relief for 1,155 properties and included construction of 4,500 feet of open waterway. Tasks included performing dynamic hydrologic and hydraulic modeling using XPSWMM-2D, planning and design of the open waterway, development of flood profiles and floodplain mapping, implementation of stormwater green infrastructure measures, and permitting

+ **Burroughs and Poponoe Stormwater Management Plan, Morgantown Utility Board – Morgantown, WV**
  Mark assisted with the hydrologic and hydraulic modeling that supported development of the flood mitigation Master Plan for Burroughs and Poponoe Run. Mark also assisted in the planning and design of the $3.5 million flood mitigation improvements that included 9,500 feet of streambank stabilization measures, removal and replacement of eight drainage structures, and street and utility relocation.



+ **29th and Lorton and Fairhaven Road Drainage Improvements, City of Davenport – Davenport, IA**
  Mark served as Project Manager for this improvements project. Repetitive flash flooding had occurred in an area located near East 29th Court and Fairhaven Road within the City of Davenport, Iowa. The flooding was caused by insufficient storm sewer/intake capacities in the lower portions of the system and lack of overland flood routes. Strand was hired to a completed a study as well as develop a detailed design for construction of the recommended drainage improvements.

+ **Sawyer Creek and Campbell Creek Stormwater Management Plan, Project Implementation and Floodplain Mapping, City of Oshkosh – Oshkosh, WI**
  Mark served as Project Manager on the Sawyer Creek (15.7 square miles) and Campbell Creek (2.9 square miles) watersheds stormwater management plans. Initial services included design of three bridge reconstructions to pass the 100-year flow along Sawyer Creek, a fourth was constructed in 2010. Significant flooding continued in these interconnected watersheds (Presidential Disaster Declarations in 1990, 1993, 2001, 2004, and 2008), prompting comprehensive planning efforts that began in 2005. These efforts utilized a combination of HEC-HMS, HEC-RAS and XPSWMM to identify complete and feasible projects that provided significant flood relief in these watersheds.

JOHN LYONS, P.E.

PROJECT ROLE: LEAD PLANNING ENGINEER

EDUCATION:

B.S., Civil Engineering, University of Massachusetts, Amherst, MA, 1987

PROFESSIONAL REGISTRATION:

Professional Engineer in Ohio and Kentucky

YEARS OF EXPERIENCE:

28

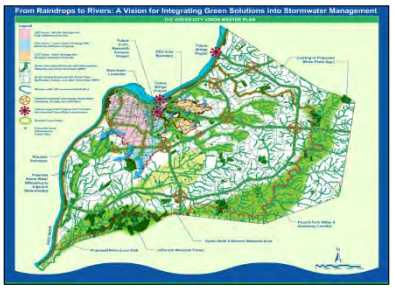
John will be the Lead Planning Engineer for this project. He has over 28 years of experience in the civil/environmental field, with a rare blend of private sector, regulatory, and municipal expertise. John has served as project manager for sustainable infrastructure and stormwater planning and design services for a number of clients around the country, including University of Cincinnati, Northeast Ohio Regional Sewer District in Cleveland, City of Euclid, Louisville/Jefferson County Metropolitan Sewer District, City of Springfield, Metropolitan Sewer District of Greater Cincinnati, and Sanitation District No. 1 in Northern Kentucky. John is nationally recognized by his peers, colleagues, and Environmental Project Agency (EPA) regulators as an expert in stormwater management. John has an exceptional ability to approach complex problems in a very pragmatic yet innovative way. John's experience in developing and implementing cohesive and multi-purpose, large scale stormwater management systems will be a tremendous asset to this project.

RELATED PROJECT EXPERIENCE

+ **Lick Run Watershed Valley Conveyance System, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  As the Principal-in-Charge for this project, John led the planning and preliminary engineering efforts to identify and evaluate opportunities in the Lick Run watershed that would provide CSO reduction as well as 100-year stormwater conveyance with economic development and urban renewal. This includes restoring 5,600 linear feet of the historical Lick Run stream, installing 55,000 linear feet of separate storm sewers, modifying bridges, improving roadways, providing green controls for water quantity and quality benefits, and providing redevelopment opportunities.

+ **Green Infrastructure Program, Northeast Ohio Regional Sewer District – Cleveland, OH**
  John served as the Project Manager for NEORSD's green infrastructure design program identifying nearly $80 million in projects that will remove hundreds of millions of gallons of stormwater runoff from the combined system, capture and treat stormwater runoff, and improve flooding issues. This has led to the design of three Green Ambassador Projects, totaling more than $10 million; which includes more than 15,000 linear feet of storm sewer and the construction of four large scale bioretention basins and five site scale rain gardens, and the preliminary engineering of ten other green projects.

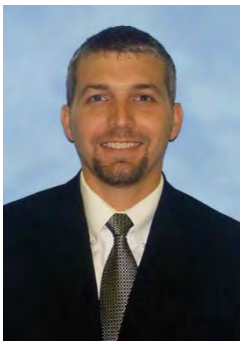
+ **Rapid Run Watershed Evaluation and Preliminary Engineering, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  John led the planning evaluation for stormwater conveyance along Rapid Run Road. Including the creation of segments of open channel stream, totaling over 2,200 linear feet to safely convey the 100-year storm event and mimic the functionality of a natural stream, areas of sewer separation, enhancement of detention basins for added water quality and quantity benefits. The project utilizes 34 FEMA buyout properties that currently experience flooding problems and 41 non-FEMA properties.



+ **Green Infrastructure Design Program, Louisville and Jefferson County Metropolitan Sewer District – Louisville, KY**
  John served as the Project Manager, leading a multidisciplinary team assisting MSD to identify green projects throughout the combined system to reduce the amount of stormwater entering the sewers, while also providing additional benefits to the community. This led to the development of a $45 million program to cost-effectively integrate green controls in its LTCP.

MICHAEL WILLIAMS, P.E., LEED AP

PROJECT ROLE: SWMM MODELING



EDUCATION:

B.S., Civil and Environmental Engineering, Iowa State University, 2000

PROFESSIONAL REGISTRATION:

Professional Engineer in Wisconsin

YEARS OF EXPERIENCE:

15

Mike will be responsible for SWMM Modeling efforts for this project. He has more than 15 years of experience with stormwater planning and management including hydrologic/hydraulic modeling, watershed planning and management, streambank restoration and design, stormwater detention basin design and rehabilitation, and design of Best Management Practice (BMP) measures. He has developed stormwater management plans using programs such as XPSWMM (1D and 2D), StormCAD, HEC-HMS, HydroCAD and HEC-RAS. Mike is instrumental in providing in-depth analysis, design and preparation of drawings and specifications for storm sewers, stormwater ponds, green infrastructure, rehabilitation and dredging of existing ponds, and streambank and shoreline restoration.

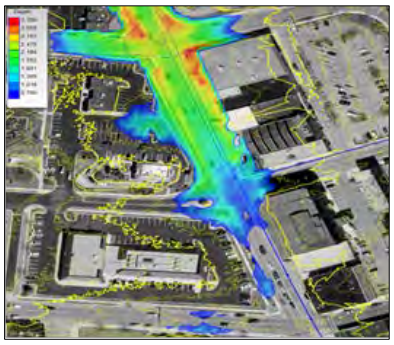
RELATED PROJECT EXPERIENCE

+ **Bee Branch Channel Restoration, City of Dubuque – Dubuque, IA**
  Mike completed the modeling and hydraulic analysis for the planning and design of the Bee Branch stream daylighting project. He used XPSWMM-2D and HEC-HMS models to analyze and design the open channel concept. The channel analysis and design included a levee, downstream detention basin, levee control structure, operating protocols, and five bridges.

+ **Sawyer Creek Watershed Analysis, City of Oshkosh – Oshkosh, WI**
  Mike completed the stormwater modeling and hydraulic analysis of the 15.7-square-mile Sawyer Creek Watershed. The modeling effort for this project assisted in selecting and developing three separate projects within the City of Oshkosh. Mike used HEC-HMS, HEC-RAS, and XPSWMM models to analyze each project alternative including several regional detention basins and streambank restoration. Next Generation Radar (NEXRAD) Rainfall Data was used to help calibrate the existing condition models.

+ **Campbell Creek Watershed Analysis, City of Oshkosh – Oshkosh, WI**
  Mike completed the hydrologic and hydraulic analysis for this project that included using XPSWMM and XPSWMM-2D to analyze the existing drainage system and analyze alternatives, including storm sewer upsizing and new detention basins.

+ **Locust Street Stormwater Improvements Planning, Design, and Construction, City of Sterling – Sterling, IL**
  Mike was the Project Manager and Stormwater Modeling Engineer to develop a comprehensive stormwater management plan to address current flooding issues and issues related to future development at the intersection of 5th and Locust Street. With our assistance, and based on modeling completed for the plan, the City was able to procure $500,000 from the Illinois Department of Transportation (IDOT) Motor Fuel Tax funding toward implementation of storm sewer improvements to reduce the frequency of the flooding in this area. The City also hired us to provide design drawings based on the Stormwater Plan recommended alternative. The project scope included detailed storm sewer modeling using XPSWMM, coordination with IDOT and Department of Natural Resources, and bid document creation.



ANTHONY SPINELLI, P.E., CFM

PROJECT ROLE: STORMWATER/PLANNING ENGINEER

EDUCATION:

B.S., Civil Engineering, Northern Illinois University, 1993

PROFESSIONAL REGISTRATION:

Professional Engineer in Illinois
Certified Floodplain Manager

YEARS OF EXPERIENCE:

22

Tony will serve as a Stormwater/Planning Engineer for this project. His stormwater management experience includes stormwater management design; stormwater runoff and conveyance analysis; implementation of Best Management Practices; erosion and sediment control design, management and monitoring; stormwater permitting with Kane, Kendall, and Will Counties, IDNR, IEPA, and USACE. Tony's background is in design of local stormwater conveyance and detention systems in urban and suburban communities.

RELATED PROJECT EXPERIENCE

+ **Flood Mitigation Feasibility Study, Village of Broadview – Broadview, IL**
  Tony is currently the lead engineer for our flood mitigation study of the Terry Lane neighborhood in Broadview, Illinois. The Terry Lane neighborhood is a residential community bordered on the east by Addison Creek and on the south by Salt Creek. The neighborhood exhibits frequent over-bank flooding from both waterways and was significantly impacted by the July 2011 storms. Tony is leading the team in identifying and evaluating various flood control alternatives from automatic flood walls and berms to compensatory storage and property buyouts.

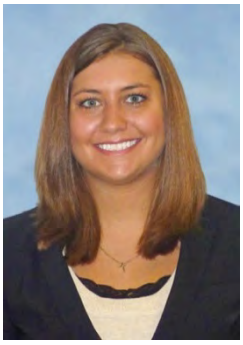
+ **Ravine Woods Subdivision, Smykal Associates – Channahon, IL**
  While with another consultant, Tony was the Project Manager and Lead Design Engineer for the Ravine Woods Subdivision development. Ravine Woods was a 308 acre residential and commercial development on the DuPage River. Because of its proximity to the river and the ravine and the existing wetland environments around the development, Tony's design needed to account for allowable floodplain area as well as water quality concerns in design of the site stormwater management system. The project design worked to maintain the natural terrain and wooded areas as valuable site amenities and included implementation of best management practices to achieve water quality improvements.

+ **Eldamain Road and Bridge Realignment and Widening, Kendall County Highway Department – Yorkville, IL**
  Tony is the Hydraulics Team Leader for our roadway and bridge realignment and widening project in Kendall County. Tony is directly providing hydrologic and hydraulic modeling of the Rob Roy Creek and floodplain area and is also leading the stormwater quality management aspects of the project. These include a combination of storm sewer and open drainage systems along with a bioretention facility for water quality enhancement prior to discharge to the Rob Roy Creek and the Fox River.

+ **Green Infrastructure Rain Garden Program, City of Aurora – Aurora, IL**
  As a Project Engineer, Tony assisted with the design services for the design of rain gardens at 28 different intersections across the City to reduce the quantity of runoff entering the combined sewer system as well as reducing the pollutant loading in the system. Each rain garden was unique for its location utilizing various hydraulic patterns for feeding the garden. The gardens were landscaped with deep-rooted plantings that were conducive to the urban environment in which they were used and required low in maintenance. These gardens were funded by a $1.2 million grant, received by the City to implement green infrastructure.

KELLY KUHBANDER, P.E., LEED AP

PROJECT ROLE: STORMWATER/PLANNING ENGINEER



EDUCATION:

B.S., Civil Engineering, University of Dayton, Ohio, 2008
M.B.A., Xavier University, Cincinnati, Ohio, 2010

PROFESSIONAL REGISTRATION:

Professional Engineer in Ohio
LEED Accredited Professional

YEARS OF EXPERIENCE:

7

Kelly will serve as Stormwater/Planning Engineer for this project. She specializes in stormwater management and sustainable infrastructure. Her technical and design expertise has resulted in an exceptional ability to assist in planning level feasibility analysis of various stormwater alternatives. Kelly is experienced working with preliminary sizing, design, and costing of both sustainable and traditional stormwater solutions, and she has worked on projects with various stormwater goals including flood mitigation.

RELATED PROJECT EXPERIENCE

+ **Lick Run Watershed Valley Conveyance System, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Kelly is working as a storm sewer design engineer for the Lick Run project which consists of approximately 55,000 linear feet of new storm sewer, 5,600 linear feet of a hybrid open channel and box conduit conveyance system, green infrastructure technologies, detention facilities, and improved traffic corridors. The project pairs CSO control, safe conveyance of the 100-year storm event to the Mill Creek, and significant community enhancement within MSDGC's Lick Run watershed.

+ **Rapid Run Watershed Evaluation and Preliminary Engineering, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Kelly served as the lead Project Engineer, utilizing Strand's sustainable planning process to develop a recommended concept plan for the flooding and combined sewer issues in the Rapid Run watershed. Following planning, the stormwater solution was advanced to preliminary design to verify feasibility. A variety of alternatives were assessed for the project area, including temporary bioretention basins in locations of FEMA buyout properties, open channel sections along a well-traveled corridor, and sewer separation areas. The effectiveness of the project was assessed for both water quality and quantity improvements. A hydromodification analysis was completed for the receiving stream, and reduction in pollutants of concern were quantified. A cost/benefit analysis was conducted between the proposed stormwater BMPs and the high rate treatment facility alternative.

+ **West Fork Sustainable Watershed Opportunities Evaluation, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Serving as Project Manager, Kelly executed a planning process to identify opportunities to reduce sewer overflows from MSDGC's combined system and provide stormwater management to flood prone areas. Solutions included strategic sewer separation, removal of direct entry stormwater points, restoring a concrete conveyance system to a separate naturalized stream channel, storage facilities, potential High Rate Treatment and the use of FEMA Mitigation Funds. The proposed solution will provide MSDGC with cost effective CSO controls while also creating public amenities for community revitalization and flood mitigation.

+ **Banklick Watershed Based Plan Development and Design, Banklick Watershed Council – Northern Kentucky**
  For the last seven years Kelly has served as the Lead Project Engineer for the Banklick Creek Watershed Council. She has helped oversee this $1 million nonpoint source EPA grant to improve the Banklick Watershed, authored a revised watershed based plan, evaluated stormwater management alternatives, selected most beneficial implementation measures, gathered public input through a public meeting process, provided engineering design guidance throughout the implementation, and led the design of detention basin retrofits to provide additional stormwater control along with water quality benefits. She worked closely with Kentucky Division of Water officials to meet grant requirements and obtained an additional implementation funding for the client.

STEPHANIE GLOSSNER, P.E.

PROJECT ROLE: STORMWATER/PLANNING ENGINEER

EDUCATION:

B.S., Civil Engineering, University of Dayton, Ohio, 2006

PROFESSIONAL REGISTRATION:

Professional Engineer in Kentucky

YEARS OF EXPERIENCE:

9

Stephanie will serve as Stormwater/Planning Engineer for this project. Her expertise includes hydraulic and hydrologic modeling of stormwater facilities, storm sewer design, green infrastructure design for stormwater control, watershed based planning, project management, water quality standards, regional green infrastructure planning and implementation, NPDEs stormwater Phase II permitting, combined sewer overflow long-term control planning, and floodplain delineation.

RELATED PROJECT EXPERIENCE

+ **Lower Mill Creek Sustainable Watershed Evaluation, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Stephanie assisted with the sustainable watershed opportunities evaluation of the Lower Mill Creek (LMC) watershed utilizing a formal planning process, developed by Strand and Human Nature, to identify opportunities for removing stormwater runoff and natural stream base flows from MSDGC's system. Stephanie worked with Human Nature to create coarse-level plans for each of the subbasins identifying opportunities to capture more than 3.2 BG in stormwater runoff. This project served as the foundation of the USEPA-approved sustainable alternative, which was approved by USEPA in place of the planned deep storage tunnel, to provide CSO control, community revitalization, and also save MSDGC an estimated $200 million over the planned gray solution.
+ **Lick Run Watershed Valley Conveyance System, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Stephanie is currently serving as Assistant Project Manager for the Lick Run Valley Conveyance System (VCS) project, which consists of approximately 55,000 linear feet of new storm sewer, 5,600 linear feet of a hybrid open channel and box conduit conveyance system, green infrastructure technologies, detention facilities, and improved traffic corridors. The project pairs the investment into green infrastructure with improvements to the aesthetics and amenities of the South Fairmount neighborhood while providing CSO control and safe conveyance of the 100-year storm event to the Mill Creek.

+ **Integrated Planning for CSO Control and Stormwater Management, Sanitation District No. 1 of Northern Kentucky – Ft. Wright, KY**
  Stephanie worked closely with the Project Manager and a multidisciplinary team to develop and implement a green infrastructure program within SD1's combined sewer system, the separate sewer service area, and the Northern Kentucky three county region. The project team worked with the overarching goal of reducing the amount of stormwater runoff entering the combined sewer system, conserving and restoring existing waterways, and providing a regional vision for smart stormwater management with the understanding of achieving multiple benefits for the community. Stephanie performed preliminary stormwater calculations and cost estimates for a variety of proposed concept plans and green infrastructure programs included in the Watershed Plan.
+ **Green Infrastructure Design Program, Northeast Ohio Regional Sewer District – Cleveland, OH**
  Stephanie served as the lead planning and evaluation engineer of the green infrastructure program for NEORSD. Stephanie's role included watershed evaluations and the identification and prioritization of nearly $80 million in projects that will remove hundreds of millions of gallons of stormwater runoff from the combined system, capture and treat stormwater runoff in green features, and improve flooding issues. This has led to the design of three Green Ambassador Projects, totaling more than $10 million; which includes more than 15,000 linear feet of storm sewer and the construction of four large scale bioretention basins and five site scale rain gardens, and the preliminary engineering of ten other green projects.

GARY R. WOLNITZEK, RLA

PROJECT ROLE: PLANNING/LANDSCAPE ARCHITECTURE

EDUCATION:

B.S. Landscape Architecture, University of Kentucky, 1985

PROFESSIONAL REGISTRATION:

Registered Landscape Architect in Ohio

YEARS OF EXPERIENCE:

30

Gary will be the Senior Landscape Architect for the project, and will lead sustainable stormwater management planning and integration into the neighborhood as well as public participation.

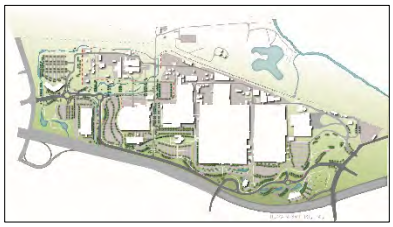
RELATED PROJECT EXPERIENCE

+ **Regional Green Infrastructure Planning, Sanitation District No. 1 of Northern Kentucky – Ft. Wright, KY**
  Mr. Wolnitzek helped design a series of comprehensive green infrastructure plans for the three-county Northern Kentucky region. He worked with a multi-disciplinary team in identifying strategies for reducing the frequency and volume of CSOs, and identified ways for reconnecting Northern Kentucky's natural systems with built environments. The green infrastructure plans and recommendations were included in SD1's Watershed Plans, a requirement under the Consent Decree with the U.S. EPA.

+ **Terraced Reforestation of Interstate Right-of-Way, Sanitation District No. 1 of Northern Kentucky – Ft. Wright, KY**
  To reduce the volume of stormwater runoff contributing to Northern Kentucky's largest CSO, Gary developed the project that includes a series of reforested berms along the existing right-of-way of Interstate I-71/75. This innovative design utilizes native tree species, meadow plantings, and a customized bio-infiltration soil mix to capture a maximum volume of stormwater runoff with a minimum need of long-term maintenance.

+ **Lick Run Valley Conveyance System 60% Design Services, Metropolitan Sewer District of Greater Cincinnati (MSDGC) – Cincinnati, OH**
  Gary is Principal-in-Charge for the design of open space components of the Lick Run Valley Conveyance System. This implementation phase builds from the Master Plan that helped MSDGC and its partner agencies finalize watershed-based CSO reduction solutions and maximize the potential for other, long-term community benefits and amenities. Key design components include a headwaters feature, the open channel that runs over 5,500 linear feet with ecological and stormwater benefits, pedestrian walkways, boardwalks and bridges, upgraded recreation facilities, upgraded streetscape with stormwater planters, an online pond and a celebratory outfall to the Mill Creek.

+ **General Electric (GE) Aviation Evendale Campus, GE – Cincinnati, OH**
  Gary was Principal-in-Charge for the complete transformation of GE's Evendale Campus. Human Nature has led a master planning effort for the 300-acre Evendale site – specifically, as it shifts to a technology center with a focus on environmental sustainability. He has led site projects on campus over the past seven years. He leads the restoration design efforts with a focus on "greening" the old industrial campus and a focus on stormwater management.



JOSEPH DANYLUK

PROJECT ROLE: PLANNING/LANDSCAPE ARCHITECTURE

EDUCATION:

B.S. Civil & Environmental Engineering, University of Cincinnati, 2006
Master of Community Planning, University of Cincinnati, 2008

YEARS OF EXPERIENCE:

12

Joseph will be responsible for data gathering and analysis, green infrastructure planning and alternative development, public participation, graphics creation, organization, and synthesis.

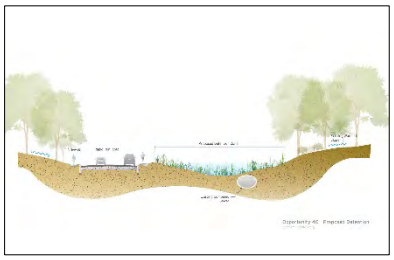
RELATED PROJECT EXPERIENCE

+ **Green Infrastructure Design Services, Northeast Ohio Regional Sewer District – Cleveland, OH**
  Joseph was Human Nature's project manager and environmental planner for the planning and design of large-scale green infrastructure projects – specifically, those that meet objectives listed in Appendix 3 of the District's Consent Decree. He developed source control solutions within the combined sewer system and coordinated the landscape design and restoration of three Green Ambassador Projects. Joseph also led public engagement meetings and coordination meetings with city agencies and project stakeholders.

+ **Lick Run Wet Weather Strategy – Early Success Projects, Metropolitan Sewer District of Greater Cincinnati (MSDGC) – Cincinnati, OH**
  Joseph served as project manager for MSDGC's Early Success Projects program. He coordinated the conceptual design of nine separate projects totaling almost $3 million in construction costs. He was responsible for the construction design of landscape and site-specific stormwater management features for seven projects. Joseph prepared cost estimates, construction phasing schedules, coordinated with the Cincinnati Park Board and its contractor during construction, and served as a liaison between MSDGC and the project team.

+ **Lick Run Alternative Project, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Joseph was project manager for this nationally-recognized CSO reduction and community revitalization project in the Lick Run Watershed. He led the comprehensive Lick Run Watershed study in 2009 and the Community Opportunities Plan study in 2010, and assisted MSDGC with the creation of a Lick Run Watershed Master Plan. The Master Plan is helping MSDGC and its partner agencies finalize watershed-based CSO reduction solutions and maximize the potential for other, long-term community benefits and amenities.

+ **Rapid Run SWEP, Metropolitan Sewer District of Greater Cincinnati – Cincinnati, OH**
  Joseph served as Human Nature's project manager for this detailed evaluation of the Rapid Run Watershed. He and the Project Team identified integrated watershed strategies that focused on MSDGC's Communities of the Future Program and that capitalized on the buyout of existing property along Rapid Run Road with a Hazard Mitigation Grant from FEMA. The proposed strategies help to reduce flooding and CSOs, all while restoring a natural system in the heart of the watershed.



MICHELLE KELLY, PLA

PROJECT ROLE: STAKEHOLDER SUPPORT

EDUCATION:

Bachelor of Landscape Architecture with High Honors
University of Illinois at Urbana-Champaign, 1992

PROFESSIONAL REGISTRATION:

Registered Landscape Architect Illinois # 157-001002, Michigan # 3901001226
Certified Playground Safety Inspector - since 1995

YEARS OF EXPERIENCE:

21

Michelle has been creating parks and designing public landscapes for the past 21 years. She excels at leading public meetings bringing a keen understanding of landscape design and construction. She succeeds in creating great outdoor opportunities for each community. Her professional work includes park master planning, formal garden design, natural area planning along with green technology, sports fields and courts, children's play areas, and forest preserve development.

RELATED PROJECT EXPERIENCE

+ **Miller Meadow Forest Preserve, Cook County Forest Preserve District – Cook County, IL**
  Michelle led the Upland team to design a new master plan for Miller Meadow, a site recently used for fill for the deep tunnel project performed by the Metropolitan Water Reclamation District. Working with the District staff, concepts to activate the site with new recreation components including a multi-use trail, river overlook, canoe launch, sport fields, dog park, slack line area, disc golf and relocated model airplane field were created. Phase I elements were chosen and Michelle led the development of construction documents for the site. The project is currently under construction.

+ **Lake Katherine Nature Center and Botanic Garden Master Plan – Palos Heights, IL**
  Michelle served as the key presenter and moderator for all focus groups and public open house meetings as part of the master plan development for Lake Katherine Nature Center and Botanic Gardens. Located along the Cal-Sag Channel in Palos Heights, Cook County, the site is leased to Palos Heights through the Metropolitan Water Reclamation District. Working closely with the staff as well as a dedicated focus group, the master plan along with development guidelines was created over a number of months. As the plan took form and conceptual sketch created, a public open house assisted in gaining community wide input.

+ **Hoover Forest Preserve, Kendall County Forest Preserve District – Yorkville, IL**
  This 400-acre forest preserve was once a Boy Scout facilities that was purchased by the Kendall County Forest Preserve District. With the help of IDNR grant funding, Upland Design created both a master plan and construction documents to update many areas of the camp and add new river access with an overlook deck, a fishing pier and one mile of accessible trail. Native plantings included the detention along with a rain garden at the new parking lot. Michelle led the design team creating the construction documents and preparing the project for bidding and construction.

+ **Spring Lake Park, Fox Valley Park District – Aurora, IL**
  Spring Lake Park is a 34 acre community park site located in Aurora, Illinois. With the assistance of an IDNR OSLAD grant, the park was transformed to embrace the lake and provide new recreation. Michelle led the design development, construction documents, permitting and bidding. The park amenities now include a boat dock, boat ramp, fishing pier, picnic shelter, rest room, 70 car permeable paving parking lot, rain garden and bio swales, 2-12 year old playground, backstop, half basketball court and walking loop.

MARIA SOVAN

PROJECT ROLE: STAKEHOLDER SUPPORT

EDUCATION:

Bachelor of Landscape Architecture
University of Illinois at Urbana-Champaign, 2008

PROFESSIONAL REGISTRATION:

Registered Landscape Architect Illinois #157-001511
Certified Playground Safety Inspector - since 2009
LEED AP BD+C

YEARS OF EXPERIENCE:

5

Maria has been a professional in public park and landscape planning for the past five years. Her past and current work is focused towards creating public spaces. Her project experience includes comprehensive district-wide master planning incorporating GIS data as well as site design through construction for landscapes, playgrounds and sports fields. Her career has been focused on serving public clients and she enjoys being involved in the creation of outdoor spaces and landscapes.

RELATED PROJECT EXPERIENCE

+ **Thatcher Woods Forest Preserve Renovation, Forest Preserves of Cook County – Cook County, IL**
  Maria worked with the Forest Preserve staff and the community to create a new master plan that solved drainage problems with new bio-swales and created accessible linkages to active camping and canoe areas. To bring the community better access and awareness of the beautiful surroundings, interpretive signage and connections to the Des Plaines River Trail system were added. A new patio space with an extensive native ornamental planting palette was designed to complement the historical pavilion and provide additional space for outdoor events.

+ **Wynwood Park Master Plan, OSLAD and Development – Winfield, IL**
  To meet the growing needs of the community for this popular sports facility, Maria designed an updated playground, splash pad and gathering space. The improvements worked with the existing topography and floodplain and improved a rain garden on site that dealt with stormwater from the parking lot. A new 40' shelter was the center point of design surrounded by activities for sports users, picnickers and playground users. New custom playground was designed to challenge users of all ages that visit the site.

+ **Rolling Knolls Forest Preserve Phase I Development: Forest Preserves of Cook County – Cook County, IL**
  In the implementation of the Rolling Knolls Forest Preserve master plan, Maria worked with the Forest Preserve staff to further develop the phased approach. The plan converted the old golf course into a forest preserve with recreation elements. Design development includes restoration of the old fairways to native areas, an accessible trail to the existing pond, three fishing stations along the perimeter of the pond, a fishing pier further into the water, an 18-hole disc golf course, and an archery range suitable for competition level events. Cost estimating was completed and phase one budgeted.

+ **Green Lake Park Master Plan and OSLAD, Buffalo Grove – IL**
  Maria worked with the Buffalo Grove Park District staff in creating a master plan for this 20 acre community park. Public input and staff objectives were incorporated into multiple concepts that were presented to the owner. A final concept plan synthesized all comments into an exciting new plan that includes: community shelter, fitness grove, accessibility updates, playground, butterfly garden, overlook, detention pond mitigation islands, and sports fields.

FIRM EXPERIENCE AND WORKLOAD

Our Project Team is available to start immediately to complete your project. This is demonstrated through our firm-wide scheduling system, which confirms our staff availability. Based on the effort required for the study, we have projected the man-hours for key team members for the schedule you provided, and compared the required number of hours to the available hours, considering current staff commitments. Our Project Team has the availability to comfortably meet your project requirements at all points throughout the project. In addition to the Project Team identified, Strand also has availability of other staff members including engineers, technical, and administrative support personnel that would be available to assist on this project if the need arises.

Clients depend on our team for our creativity, our emphasis on community interaction and participation, our leading edge technologies, and perhaps most importantly, our holistic approach to stormwater management planning and design. Our clients can attest to Strand and Human Nature's abilities with providing services related to traditional, sustainable and unique stormwater planning and design services and coordinating with multidisciplinary project teams and community stakeholders to achieve the best solutions. Below are excerpts from letters of support from our clients.

"Strand has led our regional green infrastructure program since its inception and has consistently provided quality, detailed work products that are both cost effective and innovative. We appreciate your holistic storm water management philosophy that focuses on developing multi-faceted solutions that address the full range of stormwater related quality and quantity issues."

- James P. Gibson, Director of Integrated Watershed Management, SD1

"Strand Associates made these 319 (Clean Water Act Nonpoint Source Grant) accomplishments possible; we could not have done it without them…The caliber of their work and the data available to them through trusted partnerships is outstanding. Their technical, organizational and networking skills have given our project a level of sophistication…Strand has given our efforts a level of credibility that we need when working with elected officials and government agencies."

- Sherry Carren, Mayor of Covington and President of Banklick Watershed Council

"Strand Associates Inc. has been an integral partner in providing stormwater guidance, planning and engineering for the City of Onalaska. I would recommend Strand Associates, Inc. to others needing assistance in any facet of stormwater engineering."

- C. Jarrod Holter, P.E., City Engineer, City of Onalaska

"Human Nature helped to transform Washington Park into a 'living room'… a centerpiece…a place where all are welcome, and the city has been well served by their team of landscape architects and environmental planners."

- Stephen G. Leeper, CEO, Cincinnati Center City Development Corporation

"They provided a fresh perspective on infrastructure planning and helped identify solutions that not only achieve Consent Decree compliance targets, but also have the potential to optimize planned gray infrastructure."

- Kellie Rotunno, P.E., COO, Northeast Ohio Regional Sewer District

"The efforts of the Strand Associates, Inc. team to provide the Department of Public Works and Utilities with high quality, cost competitive services in a timely manner are greatly appreciated. Other project owners would be well served to receive this high level of service."

- Dennis Duffield, Director of Public Works & Utilities

The following pages detail our Project Team's firm experience on similar holistic stormwater management planning projects.

BEE BRANCH CREEK RESTORATION FOR FLOOD MITIGATION – DUBUQUE, IA

The Bee Branch Creek Watershed has a drainage area of 7.1 square miles and is located in the north central portion of the City of Dubuque, Iowa. The historic Bee Branch Creek was enclosed within a large diameter storm sewer trunk line in the early 1900s to accommodate rapid urbanization. This watershed includes the city's most developed areas where more than 50 percent of Dubuque residents either live or work. Inadequate capacity of this trunk line resulted in severe flooding of more than 1,100 residential and commercial properties within the city. The Bee Branch solution restored the culverted stream to a urban water way and today is touted by the City as a *"fiscally responsible investment to mitigate flooding, improve water quality, stimulate investment, and enhance quality of life within the Bee Branch Watershed".*

Strand was selected to design the Bee Branch Creek Restoration improvement, which included updating the hydrologic and hydraulic models, developing a naturalized channel configuration and riparian area to integrate with a variety of adjacent land uses, and developing construction plans and specifications. Key elements of the $40 million project included more than 400,000 CY of excavation to create 4,500 LF of open channel waterway and dredging of a 25-acre detention basin. The majority of this material was used to fill an adjacent surplus detention area, thus creating a 6-acre redevelopment parcel, which contributed to a $7.5 million reduction in project costs. Structural elements included a trenchless crossing of the CPR Railroad switching yard and four vehicle bridges. The new open channel accommodates a spring fed base flow that will be capable of supporting a healthy stream ecosystem. In order to preserve the health of this system, a number of sustainable water quality improvements were incorporated, including the installation of 2,500 LF of pervious roadway, 50 pervious parking stalls, four hydrodynamic stormwater separators, five bioinfiltration basins, cascade aeration features, and reuse of noncontact cooling water for irrigation source water. The channel corridor provides linear community space that encompasses an extension of the regional Heritage Trail, a pedestrian bridge, information/educational kiosks, overlooks, an amphitheater, orchard, benches, lighting, and 1,000 new trees.

STRAND ASSOCIATES®

PROJECT DETAILS:

Client:
City of Dubuque, Iowa

Contact:
Deron Muehring
(563) 589-4270

Year Completed:
2013

Construction Cost:
$40,000,000

PROJECT FEATURES:

- *4,500 LF of open channel*
- *25-acre detention basin*
- *Railroad coordination*
- *Significant community enhancement*
- *Sustainable features including pervious pavements, biofiltration basins, and water reuse*

Completed naturalized segment of the Bee Branch Creek Restoration project.

Severe neighborhood flooding prior to the construction of the Bee Branch solution.

During construction, transforming the concrete culvert into a restored urban waterway.

SAWYER CREEK STORMWATER MANAGEMENT PLAN AND FLOOD CONTROL – OSHKOSH, WI

Since 2001, Strand has served as the watershed engineer for the flood prone, 15.7 square mile Sawyer Creek Watershed. Significant flooding in the watershed (Presidential Disaster Declarations in 1990, 1993, 2001, 2004, and 2008) prompted comprehensive stormwater master planning to address the flooding and related stormwater issues. We have completed comprehensive stormwater management planning with calibrated HEC-HMS, HEC-RAS, and XP-SWMM models provided problem area identification, alternative analysis, and implementation planning. Stormwater management projects completed include:

- Design of four bridge reconstructions to pass the 100-year flow along Sawyer Creek. These efforts utilized a combination of HEC-HMS, HEC-RAS and XPSWMM to identify projects that will provide significant flood relief in the watersheds.
- Dredging of Sawyer Creek, the lower 1.3 miles of Sawyer Creek had become clogged with sediment leading to a loss of navigability, and filimentatious algae growth. Strand designed an ecologically-based, $2.6 million dredging project to clear 1.3 miles of Sawyer Creek (40,000 CY) utilizing both mechanical and hydraulic techniques. Contaminated materials (petroleum-based) were encountered where Sawyer Creek meets the Fox River, requiring significant environmental coordination with the WDNR.
- Critical outside bends and meanders were restored using a vegetated boulder revetment soil-bioengineering technique. Two canoe launches linking the west and east side of the creek were included to promote paddling sports.
- Key components of habitat enhancement included invasive species management (buckthorn) in Red Arrow Park, creation of a 15-foot deep fishing hole with coarse woody debris and in-stream boulder fish habitat, and streambank restoration. Retention of a littoral zone along the dredged route promoted both riverine and terrestrial habitat.
- Design of a 207-acre-foot off-line dry detention basin along Sawyer Creek to provided additional stormwater storage. Design challenges included a perched water table, on-site wetlands requiring on-site mitigation/restoration, dam permitting, stable inflow and outflow, native restoration, streambank restoration, and access.

STRAND ASSOCIATES®

PROJECT DETAILS:

Client:
City of Oshkosh

Contact:
James Rabe, P.E., CPESC
(920) 236-5065

Year Completed:
Ongoing

Construction Cost:
$13,800,000

PROJECT FEATURES:

+ *Four bridge reconstruction designs*
+ *Dredged 1.3 miles of sediment and algae growth*
+ *Streambank restoration and canoe launch*
+ *Habitat enhancement*
+ *Design of 207-acre-foot off-line dry detention basin*

Completed stream channel restoration project in Sawyer Creek.

207-acre-foot flood control basin along Sawyer Creek.

Severe flooding in Sawyer Creek watershed resulted in numerous presidential disaster declarations.

LOWER MILL CREEK SUSTAINABLE WATERSHED OPPORTUNITIES EVALUATION – CINCINNATI, OH

In response to a USEPA consent decree that mandated the construction of a 30-foot-diameter, 1.2-mile combined sewer tunnel, an 84 mgd pumping station, and treatment (estimated to cost $414 million) to reduce 2 billion gallons of combined sewer overflows (CSOs), the Metropolitan Sewer District of Greater Cincinnati (MSDGC) needed a more cost-effective alternative to reduce combined sewer overflows from the Lower Mill Creek (LMC) watershed by 2018. Strand teamed with familiar partner Human Nature, Inc. to complete a preliminary sustainable watershed opportunities evaluation of the LMC watershed for MSDGC. Utilizing a formal planning process, developed by the project team, known as the Sustainable Watershed Evaluation Process (SWEP) we identified opportunities for removing stormwater runoff and natural stream base flows from MSD's combined sewer system.

The effort performed for the LMC was intended to be a coarse level evaluation, a preliminary SWEP that would identify the potential benefits that could be achieved through alternative approaches to CSO control with stormwater management. Specifically, the coarse evaluation, completed by Strand and Human Nature, focused on watershed characterization and the development of potential wet weather strategies. As part of the coarse evaluations, the project team critically analyzed the LMC watershed's natural and built systems. Strand and Human Nature created a series of coarse-level opportunity plans for each of the subbasins within the project area. The opportunity plans were developed with the overarching goal of capturing and managing stormwater runoff to reduce the frequency and volume of combined sewer overflows in the LMC watershed.

Through this process the project team identified preliminary wet weather strategies and project areas that address over 3.2 billion gallons in annual stormwater runoff that currently enters MSDGC's combined system. This effort led to the development of the Lower Mill Creek Partial Remedy: a sustainable/hybrid alternative to the previously evaluated deep tunnel option. This sustainable solution developed by our team is estimated to reduce the project costs by nearly $200 Million. This cost savings is the result of employing our innovative and sustainable watershed-based wet weather management approach. MSDGC with approval from EPA is now moving forward with the mores sustainable and cost effective solution for CSO control in the LMC.

PROJECT DETAILS:

Client:
Metropolitan Sewer District of Greater Cincinnati, Ohio

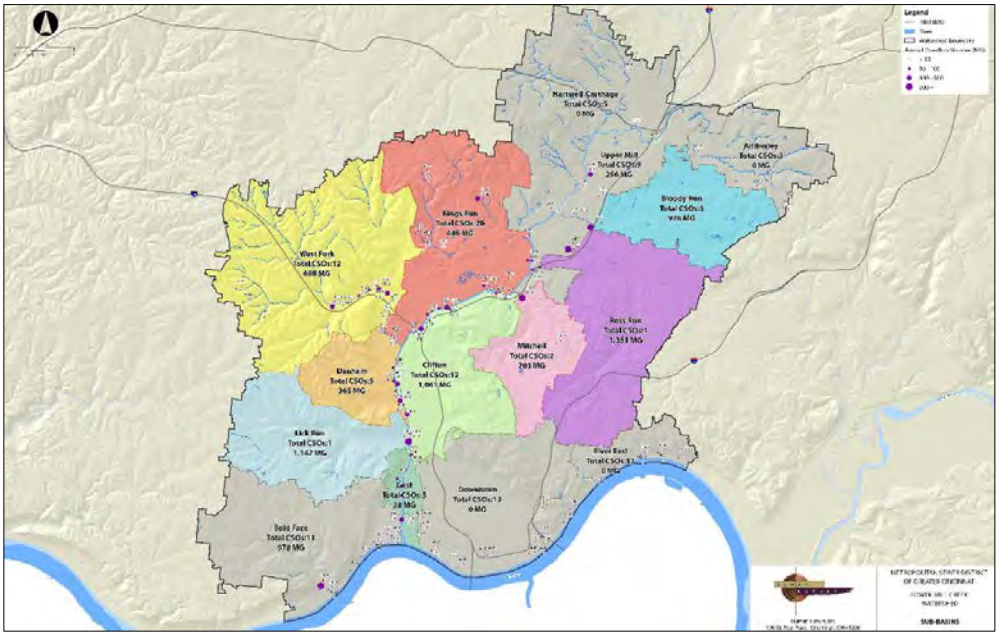
Contact:
MaryLynn Lodor
(859) 244-5535

Year Completed:
2010

Construction Cost:
$100,000 (project evaluation)

PROJECT FEATURES:

- *Identification of 3.2 billion gallons of stormwater runoff entering the combined system*
- *Sustainable/hybrid solution saves nearly $200 Million compared to planned tunnel solution*



Lower Mill Creek subbasins.

LICK RUN CHANNEL REHABILITATION AND COMMUNITY REVITALIZATION – CINCINNATI, OH

Strand and familiar partner Human Nature, were retained by the Metropolitan Sewer District of Greater Cincinnati (MSDGC) to implement the Strand/Human Nature Sustainable Watershed Evaluation Process (SWEP) in the Lick Run Watershed, on the west side of the City of Cincinnati. This process helped identify alternative wet weather control strategies throughout the watershed to address MSDGC's single largest combined sewer overflow. This innovative strategy involves daylighting portions of the existing 19.5-foot-diameter combined sewer and restoring the original Lick Run open channel through a highly urbanized corridor. This approach also incorporates water quality BMPs, strategic sewer separation, detention, and stream rehabilitiation, while providing improved environmental stewardship and community benefits.

In order to achieve the vision for this corridor Strand is leading a large, multi-disciplinary team where coordination with public agencies, utilities, stakeholders, adjacent property owners, and the public is key to the acceptance and ultimate success of the project. Therefore this project included an intensive public outreach and public involvement process which received the ***2012 NACWA award for Public Information and Education***. As part of the efforts to revitalize the community and promote redevelopment new parking areas, a multi-use access path, additional lighting, transportation improvements, and educational signage will be used to create and promote access to the new civic and recreational space adjacent to the open channel.

The stormwater components being led by the Strand team include detailed alternatives analysis and engineering for various naturalized channel configurations designed for the 100 year flood event, 16,500 LF of storm sewer ranging in size from 12" to 60", 2,800 LF of 2-cell cast-in-place box conduit, 1,870 LF of 3-cell cast-in-place box conduit, 1,020 LF of single-cell precast arch conduit, a 2.4 acre wet retention pond, and various other water quality BMPs throughout the watershed. The complexity of the engineering coordination in this project is incredible, and has required close coordination with a variety of agencies and stakeholders. This project is the largest component of the Lower Mill Creek Partial Remedy solution slated to save MSDGC over $170 Million compared to the previously evaluated tunnel option.

PROJECT DETAILS:

Client:
Metropolitan Sewer District of Greater Cincinnati, Ohio

Contact:
MaryLynn Lodor
(859) 244-5535

Year Completed:
2018 (estimated)

Construction Cost:
$104,000,000

PROJECT FEATURES:

- *5,600 LF of open channel rehabilitation*
- *2.4 acre wet detention pond*
- *Safe passage of the 100-year event through the restored corridor*
- *16,500 LF of new storm sewer*
- *Over 5,600 LF of box conduit ranging from 12' to 36' wide*
- *Water quality, education and community enhancements*

Lick Run Master Plan developed by our project team provides a vision for the watershed.

Lick Run open channel conveyance concept.

Lick Run rendering represents the vision for the restored channel as a community amenity.

SUSTAINABLE STORMWATER MANAGEMENT FOR RAPID RUN WATERSHED – CINCINNATI, OH

In response to a United States Environmental Protection Agency (USEPA) consent decree mandating control to 14 billion gallons of combined sewer overflow (CSO) discharge, the Metropolitan Sewer District of Greater Cincinnati (MSDGC) hired Strand to develop a sustainable solution to address the Rapid Run and Devils Backbone Basin CSO. Currently, combined sewers in this area overflow 400 million gallons of combined sewage into the creek annually. In addition, sewer capacity issues on Rapid Run Road caused severe flooding issues for local homes. Strand provided an integrated solution that addresses multiple issues including CSOs, flooding, water quality, hydromodification, and community enhancement. As part of this solution, FEMA Hazard Mitigation funds are being utilized to purchase properties in the floodplain, where a natural channel conveyance feature will be constructed to control flooding and improve water quality. This solution supports MSDGC's Communities of the Future framework, which focuses on wet weather solutions that integrate other community benefits such as economic development. Other elements of the proposed alternative include green infrastructure best management practices to provide water quality and quantity benefits.

Preliminary modeling and costing indicates that our proposed sustainable solution reduces the annual overflow volume of CSO 523 by roughly 90 percent for the same cost of a traditional gray solution.

Our proposed sustainable approach for overflow reduction includes the following elements:

- A conveyance system utilizing FEMA property buyout locations that could be comprised of up to 4,310 linear feet of open channel and 7,275-linear feet box conduit.
- Nearly 16,000-lineal feet of new storm sewer in upstream residential areas.
- Six inline wet ponds and one inline dry pond for reduction of pollutant loadings of TSS, nitrogen, phosphorus, and fecal coliform.
- Purchase of up to 34 FEMA buyout properties that currently experience flooding problems as well as 41 non-FEMA properties.

PROJECT DETAILS:

Client:
Metropolitan Sewer District of Greater Cincinnati, Ohio

Contact:
MaryLynn Lodor
(859) 244-5535

Year Completed:
2012

Construction Cost:
$26 Million

PROJECT FEATURES:

+ *Floodplain restoration including 34 FEMA buyout properties to alleviate historic flooding issues*
+ *4,310 LF of open channel*
+ *Safe conveyance of the 100-year flood*
+ *7 ponds to provide additional water quality benefits*

Rapid Run Open Channel Corridor Schematic.

REGIONAL GREEN INFRASTRUCTURE PLANNING AND IMPLEMENTATION – FT. WRIGHT, KY

Strand and Human Nature have served as the primary members of multidisciplinary team to develop and implement a green infrastructure program within Sanitation District No.1 (SD1) in Northern Kentucky's combined sewer system, the separate sewer service area, and the Northern Kentucky three county region. The project team worked with the overarching goal of reducing the amount of stormwater runoff entering the combined sewer system, conserving and restoring existing waterways, and providing a regional vision for smart stormwater management with the understanding of achieving multiple benefits for the community. Our team identified opportunities to capture and manage nearly 700 million gallons of stormwater runoff in the combined system. Included in this effort was a detailed analysis and design of two large scale stormwater control facilities in the Willow Run watershed.

Part if this included retrofitting an existing transportation cabinet detention basin collecting, 25 million gallons, from 120 acres, on an annual basis. The retrofit primarily included the construction of a unique outlet control structure to regulate flows at optimal release rates during smaller storm events to maximize the reduction of downstream sewer overflows. Additionally, this basin not only handles the 100-year event but has been designed to safely convey the probable maximum precipitation event of 27 inches in 6 hours. Based on flow monitoring data, these simple changes to the outlet control structure, the project demonstrated an annual benefit of 23.2 million gallons of CSO volume reduction, much higher than initial projections.

The terraced reforestation project captures and treats nearly 5.3 million gallons of stormwater runoff annually through terraced berms, complete with bioretention soil and plantings that stretch for nearly one mile in length on a hillside. The steep topography of the hillside, more than 120 feet of elevation change, posed extreme design challenges. The high profile visibility of the project has resulted in successful public education and outreach on the topics of green infrastructure, storm water management, reforestation, and CSO control. This innovative design won a ***2014 National American Council of Engineering Companies (ACEC) Award and a 2014 Kentucky ACEC Award***.

PROJECT DETAILS:

Client:
Sanitation District No. 1 of N. Kentucky

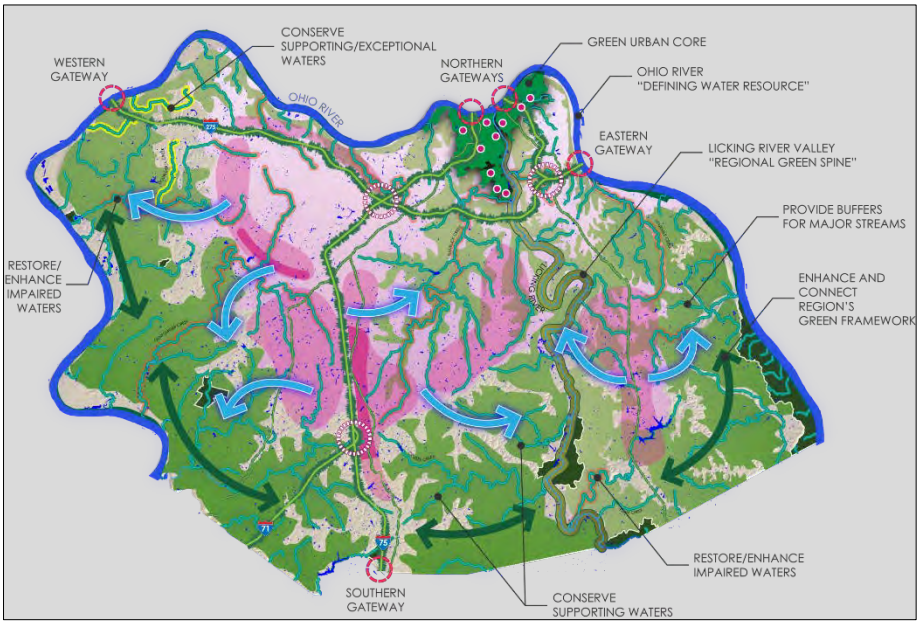
Contact:
Jim Gibson
(859) 578-7461

Year Completed:
2012

Construction Cost:
$1,750,000

PROJECT FEATURES:

- *Regional vision for stormwater management promoting quantity and quality control*
- *Combined system master plan to capture over 700 million gallons of stormwater runoff*
- *Innovative sustainable infrastructure captures and treats stormwater runoff while providing CSO control*
- *National award winning design*



KYTC Basin Retrofit.

ACEC ward winning Terraced Reforestation Project in Northern Kentucky.

WEST FORK SUSTAINABLE WATERSHED OPPORTUNITIES EVALUATION – CINCINNATI, OH

Strand teamed with partner Human Nature, Inc. to complete a preliminary sustainable watershed opportunities evaluation of the West Fork watershed for the Metropolitan Sewer District of Greater Cincinnati (MSDGC). Utilizing a formal planning process developed by the project team, known as the Sustainable Watershed Evaluation Process (SWEP), our team identified a variety of solutions incorporating both gray and green techniques to reduce the combined sewer overflow (CSO) discharges throughout the West Fork watershed.

This effort included a preliminary but comprehensive evaluation of the hydraulic challenges in this basin, including:

- Assessment of structures in the floodway and floodplain.
- Interaction between the sewer interceptor and the West Fork channel.
- Direct stream entry points to the combined system.

The result of this effort included a range of opportunities. This preliminary evaluation of the West Fork basin identified an array of possible control techniques ranging from sewer separation, to detention basins to augment existing real time control facilities, to in-channel controls to minimize the interaction between surface flows and the sewer interceptor. Additionally, our team assisted MSDGC in the preparation of FEMA grant applications for the purchase of properties within the existing floodplain. This effort could allow for the reestablishment of a functional floodplain and create opportunities to integrate additional stormwater management and CSO control facilities into these areas.

Through this process the project team evaluated several alternatives and has identified preliminary wet weather strategies that, based on results from MSD's system wide model, reduce annual overflow volumes by 319 million gallons per year within the watershed. Additionally the solution resulted in a reduction of 551 million gallons of stormwater entering the combined system annually. The recommended alternative also includes reestablishment of 6,000 LF of historic stream, proposed property acquisition to restore the 100-year floodplain, addition of a stormwater pond and other community enhancements.

PROJECT DETAILS:

Client:
Metropolitan Sewer District of Greater Cincinnati, Ohio

Contact:
Tony Parrott
(502) 244-5535

Year Completed:
2010

Construction Cost:
$100,000

PROJECT FEATURES:

+ *Management of 551 million gallons of stormwater runoff*
+ *Assistance with FEMA Grant Applications*
+ *Floodplain restoration and community enhancements*
+ *6,000 LF of historic stream restoration*

The West Fork Channel conveys stormwater and combined sewage.

Combined sewers enter the West Fork Channel at various locations.

29TH AND LORTON AND FAIRHAVEN ROAD DRAINAGE IMPROVEMENTS – DAVENPORT, IA

Repetitive flash flooding had occurred in an area located near East 29th Court and Fairhaven Road within the City of Davenport, Iowa. The flooding was caused by insufficient storm sewer/intake capacities in the lower portions of the system and lack of overland flood routes. During a rainfall event, reported street flooding depths along East 29th Court and Fairhaven Road were as high as 2 to 3 feet. Reports of rear yard flooding from residences along East 29th Court indicated that floodwaters had reached depths that inundated low building entry point. Review of available storm sewer and topographic mapping indicated the following characteristics of the study area:

- The cumulative tributary watershed is approximately 183 acres.
- Design Criteria - 10-year event no flooding, 100-year event contained within City ROW.
- No storm sewer within the upper half of the watershed.
- The flooding is believed to be caused by insufficient intake capacities, undersized conveyance systems, and obstructed or nonexistent overland flow paths.

Based on the XPSWMM 2D modeling results, the preferred drainage improvement alternative that has been developed meets each of the design criteria objectives established by the City. The recommended solution shown below was a collaborative effort with the City and our firm.

Review of the before and after flooding depths and footprints shows the benefit of the recommended solution on this project. Placing these figures side by side is a powerful way to get public and elected officials endorsement for the projects. The City has since hired us to develop a detailed design for construction of the recommended solution.

STRAND ASSOCIATES®

PROJECT DETAILS:

Client:
City of Davenport, IA

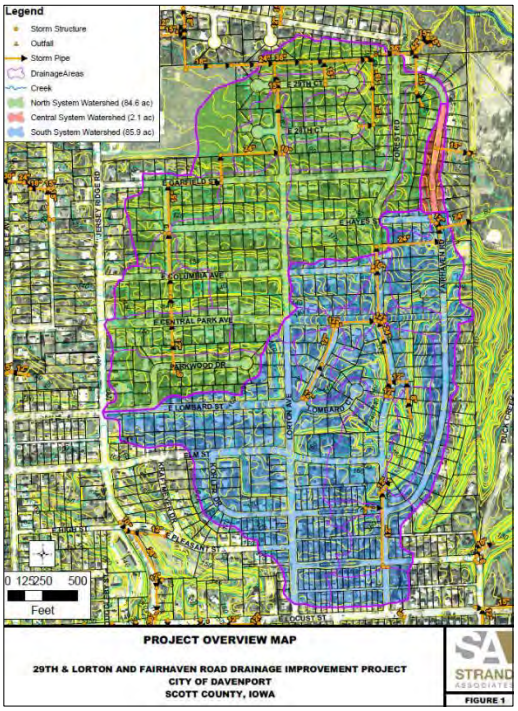
Contact:
Brian Schadt, P.E
(563) 326-7786

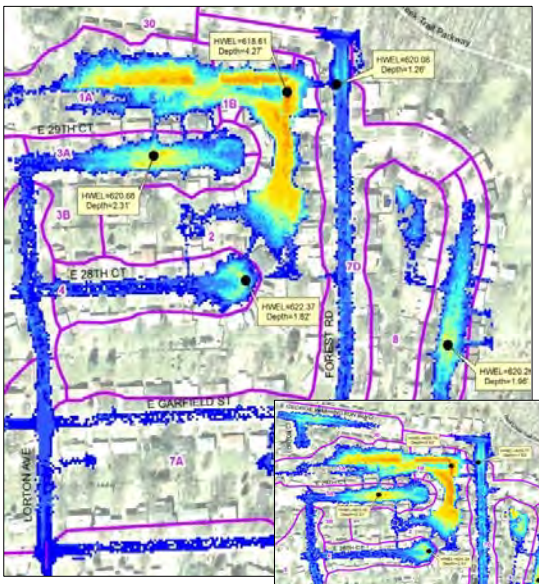
Year Completed:
Ongoing

Construction Cost:
$1.2 Million

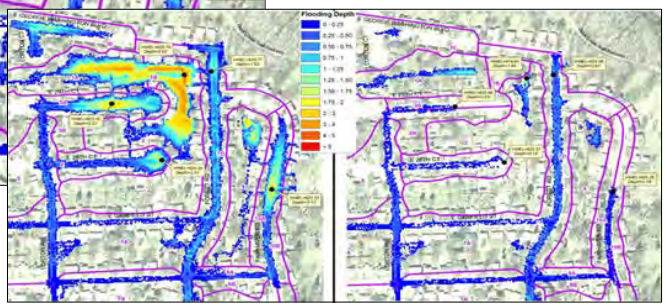
PROJECT FEATURES:

+ *XPSWMM 2D modeling*
+ *Analysis of insufficient system capacities and lack of infrastructure*
+ *Alternatives to alleviate 2 to 3 feet of street flooding*
+ *Analysis of the 100-year event and larger*





XP-2D Results - June 13, 2008 calibration event.



Before ***After***

WATER STREET STORMWATER PUMPING STATION EVALUATION – GALENA, IL

Strand was hired by the City of Galena to perform a detailed hydrologic and hydraulic analysis of its downtown stormwater conveyance system. An existing earthen levee protects downtown Galena from floodwaters of the Galena River and backwater from the Mississippi River. During periods of high floodwater on the river side of the levee, interior drainage in the City's downtown area cannot be conveyed via the gravity storm sewer system and must instead be conveyed via a series of pressure storm sewers and an existing stormwater pumping station. The City wanted to upgrade the hydraulic capacity of the existing stormwater pumping station to provide the downtown area with a level of protection for a one percent probability storm. Ponding depths in the street for this storm event must not exceed one foot. In order to estimate the required pumping capacity and street ponding depths, we developed a comprehensive XP-SWMM 2d model of the City's downtown stormwater conveyance system. Results of this stormwater modeling effort were used as the basis of design for rehabilitation of the Water Street Pumping Station.

STRAND ASSOCIATES®

PROJECT DETAILS:

Client:
City of Galena, IL

Contact:
Andy Lewis, City Engineer
(815) 777-1050

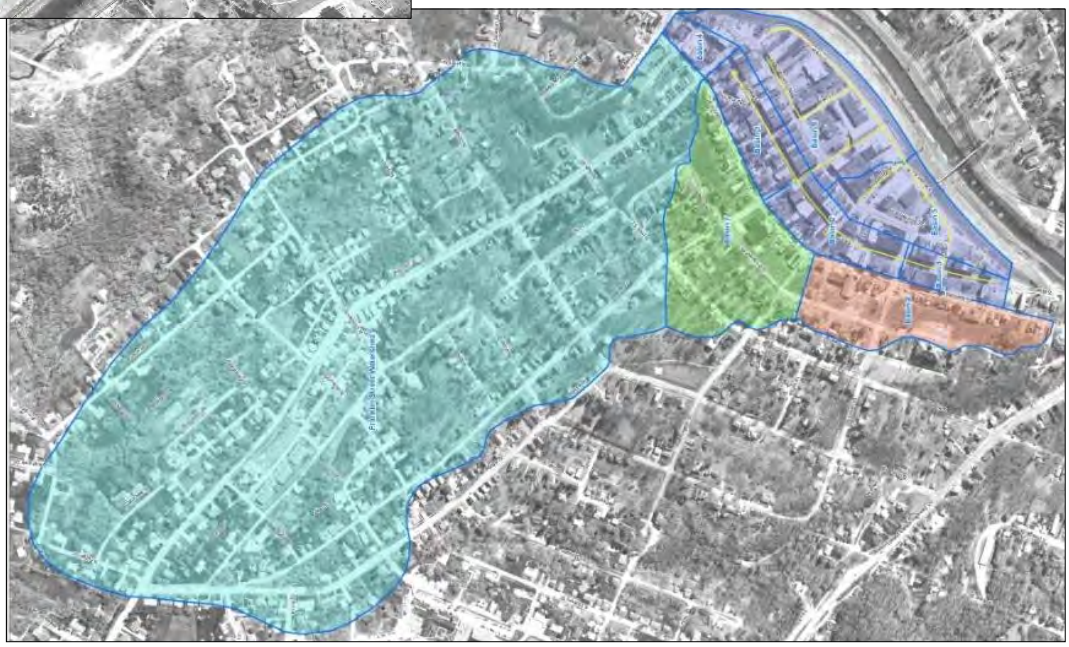
Year Completed:
2012

Construction Cost:
$750,000

PROJECT FEATURES:

- *Stormwater pumping station evaluation and upgrade*
- *XPSWMM 2D hydrologic and hydraulic modeling*
- *Recommended alternatives provide protection for the 100-year storm event*

Existing Condition XP-SWMM 2d Model Results.



Watershed mapping of downtown stormwater conveyance system.

ATTACHMENT 1

Documents and Data Available for Review

The selected Consultant shall provide professional design review services to evaluate previously completed work studies prepared by Christopher B. Burke Engineering, Ltd. The following documents will be provided for use by the Consultant in performing the cost estimate and value engineering reviews. Many of 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
- Village of Winnetka Supplemental Flood Risk Reduction Assessment, by Christopher B. Burke Engineering, Ltd., June, 2011
- Village of Winnetka Flood Risk Reduction Assessment, by Christopher B. Burke Engineering, Ltd., September, 2009.
- Village of Winnetka GIS data files
- Village of Winnetka Flood Damage Survey, Fall 2011
- XP-SWMM modeling for prior drainage studies

ATTACHMENT 2

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: Matthew S. Richards

NAME: Matthew S. Richards TITLE: Corporate Secretary
(print or type)

Subscribed and sworn to me this 3rd day of August, ~~2012~~ 2015, A.D.

By: Rachel A. Frieders
(Notary Public)

My commission expires June 20, 2017

-Seal-

RACHEL A. FRIEDERS
NOTARY
PUBLIC
STATE OF WISCONSIN

AGREEMENT CONCERNING DIGITAL MAP INFORMATION

THIS AGREEMENT, is entered into this _____ day of _____ , 20___, between (hereinafter referred to as "Consultant") and the Village of Winnetka (hereinafter referred to as "Village.")

WHEREAS, the Village has developed certain digital map information concerning certain real property located within the City, which property is the subject of the Consultant's work for the Village (hereinafter referred to as "Data"); and

WHEREAS, the Consultant has entered into an agreement with the Village for a certain project (hereinafter referred to as "Work") and would benefit from the use of the Data in the performance of the Work.

NOW, THEREFORE, in consideration of the mutual covenants herein contained and other good and valuable consideration, the receipt and sufficiency of which is acknowledged hereby, the parties hereto agree as follows:

1. The Village shall supply the Consultant with a digital copy of the Data subject to the following conditions:

   a. The Data provided by the Village is limited to the scope of the Work which the Consultant is to provide for the Village and the Consultant shall limit its use of the Data to its intended purpose of furtherance of the Work;

   b. The Consultant acknowledges hereby that:

      ii The Data constitutes proprietary materials and trade secrets of the Village and will remain the property of the Village; and

      ii The Consultant will not provide or make available the Data in any form to persons other than the Consultant's employees, for purposes specifically related to the Consultant's authorized use of the Data, without the prior written consent of the Village; and

   c. At the request of the Village, the Consultant shall supply the Village with any and all information, which may have been developed by it, based the Data, in a form consistent with Village facilities.

2. The Village makes no guarantee as to the accuracy, completeness, or suitability of the Data in regard to the Consultant's intended use thereof.

3. The term "Data" as used herein shall mean any code or sequence of code characters readable by computers.

4. The Consultant shall indemnify and hold harmless the Village, its officials, officers, independent Consultants, agents, employees, successors and assigns from and against any loss, damage, cause of action, fine or judgment, including all costs connected therewith (such as reasonable attorneys' and witness fees, filing fees and any other expenses incident thereto) which may arise out of or in connection with the Consultant's negligent acts, errors, or omissions in performances of professional services in connection with this Agreement or the use of the Data.

5. This Agreement shall remain in full force from and after its Village execution and until such time as the Work has been completed to the satisfaction of the Village, at which time the Consultant shall cease its use of the Data for any purpose whatsoever. An authorized representative of the Village, upon request, shall be afforded sufficient access to the Consultant's premises and data processing equipment to verify that all use of the Data has been discontinued.

6. Notwithstanding anything to the contrary contained hereinabove, the Village may terminate this Agreement upon notice, effective immediately, in the event the Consultant fails to comply with any of the terms and conditions hereof.

7. All notices that are required hereunder, or which either the Village or Consultant may desire to serve upon the other Party, shall be in writing, and shall be deemed served when delivered personally, or when deposited in the United States certified mail, postage prepaid, return receipt requested, addressed as follows:

If to the Village:

Village Manager
Village of Winnetka
510 Green Bay Road
Winnetka, IL 60093

If to the Consultant:

_____

_____

_____

_____

8. The Consultant certifies hereby that it is not barred from entering into this Agreement as a result of violations of either Section 33E-3 or Section 33E-4 of the Illinois Criminal Code and that it has a written sexual harassment policy in place in full compliance with 775 ILCS 5/2-105(A) (4).

IN WITNESS THEREOF, the parties hereto have executed this Agreement on the date first above written.

Consultant

ATTEST

By_____

_____

Its _____

Village of Winnetka

ATTEST

_____

_____

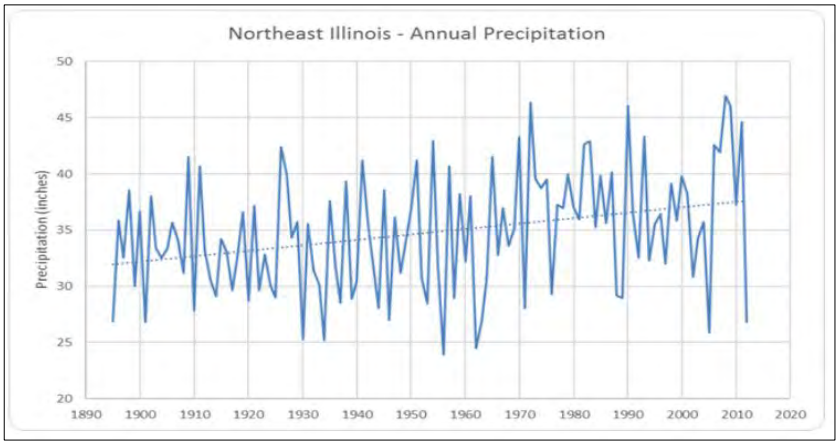
Village Manager

B. APPROACH TO PROJECT

B. APPROACH TO PROJECT

PROJECT UNDERSTANDING

For the residents of Winnetka there is no question about it; rainfall quantities are increasing in Northeast Illinois. The Illinois State Water Survey's recent evaluation of annual rainfall data has shown an annual increase, but Winnetka did not need the study to show them that. The Village residents have been burdened with multiple historic rainfalls in less than 10-years and they know they need to do something about it. Unlike many communities that react to a damaging storm event with great intentions but then find other issues to take their attention, Winnetka has continued to pursue a solution to its stormwater management concerns.



Starting in 2008 with the influence of Hurricane Ike dropping over 8 inches of rain on the area in 36 hours, the Village of Winnetka took notice and moved to evaluate its stormwater management systems. It was not as if the Village had been doing nothing. Nearly $3 million had been spent on stormwater management improvements in the prior decade. But the two studies that resulted from the 2008 storm showed that Winnetka was still vulnerable with recommendations to spend over $14 million to achieve a 10-year storm level of protection.

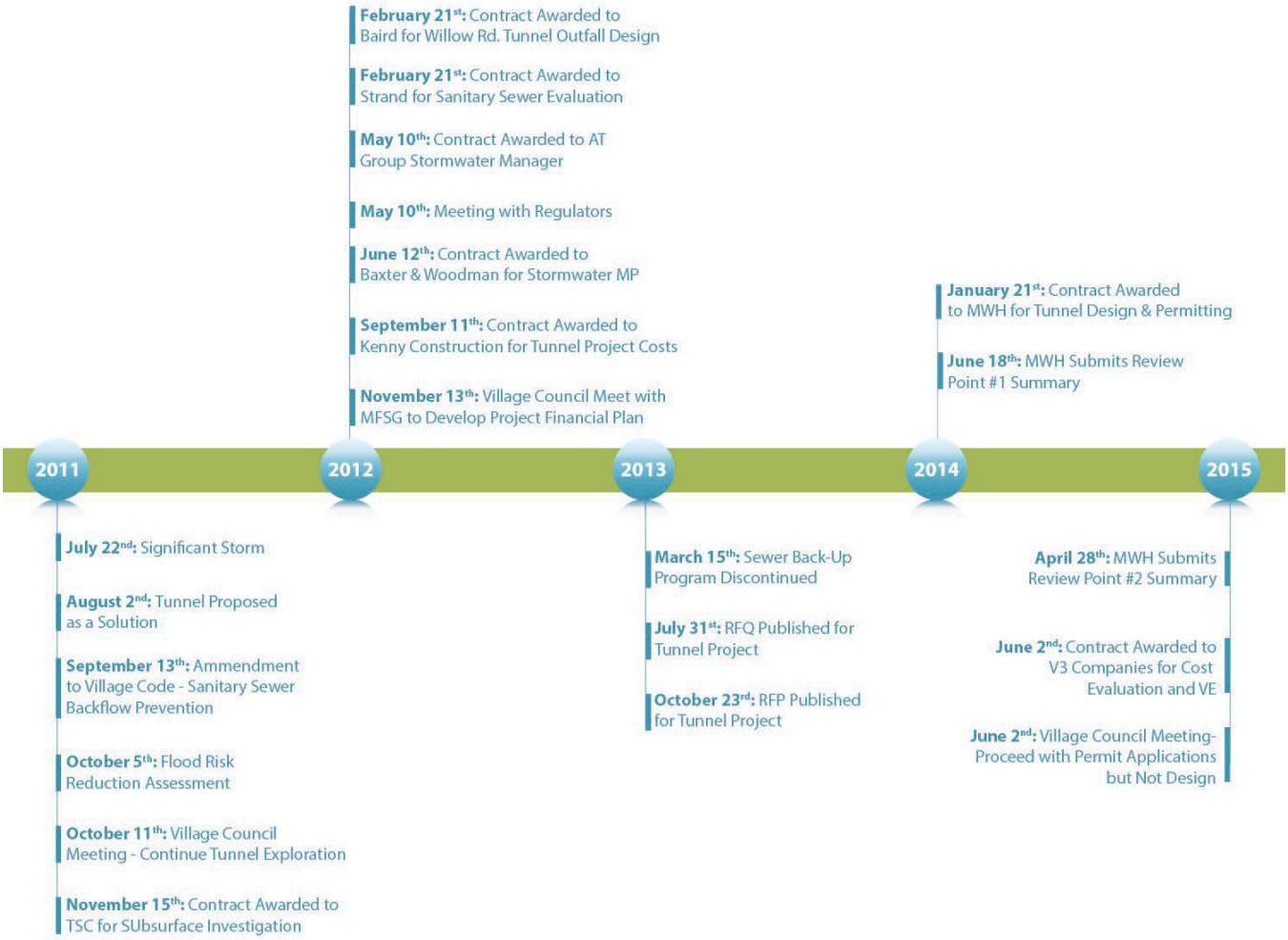
No sooner had the Village Council been presented with the study results in July 2011, when Winnetka was once again hit with over 8 inches of rain; 6.5 inches falling in just over 3 hours. This event took a massive toll on the residents of Winnetka. A survey of damage estimates 1,000 or more homes incurred some level of damage from the event and standing water burdened the community for more than a week following the event. The Village suffered through a third historic rainfall event in April 2013 that resulted in almost 5 inches of rain on northeast Illinois.

Cherry Lane flooding on July 23, 2011.

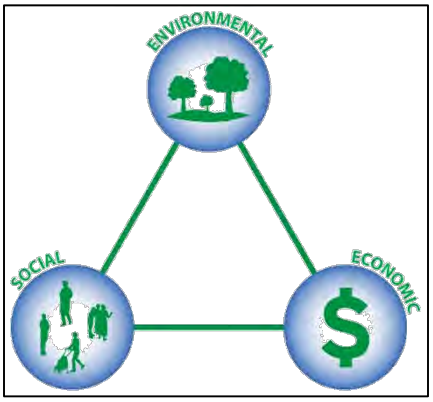
Clearly with three historic rainfall events in less than 5 years, a 10-year level of protection was not seen as sufficient, and the Village pushed to identify solutions to provide Village residents with a greater level of protection. The revised study issued in August 2011 recommended several stormwater management improvement projects. Some of these projects, like the Winnetka Avenue Pumping Station Improvements, the Tower Road and Foxdale Improvements, and the Greenwood and Forest Glen Improvement project are complete or currently underway. The Village has spent over $6 million to date tackling its stormwater deficiencies. But the deficiencies identified in the west and southwest portions of the Village have proven to be extremely challenging to overcome.

The Flood Risk Reduction Assessment the Village developed presented two potential paths for addressing the western and southwestern portions of Winnetka. The first path presented a series of five individual projects that were a combination of increased sewer conveyance, open drainage improvements, above and below ground storage, and pumping. The projected cost of these projects was $41.7 million. The second path proposed a series of storm sewer upgrades connecting to a new deep tunnel on Willow Road to convey stormwater to Lake Michigan. This project has come to be known as the STADI project and had an estimated cost of $32.5 million. Both paths have experienced serious barriers impeding their progress and success. A mix of political, environmental, and economic concerns has placed both paths in serious question and the Village Board seeking a solution that could overcome those barriers.

Since 2008, after the impacts of Hurricane Ike, Winnetka has spent millions of dollars on studies and improvements to understand and manage stormwater in the Village. We have reviewed the information provided by the Village, and have created the following timeline and sequence of events to solidify our understanding of the events that have occurred and the tremendous level of effort the Village has invested in finding a solution during this time.



Based on our review of the prior studies and the recommendations presented to the Village since 2009, we recognize that cost estimates provided to the Village have been increasing to what is now estimated to cost $58.5 million or more. With such a massive public expenditure planned, the stormwater solution for the Village of Winnetka needs to be thoroughly evaluated so the Village has confidence in the selected alternative and the return on investment for the community as a whole is meaningful. Our team sees great value at this stage in re-engaging potential partners like the Forest Preserve District of Cook County and considering all possible solutions before proceeding with the STADI project.



A multi-faceted evaluation is critical

Strand has not only listened to the recordings of the most recent Village Council discussions of their flood risk reduction fears, but we attended the June 30 meeting and witnessed in person the Village's desperate desire to make the right decision moving forward to protect their community from further damages. We heard statements that the final project needs to be "effective, sustainable, and holistic." We heard concerns that issues such as benefit versus cost were not considered and "win-win scenarios" for Winnetka and potential project partners were not fully explored. **It is clear to us from attending the June 30 Special Meeting that what the Village is looking for are the unique and progressive services Strand Associates has been providing to our clients for over a decade.**

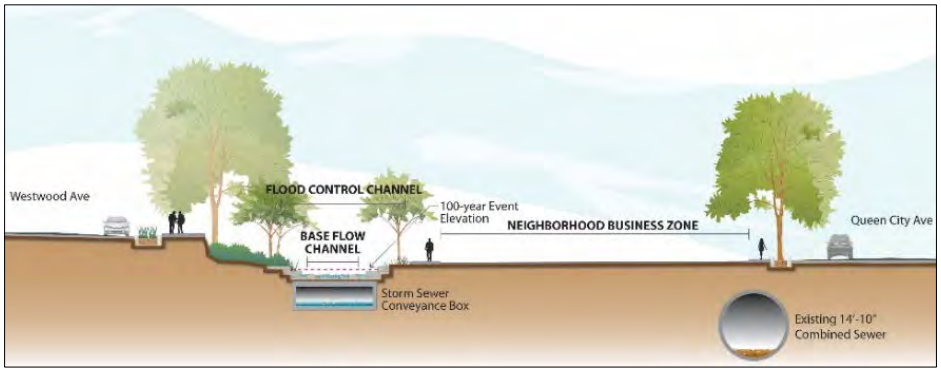
The purpose of the Village's Request for Proposals for Evaluation of Stormwater Management Improvements and Alternatives for Western and Southwestern Winnetka is to confirm the recommendations and costs presented in the prior Flood Risk Reduction Assessment for the 5-project path, evaluate alternative solutions for flood reduction in western and southwestern Winnetka, and contrast these alternatives in an effort to identify the stormwater management program that delivers sustainable, effective, and responsible flood reduction improvements.

The goal of the project is to give the Village confidence that they have considered all of the angles, called upon all of their partners, and leveraged all of their resources to promote a stormwater management and flood reduction program that can be supported by the residents of Winnetka.

At the June 30th Special Meeting, Village President Greable implored the firm selected to undertake this latest study to be ready to "stake their reputation" on their findings. The Strand/Human Nature team is nationally recognized for our stormwater planning work, and our team is prepared to provide the Village with our firms' experts to provide the Village with confidence in the results of our study.

Based on our understanding of this project, we have identified the following critical success factors:

- **Identification of Viable Alternatives** – This is the primary purpose of this project, which does not mean the identified alternatives will necessarily be the best alternatives, but the Village must have confidence going forward that all potential alternatives have been considered and they have the best available information to make solid decisions.
- **Implementation of Sustainable Stormwater Management** – The Village recognizes the alternatives presented to date entail traditional stormwater management and desire solutions that also implement more natural and sustainable controls. We feel this has been missing to date and that there are opportunities for sustainable stormwater management that need to be considered.
- **Establishment of Community Partnerships** – It's our experience that successful watershed planning for implementation of stormwater management and flood control requires a partnership with the community. In the case of western and southwestern Winnetka, gaining the support of community partners like the School District, Park District, and Forest Preserve District will be critical to the viability of potential alternatives.



Cross section graphic of a stormwater control alternative.

Example public education documents created by Human Nature.

- **Public Education and Understanding** – Regardless of which stormwater and flood management alternative or alternatives the Village ultimately pursues, it will be critical that the general public understands the supporting data and reasoning that goes into making that decision. Communication with the public will be key, which does not mean just speaking and listening, but understanding.

Based on our understanding of this project, we have identified the following potential obstacles to success, and we have included our plan to address these obstacles.

POTENTIAL OBSTACLE TO SUCCESS	PLAN TO OVERCOME OBSTACLE
Availability of Land for Stormwater Management	**Open Dialogue Focused on Property Owner Goals** – an open dialogue starts with recognizing the property owner's expectations and objectives for the use of their property. Our project team brings strong current relationships and experience with the Forest Preserve and Park Districts through our partner, Upland Design. Also, our approach emphasizes building on this relationship and understanding of their property goals and showing how the Village's stormwater management solutions are in line with those goals and their benefit.
Physical Conditions, Topography, Base Flood Elevations	**Watershed Evaluation Process** – our approach expands stormwater evaluation of specific flooding to a broader watershed evaluation and consideration of holistic alternatives. This bigger picture evaluation process uses all potential tools to overcome the individual physical constraints of the study area.
Water Quality Concerns	**Implementation of Sustainable/Green Infrastructure** – our approach focuses on implementing best management practices that inherently provide water quality benefits. Whether the solution is grey or green infrastructure, support of the final project by jurisdictional agencies and the general public will only be achieved if water quality improvements are achieved.
Cost	**Cost-Benefit Evaluations** – up to this point the goal has been to provide protection up to the 100-year frequency storm event, but the associated cost seems to continue to rise. From recent Council meetings and the Village's Request for Qualifications, we feel it important to provide the Village with a more comprehensive cost-benefit evaluation that tracks the project cost relative to level of protection giving a perspective for the Village to determine what they feel to be their most cost-effective plan of attack.
Public Expectations	**Clearly Define Success** – the foundation of our study will be establishing through our communications, reports, and presentations the expectations of a successful project. This includes clarifying that not all viable alternatives will be popular, such as property buyouts and home flood proofing or even deep tunnels. But the success of this study is in building confidence that all solutions have been considered and solid decision making has been achieved.
Public Education	**A Robust Public Participation Program** – overcoming project obstacles hinges on successful public education, which is why we place great emphasis on our Public Participation Program. Our program does not just focus on speaking and listening, but on establishing understanding. The technical aspects of stormwater management are complicated and confusing. We have proven our ability to present these aspects through various tools and visuals that make the concepts understandable, relatable, and supportable.

PROJECT APPROACH

The Strand and Human Nature team have extensive regional stormwater master planning experience having completed regional sustainable watershed evaluations and flood studies for a number of Midwestern communities including Cincinnati, Ohio, Cleveland, Ohio, Dubuque, Iowa, Davenport, Iowa, Sterling, Illinois, Northern Kentucky, Louisville, Kentucky, Oshkosh, Wisconsin, Onalaska, Wisconsin, and Galena, Illinois. While the stormwater management opportunities and strategies identified are unique to each community and differ considerably, we have consistently achieved impactful, cost-effective and implementable stormwater management programs for our clients. In each community, we have successfully achieved project objectives similar to those described in the Village of Winnetka Stormwater Management Study Request for Proposals (RFP).

Our Team has developed a unique watershed based approach which places a heavy emphasis on establishing a strong planning foundation, which we believe is critical to the success of any stormwater management program. Proper planning helps to ensure that the selected projects:

- are cost-effective and feasible;
- integrate a comprehensive evaluation of innovative sustainable and traditional solutions;
- encourage community partnerships and benefits; and
- represent a cohesive watershed-based plan.

Our watershed based approach results in a solution matrix that is community specific and reflects the important relationships among natural systems, the environment, infrastructure (sewers, transportation, parks and open space), the economy, and the community. Our approach is intended to consider integration of stormwater and flood control solutions into the broader vision for the community as a whole. This means that our approach typically provides tremendous added value to communities by providing tangible and visible amenities beyond just stormwater management and flooding control. The Village of Winnetka is preparing to undertake a massive public works project that will invest tens of millions of dollars into enhancing the community's infrastructure, and one of our goals is to make sure that the result of that investment is as meaningful as possible to the rate payers.

Our Team's watershed evaluation process also employs a "business case" evaluation in which we compare costs and benefits of various solutions to better understand the value and merits of various alternatives. We place a great deal of emphasis on development of detailed graphical concepts and renderings to clearly convey the design intent and desired aesthetic of each proposed alternative to help the community and decision makers to visualize each potential solution. Our proposed solutions often involve multiple elements and typically represent a mix of traditional gray engineering and "green infrastructure" solutions.

We have reviewed the proposed scope of work provided by the Village in the RFP, and we believe that these 10 tasks align well with our team's planning and evaluation approach for stormwater management and will allow us accomplish the Village of Winnetka's goals and objectives. We have outlined our general approach to each of these 10 tasks as follows.

TASK 1 – PROJECT KICKOFF MEETING

As outlined by the Village, our team will conduct a kickoff meeting within 7 days of the notice to proceed. This meeting will be used to establish schedules, roles, responsibilities, milestones, communication plans and general project management guidelines. As discussed previously in our Project Team section, we are approaching project management and leadership of our team in a unique way to serve Winnetka as effectively as possible with the best technical experts in our firm. Accordingly, Mike Waldron (project manager), Mark Shubak (modeling expert), and John Lyons (stormwater planning expert) will all be present at the project Kickoff Meeting. We believe establishing and maintaining strong lines of communication with the Village, key stakeholders, the public and the various team members will be the key to a successful project, starting with an effective Kickoff Meeting.

TASK 2 – COUNCIL INPUT SESSION

Village of Winnetka Council Members.

Per the recommendation in the RFP, we have included sufficient meeting time for Council input sessions. In preparation of this submittal, we have reviewed the provided Council meeting recordings, and we have a firm understanding of the importance of this project to the Village Council. We are prepared to take clear direction from the Council and to engage and communicate with the Council as needed. We recognize that as elected officials it is the duty of the Council to be good stewards of public funds, and to strive for projects that have the best possible end result for the residents of Winnetka. We also recognize that the Village has made a concerted effort towards fiscal transparency. We will keep this in mind as we work with the Council on this project. We recognize that, similar to the community at large, each Council member brings their own perspective and their own concerns to the project. Therefore, we agree this initial Council input session should occur early in the project focusing on the project plan, budgets, desired project outcomes and expectations, goals and processes.

TASK 3– DATA GATHERING

Our approach recommends breaking the data gathering phase up into three key steps (1) review of available information, (2) review of existing XP-SWMM modeling, and (3) comprehensive inventory and analysis. These steps are described as follows.

3.1 Review of Available Information

Our team will continue to review all available relevant information including previous drainage studies and reports, existing GIS data, and flood damage surveys. Our team will develop a strong understanding of all the background information and previously explored alternatives to ensure that we are able to quickly move this study forward in a manner that will minimize inefficiencies. Our team has already built a foundation for this data review by analyzing the information made available through the RFP and the Winnetka Stormwater Management Plan website.

3.2 Review of Existing XP-SWMM Model

XPSWMM 2D modeling results.

A thorough review of the existing XP-SWMM model is crucial to this project. The model is the foundation upon which all proposed projects are evaluated and project sizing is based. An inaccurate or un-calibrated model could result in improperly sizing controls which could potentially add unnecessary costs to the project. Our team of expert modelers will review the existing model and identify any areas of concern or potential opportunities to enhance or improve the model to generate more accurate modeling results. Based on a brief review of the 2011 Flood Risk Assessment Report completed by Christopher B. Burke Engineering, there appears to be an opportunity to upgrade the XP-SWMM 1D model to a XP-SWMM 2D model platform. Limitations of a 1D modeling platform include the inability to accurately reflect surface flood storage volumes and overland flood routes. The 2D modeling platform that we propose will utilize available Cook County LIDAR topographic data to accurately reflect flood storage volumes in the model and clearly define overland flood routes. Furthermore, the graphical output of the 2D model, which clearly indicates estimated flooding extents and depths, are easy to understand and an invaluable tool for communicating stormwater results to Village representatives, local residents, and stakeholders. We have also reviewed the Hydraulic Basis of Design Report prepared by MWH. Based on our review of this document we understand that additional modifications were made to the Christopher B. Burke Engineering model.

Unfortunately, MWH added these changes to the model under their own MWH InfoWorks modeling platform. The proposal has stated the Village's willingness to move forward with the Christopher B. Burke Engineering XPSWMM model, therefore, we will investigate these additional changes and if appropriate will add the changes into the Village's XPSWMM models.

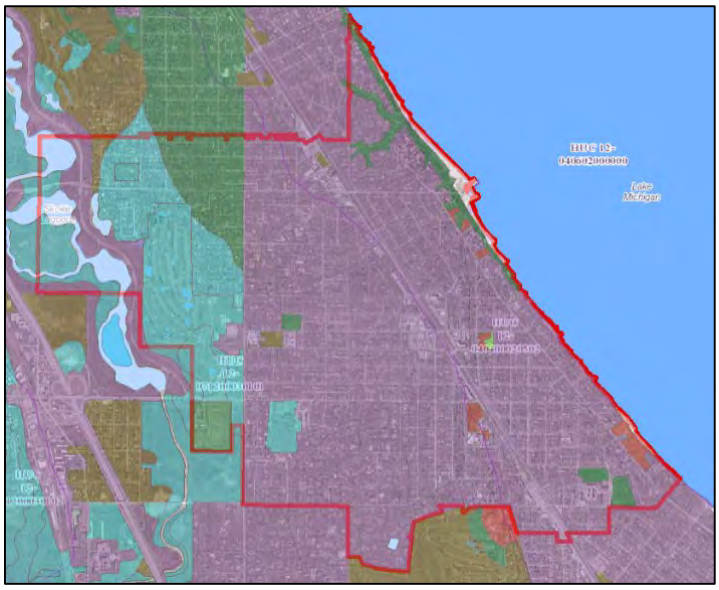
3.3 Comprehensive Inventory and Analysis

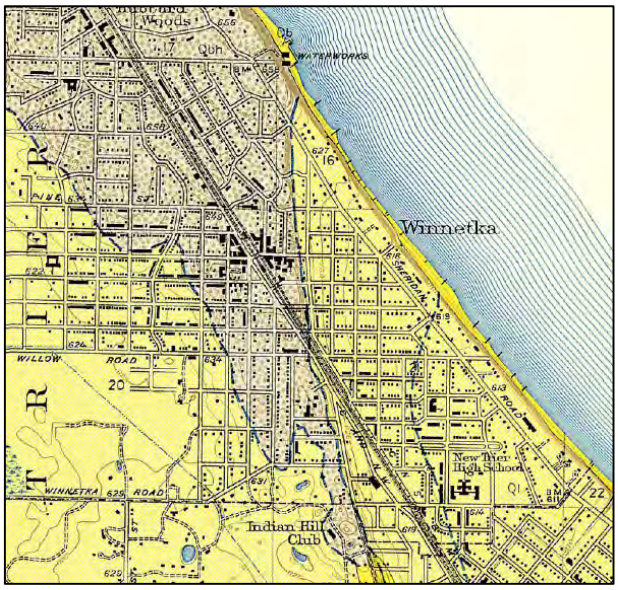
As part of this task we propose the completion of a comprehensive inventory and analysis phase to more comprehensively look at the assets, character, and opportunities that exist for Winnetka. The inventory and analysis will primarily use geographic information systems (GIS), limited field investigations, existing community plans and input from Village staff and stakeholders. The information and the opinions and viewpoints provided by Village Council and staff will be instrumental in driving the direction of the proposed alternatives. As part of our inventory and analysis our team will focus on the following key data categories:

- Natural systems
- Built systems
- Community character
- Policy issues
- Existing and planned projects
- Stakeholders

A description of what we evaluate in each of these categories is provided below.

+ **Natural Systems** – Natural systems include, but are not limited to, topography, hydrology, soils and geology, and tree canopy. An assessment of these systems will help our team identify opportunities and constraints for a range of stormwater management alternatives. Understanding how natural systems worked before being altered by development can lend insight into how sustainable solutions could be implemented to solve current problems. The following maps show the known hydrologic soil groups throughout the Village of Winnetka, and the surficial geology of the area.





Example Natural Systems Mapping for the Village of Winnetka - Hydrologic Soil Groups (above left), Surficial Geology (above right).

+ **Built Systems** – While built systems are essential to the quality of life in urban areas, they have influenced the natural function of landscapes and watersheds. These systems include land use and land cover types, impervious surfaces, and infrastructure (e.g., sewer, transportation, and other utilities). A detailed review of land use will result in identification of potential parcels for placement of stormwater controls. A region's transportation corridors also provide valuable opportunities for integrated stormwater management within the right of way. Our team will investigate arterials and local streets, public transit routes, pedestrian circulation, sidewalk connectivity, and recreation routes to determine if stormwater management opportunities exist. We will also conduct a detailed review of existing impervious surfaces to identify appropriate strategies for integrated stormwater management. Our team will also develop a detailed understanding of the existing storm sewer infrastructure to allow proposed management strategies to capitalize on exiting assets.

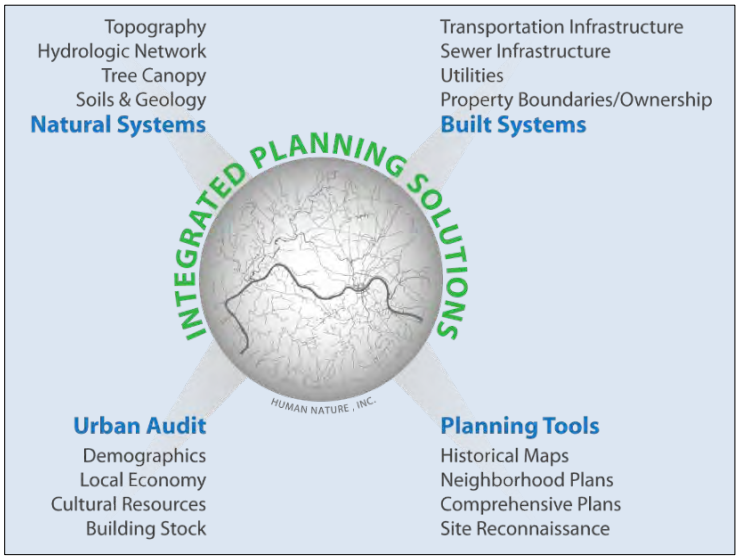
+ **Community Character** – As communities develop over time, they often create unique patterns of development. We want to understand the unique character so that the proposed solutions can honor the character of Winnetka. Therefore, an integral component of the watershed inventory and analysis is an understanding of past development patterns. Mapping changes in topography, land use, and development over time can indicate the location of historical wetlands and streams, former agricultural lands, sensitive landscape features that have been lost, this information can be useful in the development of creative and comprehensive stormwater solutions. Property lines, property ownership, and the shape, pattern, and size of parcels are key factors in the appearance of the built environment. During this task, the team will investigate general parcel data as well.

+ **Policy Issues** – Using a combination of traditional engineering techniques and sustainable technologies for stormwater control requires a comprehensive understanding of existing policies and regulations that may affect the types of strategies that can be employed in the Village. Our team will consider zoning and municipal codes, subdivision regulations and stormwater management regulations to identify opportunities and hindrances to the implementation of green infrastructure.

+ **Existing and Planned Projects** – A thorough analysis of the Village should include identification of all infrastructure projects or improvements that are existing or planned within and around the area. These plans may present opportunities to integrate infrastructure improvements or to engage additional stakeholders in the planning and implementation processes. Projects can include transportation infrastructure projects (e.g., highway improvements, street improvements), utility projects (e.g., sewer, water, electricity), housing, commercial, and/or business developments, comprehensive plans strategies plans, and neighborhood-specific zoning changes or amendments.

+ **Stakeholders** – An important element for the Village to consider as part of its overall green strategy is the identification of partnership opportunities throughout the community. Numerous public agencies in and adjacent to the Village may have plans to invest significant amounts of money over the next decade in the construction and upgrade of public infrastructure, including, but not limited to, streets, schools, parks, and rail transit. For instance, the Winnetka Park District has already begun implementation of their Skokie Playfields Master Plan, but opportunities for further partnering may still be available. Each public project represents an opportunity for leveraged infrastructure investment whether it is gray, green, or a combination of the two. The team will work closely with Village staff to identify and communicate with relevant stakeholders.

Conducting a comprehensive inventory and analysis will allow our team to look at the Village's stormwater management challenge from a fresh perspective. An extensive inventory and analysis will set the stage for our team to think outside the box, and consider new and creative solutions to Winnetka's flooding problems. This step is key component of our watershed planning and evaluation process to ensure a solution based on community specific conditions.



Our detailed inventory and analysis leads to community specific solutions.

TASK 4 – PROGRESS REPORTING

As requested in the RFP scope of work, our team will provide weekly written progress updates for Village staff and monthly written progress updates for Village Council. These frequent written communications between our project team and the Village will ensure that everyone is updated on the project status. Our progress reports will be comprehensive yet concise to clearly and effectively convey updates. Additionally, our Project Manager will be available to attend Council meetings to answer questions and assist staff with their monthly stormwater report.

TASK 5 – EVALUATE/CONFIRM AND UPDATE EXISTING HYDROLOGIC AND HYDRAULIC MODELING

Accurate modeling is critical to the development of realistic, appropriate and feasible stormwater management solutions. As part of this effort our team will evaluate, review, update and calibrate the existing model to ensure it can be used to evaluate existing conditions and proposed alternatives. Our team plans to leverage the Village's existing model to the greatest extent possible and will complete the following as part of our model analysis and update:

- **Existing Network Review** – Our modelers will review the existing infrastructure represented within the model with current GIS information, field checks of critical structures or locations, pump station operations and input from Village field staff on how the system functions.

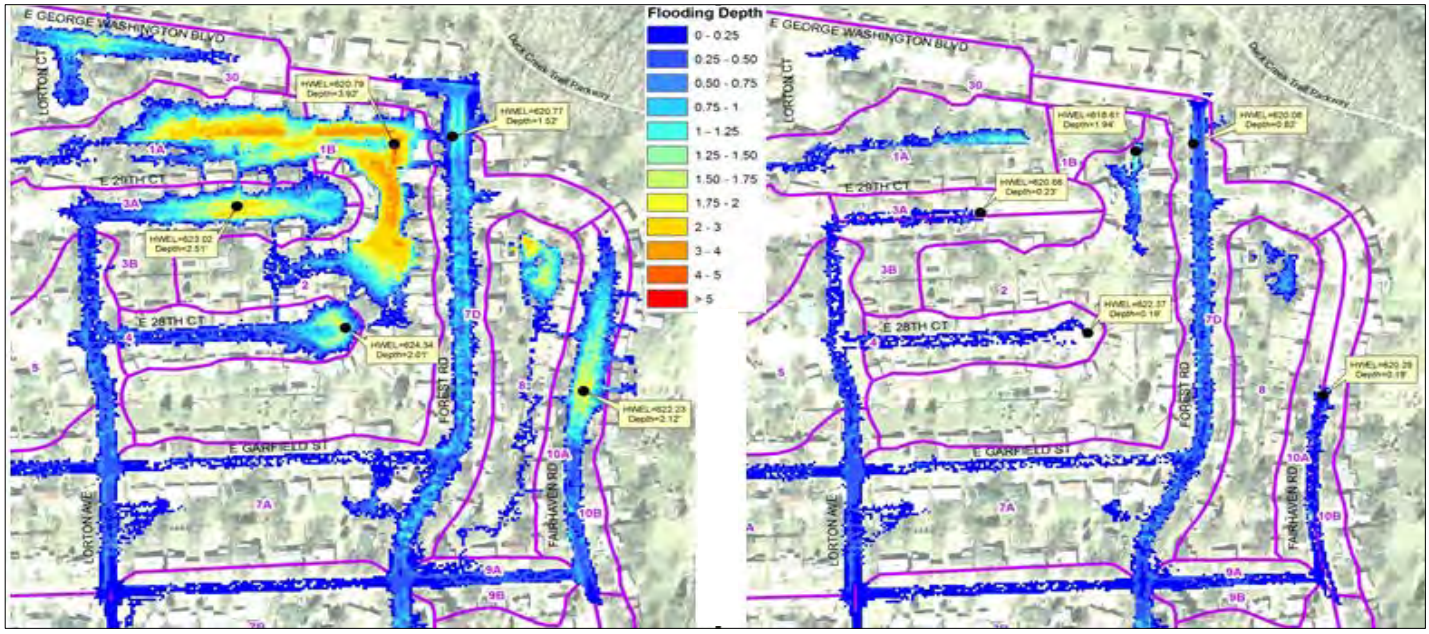
- **Runoff Data Review** – We will review and update the model to verify runoff data is based on the most up to date topographic, imperviousness, soils, and seasonal groundwater variability information available. Additionally, our modelers will review historic rainfall data (depending on availability) to confirm average conditions and to understand the larger events impacting the Village.
- **Calibration** – Based on updates made to the model from the network and runoff data review our modelers will calibrate the revised model to confidently assess the existing conditions within the Village along with the proposed stormwater improvements. We will work with the Village Staff to determine the most appropriate historic storm event and measured high water elevations during that storm to calibrate the model to.

TASK 6 – MODEL/VERIFY EXISTING CONDITIONS AND EXISTING FLOODING LOCATIONS

To more accurately represent the existing conditions and verify the existing flooding locations, we recommend the use of the XP SWMM 2D modeling enhancement. Upgrading the Village's existing XP SWMM model to the enhanced 2D version is relatively simple and will yield much more accurate flooding extents. The following graphic represents XP SWMM 2D modeling completed by Strand for Davenport, Iowa to demonstrate the extent of flooding occurring in this neighborhood under existing conditions, and after the implementation of our proposed stormwater management controls. This type of graphical modeling output helps convey extent and depth of flooding before and after implementation of proposed solutions. In this particular case in Davenport, our solution was designed to keep the 100-year event flooding contained within the City's right of way.

Our firm was one of the first engineering firms to utilize the XP SWMM 2D package in 2009. In the past 6 years, we have continued to use this technology to assist numerous communities throughout the Midwest. Beyond our 6 years of extensive 2D modeling experience, we have used XPSWMM 1D (1D) for the last 15 years to help clients formulate successful stormwater management plans. This experience has allowed us to understand the nuances of 1D and 2D modeling to efficiently perform XPSWMM modeling in large interconnected storm sewer networks. As a result, we are confident in the analysis and results that we provide to our clients.

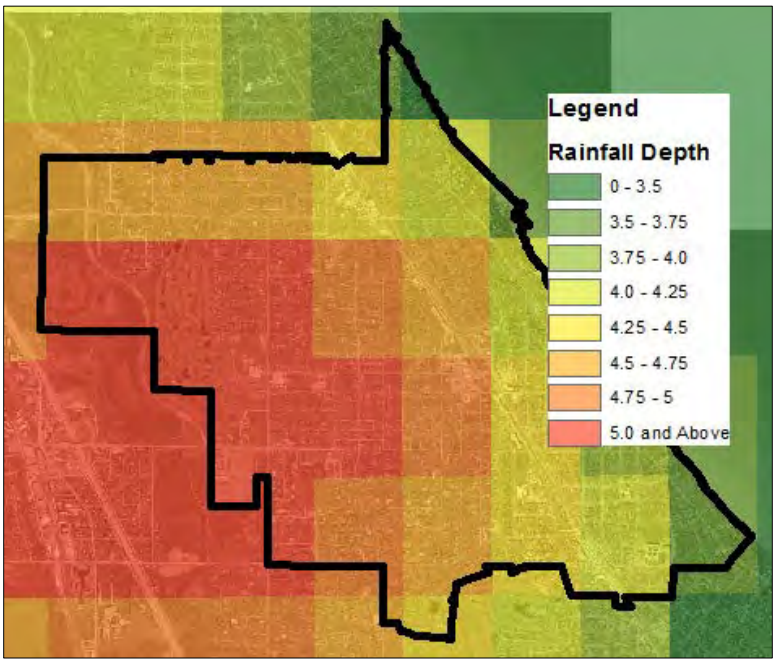
BEFORE **AFTER**



Model output showing before and after impacts of the 100-year event.

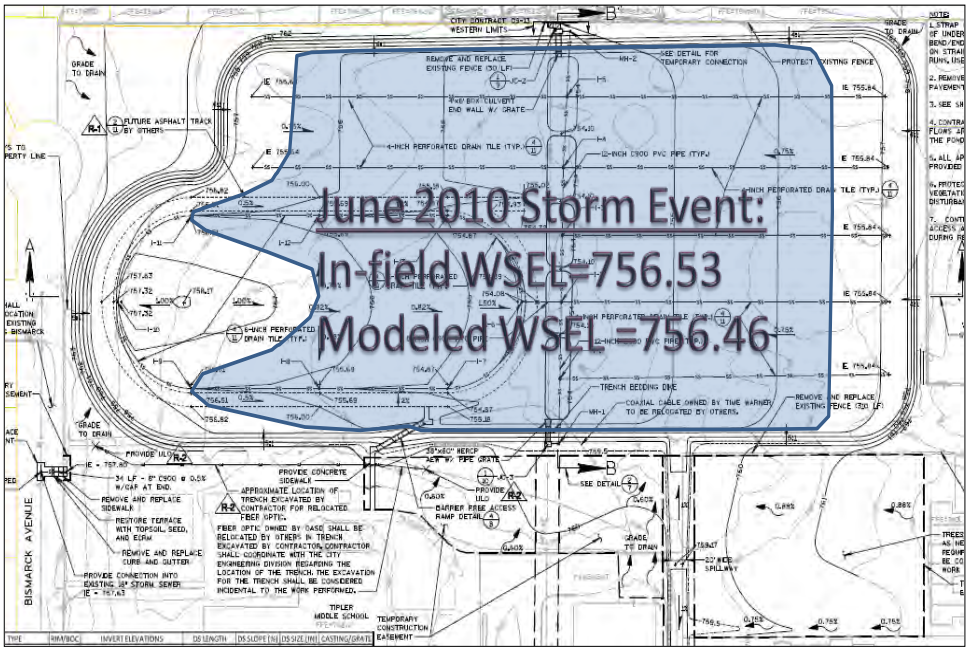
While the XPSWMM model and add-ons are a powerful toolset, the effectiveness of the solutions are only as good as the accuracy of the models. Our experience, training, and software will provide the Village with a skilled modeling partner to verify the existing model and flooding extents. Flood extent maps derived from our efforts assist in confirming accurate existing conditions.

Our proposed calibration methodology provides the Village with a high level of confidence that the model reflects what is actually occurring. The calibration step also ensures that the selected flood mitigation alternatives are appropriately sized to meet the various design requirements the Village has developed. Our calibration method will incorporate soil moisture conditions, historic rainfall measurements and Next Generation Radar Data (NEXRAD), water elevations in the Skokie River, and known high-water elevations from prior flood conditions. Using NEXRAD data allows us to properly reflect the variation in rainfall amounts and intensities across the Village's watersheds. This step will either confirm the appropriateness of utilizing rain gage data for calibration purposes or highlight the need to use a spatially distributed rainfall approach. To demonstrate the importance of reviewing radar data for specific storm events, the figure at right shows Radar Imagery acquired from the National Climatic Data Center for the Village of Winnetka during the July 2011 rain event which shows extreme variability in the spatial distribution of rainfall - some areas of Winnetka received over 5 inches of rain and other areas received less than 3.5 inches of rain. This color range shows the potential for variable rainfall across a community and how only using gauge data can produce inaccurate models.



Radar imagery of the July 2011 event over Winnetka.

The ultimate test of a calibrated hydrologic and hydraulic model is to compare the modeling results to an actual storm event with flood mitigation improvements in place. We successfully demonstrated this in the City of Oshkosh, WI with the Tipler Regional Detention Basin that was constructed in 2009 and subjected to a significant storm event on June 27, 2010. The modeled high water elevation of 756.46 compared favorably to the approximate field observed high water mark elevation of 756.53 - a difference of less than 1 inch! This confirms a high-level of confidence in the model and confidence that the constructed design is performing as planned. This validation of the model assures concerned residents that our planning is sound and projects are performing as promised. Our detailed approach to verifying the existing conditions of Winnetka's stormwater model will result in an accurate model which will provide confidence in the alternatives analysis phase.



Tipler detention basin model validation.

At the conclusion of the model calibration, our team will produce XPSWMM 2D maps visually showing flooding extents, along with tables of affected properties for various rainfall events.

TASK 7 – PUBLIC PARTICIPATION

The Stormwater Management Study is a significant investment not only in sewer infrastructure, but also in the built environment in the Village of Winnetka. An extensive public participation effort will be directed towards a comprehensive group of stakeholders. This coordination will provide an opportunity to gain valuable input from the community and to merge their needs/desires/opportunities with the Village's stormwater flood reduction objectives. We believe that the more people are involved throughout the planning and design processes, the more accepting they are of the outcomes and likely to understand the need, support the alternatives and be more likely to support funding for the projects.

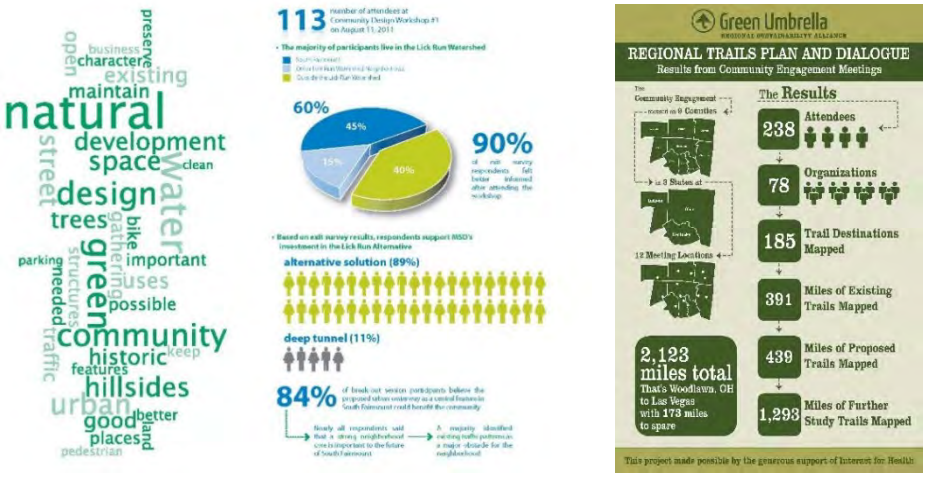
The Strand Team will facilitate four to six public open houses, to help engage the public during the inventory and planning process. While we would tailor this approach with the Village's expectations, we typically have an initial public meeting during what we call the Awareness Phase, where we would illustrate and explain existing conditions and the need for some type of measure. This is also a time to set goals and a clear understanding between the Village and the citizens the intent and the expectations of the stormwater study. At each meeting we would solicit and record all comments and input that would inform the next phase of work. We begin the next meeting with reviewing input recorded from the first meeting, to let the citizens know that we heard them. We would then present the varying alternatives that strive to meet the goals of the project as part of the Exploration Phase. We often present a spectrum of concepts that might have varying degrees of impact or cost. Again, we solicit input on each alternative, which in turn informs the next phase. The team will work with Village staff to further develop the preferred approach for each public open house. In addition to approach, it is important for the Team to become familiar with the Village's expectations on the level of planning, coordination, and graphic design support. Depending on the complexity of alternatives, this Exploration Phase of the project may require more than one meeting. After the Exploration meeting(s), we will synthesize the alternatives to a recommended alternative that is further developed and presented at a public open house during what we call the Vision Phase.

Example of a graphic display created by Human Nature to illustrate stormwater control features for public review and input.

For each meeting, we will prepare two types of materials: visually-compelling graphic content materials (e.g., graphic displays, maps, concept plans, and other presentation support materials such as 3-dimensional renderings and sample images) to illustrate and communicate effectively to open house participants; and open house facilitation materials (i.e., advertisements/notification letters; PowerPoint presentations, comment cards, questionnaires, and summaries) to gather and document feedback from attendees at each open house.

We are also aware that not all concerned residents are willing or able to attend public gatherings or are uncomfortable sharing their opinions in public. For this reason we propose to work with the Village to develop a link on the Village's website allowing people to freely review presentation graphics and reports and provide feedback as they are comfortable. We also recognize other social media benefits like Facebook and Twitter that can be used to make these materials easily accessible for public review and comment. These social media applications allow for continual dialogue and feedback on project issues. After each public open house, our Team will coordinate with Village staff on summarizing meeting outcomes and feedback provided by attendees and on integrating feedback into the design of infrastructure improvements.

As part of the Lick Run Channel Rehabilitation and Community Revitalization project, Human Nature and Strand led a comprehensive public outreach program, which included a Community Open House, three Community Design Workshops, meetings with the Advisory Committee, and one-on-one meetings with local businesses and property owners. Throughout the master planning process, input from this broad cross-section of the community (within the watershed, as well as the greater regional community) was vital to understanding existing conditions and challenges, as well as specific goals and priorities. At each of the Community Design Workshops, attendees responded to graphic displays and facilitation materials by providing verbal and written feedback and completing feedback forms so that every voice could be recorded.



Examples of feedback summary graphics from public input meetings.

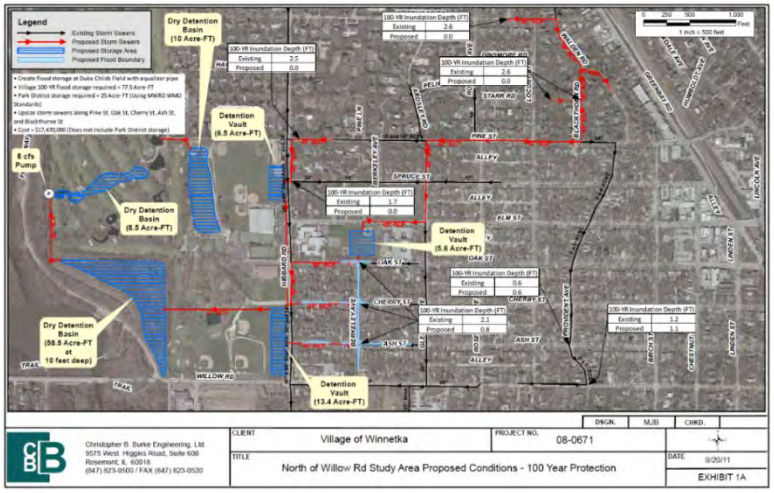
Top: Example visual preference survey board used at a public meeting to obtain input on stormwater features.
Bottom: Images from public meetings and open houses facilitated by Human Nature and Strand.

TASK 8 – REVIEW PRIOR PROPOSED IMPROVEMENTS

As requested our team will perform a detailed review of previously proposed 100-year event improvements within the South of Willow Road and North of Willow Road and Provident Avenue study areas. According to the October 2011 Winnetka Flood Risk Reduction Assessment the following was proposed for these areas:

- **South of Willow Road** – The previously proposed 100-year event improvements for this area include 65 acre-ft of storage on the Cook County Forest Preserve District's (CCFPD) property, relocation of the Mt. Pleasant Road pump station, ditch regrading and lowering to portions of the Skokie Ditch, and new storm sewer from the Skokie Ditch to the storage area and pump station. This included options for ether above ground or underground storage. This improvement would also require approvals from the CCFPD. In 2011, the cost for this study area was $17.8M with underground storage and $9.6M with above ground storage.

- **North of Willow Road and Provident Avenue** – The previously proposed 100-year event improvements for this area include three underground vaults providing 25.5 acre-ft of storage, three dry detention basins providing 77 acre-ft of storage, a new pump station, and upsized storm sewers throughout the area. This option also allows for street flooding in a few areas during the 100-year event. Due to the six storage facilities this improvement scenario would require approvals from CCFPD, the Park District, New Trier High School, and D36. In 2011, the cost for this study area was $17.5M. The adjacent graphic shows the solutions identified by CBBEL for this area.



Previously developed concept for the North of Willow Road Study

Our team will conduct a thorough re-evaluation of all previously proposed alternatives within these areas. We will consider a variety of factors in our assessment including:

- Feasibility and constructability
- Sizing of proposed controls
- Volume of stormwater to be controlled
- Potential obstacles/challenges
- Cost of proposed controls
- Net reduction in property flooding

Due to the number of impacted property owners, as part of this assessment, our team will reengage the key public agencies or stakeholders to review the goals and objectives of the Village's stormwater management efforts, review the plans and needs for their property, and identify potential opportunities and limitations for managing stormwater in these areas. Our team's process places a very strong emphasis on exploring potential partnerships and collaborative opportunities with watershed stakeholders. In the case of Winnetka, potential stakeholders could include the following public agencies which own land within the watershed as indicated in the RFP:

- Winnetka Park District
- Winnetka School District
- New Trier High School District
- Cook County Forest Preserve

Our team partner, Upland Design brings experience and strong relationships with the Directors of both Forest Preserve and Winnetka Park Districts. Upland Design will lend their understanding of the values and objectives of these two critical agencies as they provide consultation identifying stormwater management alternatives that are positive and exciting to the Districts. They will also be present at the table to discuss these alternatives with the Districts and our efforts to build partnerships and develop collaborative opportunities.

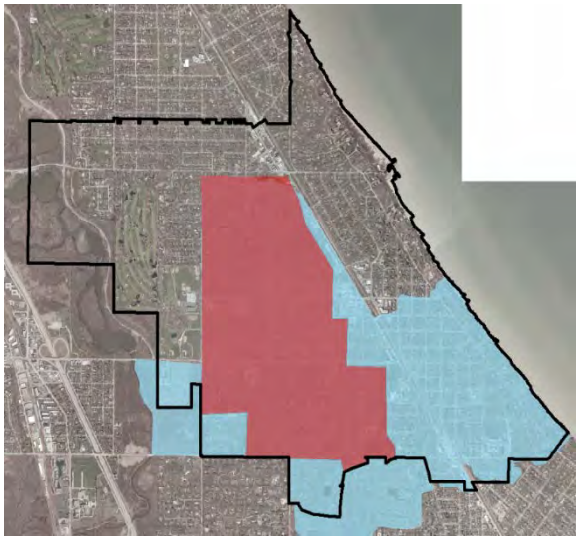
Our team also recommends engaging with additional stakeholders where we could see mutually beneficial partnerships including:

- Large private property owners
- Property Owners Adjacent to the Skokie Ditch
- Indian Hill Golf Club

At the conclusion of our review, our team will provide a recommendation for all previously recommended solutions that we believe merit additional consideration as viable alternatives.

TASK 9 – DEVELOP ALTERNATIVES

Based on our comprehensive review of existing information, including our review of the existing SWMM model data, and the previously proposed stormwater improvements, our team will work collaboratively with Village staff to identify alternative flood mitigation measures. We will evaluate the feasibility and cost-effectiveness of each alternative based on cost, performance, and long-term maintenance. While our focus will be on the identification of alternatives that will reduce the flooding within the study areas listed in Addendum 1 to the RFP, we propose to evaluate locations and alternative controls outside of the delineated study areas that would in turn have a direct benefit on the study area. The figure at right roughly delineates the difference between the Village of Winnetka municipal boundary (black), the specific areas for this study (red) and the drainage area related to the STADI project (blue).



Comparison of study area to STADI drainage area.

Our team will explore the full spectrum of potential stormwater management solutions which includes many traditional stormwater management controls similar to those previously evaluated, but we are proposing to also evaluate a selection of more innovative and creative solutions that may not have been previously considered. Our team recognizes that all of these potential solutions will need to be evaluated in detail to determine the viability of each potential alternative, as well as the costs and implications, but we believe at this point the Village should "leave no stone unturned" when considering potential stormwater control solutions. Below we have included a summary and brief descriptions of our approach to evaluating the more "traditional" stormwater controls, as well as our proposed more "innovative" control alternatives.

TRADITIONAL STORMWATER CONTROL ALTERNATIVES

The following includes a brief overview of the traditional stormwater control alternatives that our team proposes to evaluate.

- Wet detention/retention
- Dry detention
- Underground storage
- Pump/lift stations
- Surface/Roadway Storage
- Maximizing Use of Existing Infrastructure
- Storm sewer upgrades
- Tunneling

Our evaluation of all of these stormwater controls will take into account standard engineering design considerations such as construction cost, available land space, property ownership, topographic feasibility, maintenance costs, environmental obstacles, and geotechnical conditions. In addition, we have listed below specific considerations associated with each of these types of controls.

- **Wet Detention/Retention**

  Wet detention or retention ponds represent an opportunity to detain stormwater flows in the form of a pond with a staged outlet control structure. A wet pond holds water all year round, and water levels rise as stormwater flows are stored in the basin during rainfall events.

  Outlet control structures regulate the release rates of water from these ponds to achieve the desired stormwater control. Some preliminary considerations related to the use of wet detention ponds in Winnetka that our team will consider include:

  + **Safety** – locations such as the Skokie School, Carleton Washburne School, and Crow Island School properties may not desire a permanent pool of water on their property as it could represent a potential safety risk for children.
  + **Groundwater Levels and Soils** – to retain a permanent pool of water the design should consider the groundwater levels and existing soil conditions of the site.
  + **Location** – appropriate locations would need to be identified in Winnetka where a wet pond makes sense. The Winnetka Public Golf Course for example is a location where a wet pond might be a desirable feature.

Example wet detention basin.

- **Dry Detention**

  Dry detention basins are designed to store water during wet weather, and slowly release the water after the rain event as downstream conveyance capacity becomes available. Based on a preliminary review of the study area it appears that there are very little if any existing dry detention basins within the study area - addition of 100-year flood control dry detention basins could result in a meaningful impact on flooding in the study area. Our review of this opportunity will consider:

  + **Available Land Space** – the study area is almost entirely built out with very limited available land space. We will focus our review of land space on publicly owned parcels, but will also consider small areas of property acquisition or easements.
  + **Environmental Impacts** – while the installation of dry detention basins can add significant value for stormwater management, we would be very cautious about the location of new regional detention facilities with regard to their environmental impact. For example, we would not want to cut down large mature trees to create a clearing for a proposed detention basin.

Example Dry Detention Basin.

- **Underground Storage**

  Underground storage comes in many shapes and sizes and can be designed to fit almost any terrain and almost any lot configuration. Underground storage can be designed beneath parking lots and can be incorporated in areas that will leave very little noticeable impacts on the community when complete. The biggest obstacles to underground storage that we will consider include:

  + **Cost** – underground storage tends to be significantly more costly than surface detention, however it can be cost effective in the right applications.
  + **Maintenance** – While all controls require maintenance, underground storage can suffer from the "out of sight out of mind" effect, and these features need to be maintained and cleaned out periodically to maintain design functionality.

Example of underground storage chambers.

- **Pump/Lift Stations**

  It is our understanding the Village already owns and operates several stormwater pump stations including the Winnetka Ave. Pump Station, the De Windt Road Pump Station, the Mount Pleasant Pump Station and the Ash Street Pump Station. As part of our evaluation we will review the functionality of the exiting pump stations, and we will consider if these existing stations can be enhanced or optimized to provide better stormwater control. As a general rule we also look to eliminate unnecessary pump stations where possible to reduce the operation and maintenance burden on the Village. Our team will complete a full assessment of the need for and use of pump/lift stations as part of our review.

- **Surface/Roadway Storage**

  The Village RFP makes it clear that the Council does not expect completely dry streets and yards as a result of this project. Several municipalities throughout Illinois have explored the use of in street detention during storm events using inlet modifications to regulate the rate at which stormwater leaves the streets. The Village of Wilmette has implemented such stormwater management in their combined sewer area and we recently assisted them with a study of doing the same in their separate sewer areas. The City of Chicago's "Rainblocker" program is another example of where this has been implemented. This concept allows the existing streets to act as a temporary holding area for the rainfall. From our experience we recognize the pros and cons to the use of in-street detention, and our team can evaluate this opportunity and discuss the implications with the Village. The image above shows a street in a Chicago neighborhood intentionally flooded using the inlet blocking device to regulate flow into the storm sewer system.

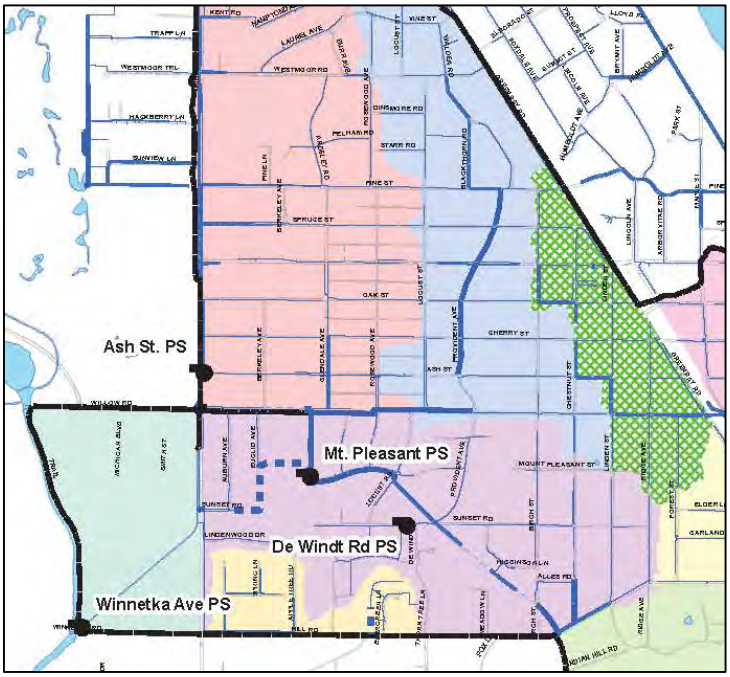
Example of intentional street flooding for stormwater detention in Chicago.

- **Maximizing Use of Existing Infrastructure**

  The Village of Winnetka already owns significant stormwater infrastructure assets within the project study area. The storm sewer network in the study area ranges from 12" diameter storm sewers up to 60" diameter storm sewers. We will review this infrastructure to evaluate its functionality and capacity during large storm events. While our team recognizes that it is unlikely that the existing sewers have available capacity in the 100 year storm event, it is still an important first step to confirm that your existing system is optimized before you add on or enhance it.

- **Storm Sewer Upgrades**

  In addition to maximizing the use of existing infrastructure our team will evaluate opportunities to cost effectively upsize storm sewers as well as opportunities to install new storm sewers and inlets as needed. New storm sewers would likely be installed in conjunction with other proposed stormwater control features to provide necessary conveyance.



Existing storm sewer system in Winnetka includes storm sewers up to 60" on diameter.

- **Tunneling**

  We recognize that CBBEL, MWH, Baird Associates, Kenny Construction, and other parties have been intimately involved in the evaluations surrounding the STADI project and in particular the Willow Road Tunnel. Our team will not place an emphasis on evaluating tunnel alternatives, but in the event that our analysis concludes that some version of a tunnel is still needed to solve Winnetka's stormwater issues, we do have experience evaluating, modeling and sizing tunnels that will be useful as we compare and contrast solutions. Our Project Manager, Mike Waldron is currently one of the project managers on a tunneling project we engineered for the City of Joliet on their combined sewer system. The project includes an 8ft diameter tunnel under the Des Plaines River in Joliet utilizing a tunnel boring machine.

INNOVATIVE STORMWATER CONTROL ALTERNATIVES

While all of the traditional solutions have merit and are worth considering, our team would also like to explore a variety of more innovative stormwater controls as follows:

- Predictive Detention Storage
- Enhancement of Surface Drainage
- Managing Water Levels in Skokie Lagoons
- Collaboration with Entities Outside of the Village Limits
- Modifications to the Willow Road Dam
- Stormwater Management Within the ROW
- Watershed Based Green Infrastructure
- Deep Stormwater Infiltration Wells
- FEMA Hazard Mitigation Property Buyout

We have included a brief description of each of these innovative stormwater control alternatives below.

- **Predictive Detention Storage**
  Stormwater detention technologies have been rapidly advancing in recent years. Predictive detention storage is a concept that incorporates supervisory data control and data acquisition (SCADA) principles to communicate between stormwater detention facilities and weather forecasting platforms. When a storm is forecasted for a particular area, the basins or ponds that hold water for that area can be notified in advance of the storm to draw down the normal water pool level to create capacity for the anticipated storm event. This technology could potentially be applied at a variety of scales in Winnetka from drawing down a golf course pond that was holding water for irrigation, to creating additional capacity in the Skokie Lagoons prior to a storm event. Predictive detention storage can be applied in many different ways and is an innovative technology that we believe is worth considering as part of our solution matrix.

- **Modifications to the Willow Road Dam**
  Our team is intrigued by the potential opportunity presented by the existing Willow Road Dam. The dam was originally constructed in 1934 as shown in the photo at right and was the largest Civilian Conservation Corps (CCC) project in the nation according to the Forest Preserve District. The massive structure regulates stormwater flow creating the Skokie Lagoons.

  In 2009, Allan Mellis, Director of Planning and Development of the Forest Preserve District of Cook County presented information related to modifications to the Willow Road Dam to reduce debris blockages at the three round openings at the base of the dam (openings shown in the figure at right). The Forest Preserve District replaced these three openings with a rectangular notch to reduce debris blockages. In his report Mr. Mellis specifically states that during the September 2008 8.54 inch rainfall event water levels in the Skokie Lagoons did not rise to the point of overtopping the dam, which may imply additional available flood storage capacity in the Lagoons that could benefit the Village of Winnetka. Our team is interested in further exploring the possibility of utilizing the additional upstream storage capacity in the lagoons only during large flood event situations. The ecosystem, habitat, and overall health of the Forest Preserve District lands and the Skokie Lagoons would be a paramount consideration in this evaluation.

The Willow Road Dam during construction in 1934 and as it existed before modifications in 2008.

- **Enhancement of Surface Drainage**
  Our team would like to explore enhanced surface drainage options in addition to piped conveyances. Keeping stormwater flows above ground in surface conveyances creates an opportunity to enhance an area with a visual waterway and potential community amenities. Our team could explore the enhancement of existing surface drainage systems in addition to the potential creation of new stormwater conveyance channels. One potential existing conveyance our team would evaluate is the Skokie Ditch which currently conveys flows via a system of piped and open channel conveyances from the Indian Hill Golf Course through the proposed study area. This could represent an opportunity to enhance the capacity of existing surface drainage while creating additional community amenities.

CASE STUDY:

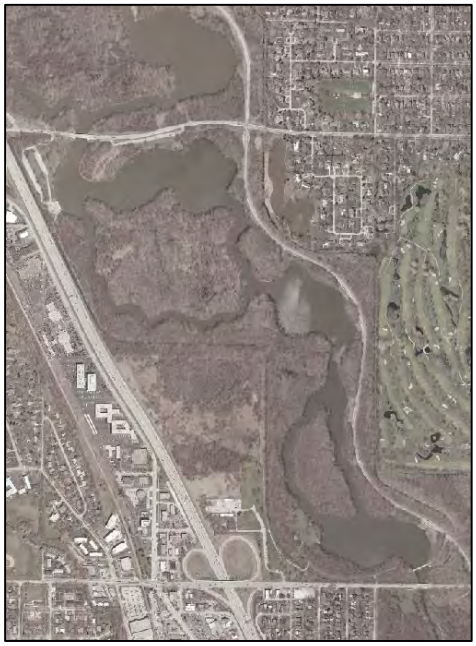
BEE BRANCH FLOOD CONTROL CHANNEL

Our team completed the Bee Branch project for an approximately 7.1 square mile watershed located in the north central portion of the City of Dubuque, Iowa. Inadequate capacity of storm sewers resulted in severe flooding of more than 1,100 residential and commercial properties within the City. The Bee Branch solution developed by our team restored an urban water way through the City and today is touted by the City as a "fiscally responsible investment to mitigate flooding, improve water quality, stimulate investment, and enhance quality of life within the Bee Branch Watershed". The below photos show before and after views of the same location in Dubuque.

The Bee Branch flood control project created a transformative amenity - view from E. 16th Street before construction (top photo) and after construction (bottom photo).

- **Managing Water Levels in Skokie Lagoons**

A vast majority of the flood prone areas within Winnetka drain away from Lake Michigan to the west where the Village is bordered by the CCFPD and the Skokie Lagoons. While the lagoons are an important natural amenity for the region they may hold opportunity to provide additional stormwater control. Our team would like to explore the opportunity to use the lagoons to provide additional storage during large events. This could include a variety of potential strategies including slight alterations to the footprints of the lagoons, or slight alterations to the water level in the lagoons to create additional storage prior to storm events. This type of control could potentially be implemented in conjunction with the predictive detention storage concept previously mentioned to create a slight drawdown of the lagoons prior to a predicted large storm. Our team would place a very strong emphasis on understanding of the existing conditions within the lagoons and the maximum drawdown allowable without causing impacts to the existing habitat or ecosystem in the area. We approach every project with environmental considerations at the front of our minds and we would certainly not want to cause any negative impacts to the beautiful habitat that exists here today. Our team would encourage early meetings with the Forest Preserve District to determine if they have needs or plans for the area that could potentially be incorporated into a larger solution resulting in a mutually beneficial project.



Aerial view of the Skokie Lagoons adjacent to the Village of Winnetka.

There may also be an opportunity to include expansion of the lagoon system between Willow Road and Winnetka Avenue. This area offers approximately 50 acres of open space with the potential to continue the amenity and passive recreational benefits of the lagoon system. Again, our team would strive to understand the existing conditions as well as the goals and values of the Forest Preserve District in assessing alternatives that impact the lagoons and District property.

- **Collaboration with Entities Outside of the Village Limits**

It is our understanding the proposed STADI project would control stormwater runoff from 137 acres of land from the Indian Hill Golf Club which is located outside of the Village of Winnetka's municipal jurisdiction. The flow from the golf course enters the Village's project area via the Skokie Ditch causing stormwater from outside of the Village's jurisdiction to negatively impact the flooding conditions in Winnetka, and the Village is prepared to incur additional costs related to the proposed Winnetka Pumping Station and the associated storm piping to manage this runoff. This is an example where our team would like to explore partnerships outside of the Village limits and engage in a dialogue with the Indian Hill Golf Club to explore potential mutually beneficial partnership opportunities. Below is a case study example where we have successfully worked with a golf course in Northern Kentucky to achieve stormwater controls.

CASE STUDY:

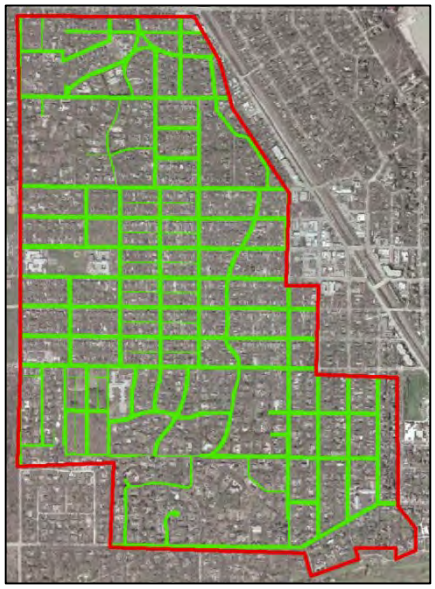
DEVOU PARK GOLF COURSE RAINWATER HARVESTING PROJECT

Our team identified an opportunity to offload a 60 acre drainage area and convey its stormwater runoff to the nearby DeVou Park Golf Course Irrigation Pond where it could be stored and used for golf course irrigation. We completed a business case evaluation to demonstrate the cost effectiveness of this project and determined that the proposed sustainable rainwater harvesting project in collaboration with the golf course would save the stormwater agency approximately 50 percent of the cost of a more traditional wet weather storage tank. Additionally, the project would save Devou Park approximately $20,000 each year in water usage fees. This is a tremendous example of collaboration with watershed stakeholders, and this project resulted in a mutually beneficial solution for both parties.

DeVou Park Golf Course Irrigation Pond.

- **Stormwater Management within the ROW**

Beyond the use of in street detention as mentioned above under traditional approaches, our team will also consider other stormwater management alternatives within the right-of-way (ROW). Based on our preliminary evaluation, nearly 150 acres, or 20 percent of the study area is within the ROW (shown in green in the figure at right). Because the ROW is such a substantial part of the overall study area it is worthwhile to explore the addition of stormwater management features in this area where space allows. The benefit of locating controls features within the existing ROW is the land is already publicly owned, features would be easily accessible for construction and maintenance, and a significant amount of stormwater runoff could be collected and managed. Stormwater management within Winnetka's ROW could be accomplished using a variety of control alternatives such as:



Winnetka ROW.

+ Surface Storage Swales/Ditches
+ Underground Storage Pipes
+ Tree box Infiltration/Storage Trenches

Although these controls stormwater management alternatives are typically intended to provide water quality benefits during small storms, they could be sized accordingly to provide a reduction of water surface elevation during flooding events by capturing, storing and infiltrating runoff during larger design storms. Stormwater management alternatives that include a combination of green and grey infrastructure may ultimately be necessary to manage the 100-year storm event entirely within the ROW, which will be considered in our evaluation. When considering controls within the ROW our team would also consider safety of motorists and pedestrians.

CASE STUDY:

TERRACED REFORESTATION AND KYTC DETENTION BASIN WITHIN THE ROW

Our team completed two large stormwater management projects within the ROW in Willow Run Watershed in Northern Kentucky. For the KYTC Basin Retrofit, drainage from 120 acres was captured and the detention basin outlet structure was designed to control the Probable Maximum Precipitation (PMP) Event. The PMP rain event is significantly larger than the 100 year flood event, with 27 inches of rain in 6 hours this event significantly larger than a 100 year rainfall event. Several site constraints were realized early during design, including an existing USACE wetland, low native soil infiltration capacity, and an unpermitted high hazard dam. Flow monitoring of this feature before and after construction indicate that it is performing better than model predictions.

The Terraced Reforestation project captures drainage on a hillside and manages the stormwater through a series of terraced berms, complete with bioretention soil and plantings, which provide water quality benefits. The steep topography of the hillside, more than 120 feet of elevation change, and clayey soils created design challenges. Strand and Human Nature worked with a multi-disciplinary team to overcome these challenges and design this stormwater management feature in an unlikely location within the ROW. The project was constructed in 2011 and is currently functioning as designed.

KYTC Detention Basin Retrofit within the ROW controls the PMP storm event which is larger than the 100 year event.

Terraced Reforestation project won National Engineering Award for its innovative stormwater management.

- **Watershed Based Green/Sustainable Infrastructure**
  While traditional green infrastructure installations such as rain gardens and pervious pavements are better suited for water quality controls for smaller rain events and will not provide meaningful flood control, this does not mean that green or sustainable infrastructure can't be a meaningful solution for Winnetka. Our team approaches green infrastructure in a different and more holistic watershed based fashion that allows green and sustainable solutions to play a much larger role than just water quality controls. Every community is comprised of different assets, opportunities, constraints, natural systems, and built systems - our team works to develop sustainable solutions that are unique to each community based on that communities specific characteristics.

CASE STUDY:

LICK RUN SUSTAINABLE INFRASTRUCTURE SOLUTION

Our team developed a very unique sustainable watershed based solution for the Lick Run Watershed in Cincinnati, Ohio. This was the largest project in the larger Lower Mill Creek Evaluation which is projected to save Cincinnati $200 Million in comparison to the tunnel that was previously planned. The Lick Run project specifically, is a sustainable watershed based solution centered around conveying stormwater in an urban channel in lieu of constructing a 30-foot-diameter, 1.2-mile sewer tunnel, an 84 mgd pumping station, and treatment.

Our approach incorporates both traditional and innovative stormwater control strategies, including water quality BMPs, strategic sewer separation, detention, and stream rehabilitiation, while providing improved environmental stewardship that integrates tangible community benefits. This strategy supports the client's goals for urban revitalization by creating an amenity through the center of a blighted community on the west side of Cincinnati, Ohio. Below is a listing of the key elements of the Lick Run sustainable watershed based project approach currently being design by our team:

- 5,600 LF of open channel rehabilitation
- Over 5,600 LF of box conduit ranging from 12' to 36' wide
- A forebay and 2.4 acre wet retention pond
- 5 structural water quality treatment units
- 15,600 LF of new strategic storm sewer separation
- Alternatives analysis and design of five vehicular bridges, and one pedestrian bridge
- Streetscapes and other transportation improvement opportunities

Our team completed preliminary design plans that included detailed alternatives analysis and engineering for various naturalized channel configurations designed for the 100 year flood event. A major challenge of this project is the detailed engineering required to design this urban waterway through a narrow congested corridor. The project design currently includes 1,700 linear feet of sanitary/combined sewer relocation, 13,000 linear feet of water main relocation including sizes up to 42-inch, 4,500 linear feet of gas main relocation, and 9,950 linear feet of electric relocation, including telephone and electric poles. The complexity of the engineering coordination in this project is incredible, and has required close coordination with a variety of agencies and stakeholders. Our team was also involved in a rigorous public/stakeholder involvement process, which has truly been an integral aspect to the success of this project. The proposed strategy will transform 40 acres along the community's busiest thoroughfare, requiring approximately 100 neglected properties and manufacturing businesses to be razed and turned into an open channel.

Lick Run Greenway rendering represents the vision for the restored stream as a community amenity.

- **Stormwater Infiltration Points**

Stormwater infiltration points (sometimes called "drywells") are a technology that is being used throughout the country to infiltrate stormwater deep below the ground surface.

These infiltration points are preceded in the management process by water quality protections such as settling basins, bioswales, and engineered soils before the water is then percolated through the ground. Stormwater infiltration points represent a potential opportunity to "punch through" Winnetka's upper layers of poor infiltrating clayey soils to reach deeper pockets of highly potentially infiltrative soils. Our preliminary review of the existing well information in the study area indicates some potential for such infiltration wells to play a role in Winnetka. Shown at right is a portion of the well log from the Illinois State Geological Survey. This particular well log is from a water well located within the Winnetka Golf Club property immediately west of the study area (Well number 120310060800). This well was dug to a depth of 351 feet, and records indicate a 6 foot gravel seam located 90 feet deep. The presence of this gravel seam indicates the potential to further explore the use of infiltration wells to manage stormwater.

Page 1 ILLINOIS STATE GEOLOGICAL SURVEY

Irrigation Well	Top	Bottom
clay	0	10
mud & rock	10	90
gravel	90	96
mud & rock	96	116
lime	116	345
shale	345	351
Silurian	116	
Maquoketa	345	
Total Depth		**351**

Casing: 10" from 0' to 119'

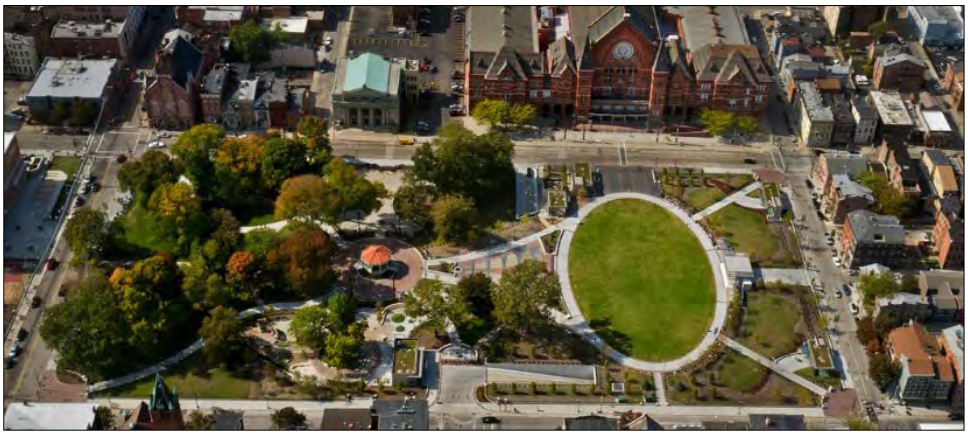
Size hole below casing: 9.87"

Driller's Log filed
Sample set # 55128 (0' - 350') Received: February 19, 1968

Owner Address: Winnetka, IL
Location source: Location from permit

CASE STUDY:
WASHINGTON PARK STORMWATER DRYWELLS

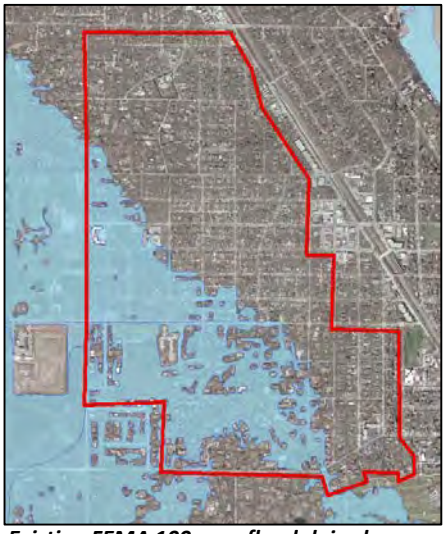
Human Nature collaborated with a multidisciplinary team to develop a $42 million master plan for Washington Park, one of Cincinnati's oldest public parks located in the downtown's historic Over-the-Rhine neighborhood. Strand provided technical review and construction oversight for the green infrastructure components of the site. Human Nature led the Master Planning phase, developed construction documents, and performed construction administration. The park incorporates many green stormwater infrastructure features, including the first-ever dry wells in downtown Cincinnati. The dry wells, which were funded through a partnership with Metropolitan Sewer District of Greater Cincinnati (MSDGC), range in depth from 25 to 35 feet and collect and percolate stormwater into a natural layer of sand and gravel. **The Washington Park Drywells provided stormwater control in excess of the 100 year storm.**



Aerial view of park project which included 5 drywells.

Dry well installation to capture and infiltrate stormwater runoff.

- **FEMA Hazard Mitigation Property Buyout**
  Due to the continued flooding occurrences in Winnetka along with the damages to private residences there may be the option to consider obtaining FEMA Hazard Mitigation for properties in a select area. As shown in the figure at right, the Winnetka study area (shown in red) is approximately 750 acres, and nearly one third of this area falls within the existing FEMA 100 year floodplain (shown in blue). Using the data collected and evaluated during the inventory and analysis phase and based on information from the model simulations our team may recommend select properties for removal to create more useable space for stormwater management. By using FEMA Mitigation Funds a floodplain/stormwater management area can be created within the Village providing control for other areas. Additionally, our team would evaluate ways to provide adde community benefits within this area through added park space and public use areas. We recognize that this solution may not have widespread appeal in many Winnetka neighborhoods, however the potential for limited buyouts could still be explored on a limited basis in key areas.



Existing FEMA 100 year floodplain shown in blue in the Winnetka study area (red).

CASE STUDY:

RAPID RUN AND WEST FORK FEMA HAZARD MITIGATION PROPERTY BUYOUTS

Our team assisted Cincinnati and Delhi Township with two FEMA Hazard Mitigation Grants, as part of a larger regional stormwater planning efforts one was in the West Fork watershed and the other in the Rapid Run watershed. The grant application requested $4.3 Million for West Fork and $3.1 Million for Rapid Run in state and federal funds to purchase 57 total properties located within the floodway and floodplain. Completion of these projects would minimize risk and mitigate flood hazards by acquiring properties, demolishing structures, and returning the flood prone areas to open space with deed restrictions in perpetuity. These projects mitigated the risk of loss of life and property as well as future damage claims to FEMA, and help Cincinnati reconnect stormwater to a more natural and functional floodplain.

Example property buyout map included in FEMA e-grant submission.

TASK 10 – PRESENTATION TO VILLAGE COUNCIL

To conclude our efforts, our team will present to Village Council the findings of our evaluation. Our presentations of refined alternatives will be illustrated graphically, and will clearly explain the costs, benefits, challenges, and protection levels of each alternative. Based on input and approval from the Council during this presentation our team will work with Village staff to finalize the recommendation for stormwater management within Winnetka.

- **Grant Writing**

  An additional service that Strand can provide is grant writing support. In recent years we have helped municipalities procure more than $14.8 million in grants for various flood mitigation projects. Flood mitigation components considered as part of the study will have varying levels of "fit" with grant funding programs. We will discuss each of the grant programs and their application deadlines with the Village for the various components. Having considerable experience preparing applications and obtaining grant dollars from the programs below, we are well suited to assist the Village in obtaining grant funding. In recent years we have successfully assisted our clients in procuring the following stormwater grants:

STORMWATER GRANT EXPERIENCE	
Grant Type	**Total Grant Amount**
Lake Planning and Management Grants (WDNR)	$27,500
Municipal Flood Control Grants (WDNR)	$1,863,600
Targeted Runoff Management Grants (WDNR)	$150,000
Urban Nonpoint Source and Stormwater Construction Grants, (WDNR)	$1,739,600
Rapid Run FEMA Hazard Mitigation Grant	$3,100,000
West Fork FEMA Hazard Mitigation Grant	$4,300,000
Urban Nonpoint Source and Stormwater Planning Grants, (WDNR)	$910,000
KDOW 319 Grants	$2,000,000
OEPA SWIF Grant	$150,000
Wisconsin Hazard Mitigation Grant (FEMA)	$350,500
Urban Water Quality Grant (Dane County)	$300,000
TOTAL	**$14.8 Million**

APPROACH CONCLUSION

Our Team's demonstrated expertise in the completion of stormwater management planning provides the Village with a proven, effective process for developing realistic, achievable, and creative stormwater solutions.

- **Our understanding of the history of Winnetka's flooding and the previous studies that have been completed to date provide our team with a solid foundation upon which to begin our evaluation, yet our fresh outside perspective on your community will provide a new angle and assessment of possible solutions.**
- **Our team is nationally known for "thinking outside the box" and developing creative and unique solutions to stormwater management. In addition to our successful history of traditional stormwater management and flooding reduction projects, our team is also nationally recognized as an expert in green/sustainable infrastructure solutions which could play a meaningful role in the revised alternatives matrix.**
- **Our team has led successful public engagement campaigns for many of our clients. Our ability to produce clear graphic representations of often complex engineering problems and solutions enables the public to not only understand the problem but actively engage in identifying a sustainable solution. Clients depend on our team for our creativity and our emphasis on community interaction and participation.**
- **Our proposed approach is multi-faceted and considers a broader planning and community context. While cost effective flood reduction in the western drainage area will be the primary focus of our evaluations, we will also evaluate a much broader range of considerations that will enhance and integrate with the community's built and natural environments. Our approach will result in recommendations tailored to Winnetka and the defining characteristics of your community.**
- **We recognize the need for well-developed and well vetted solutions with solid planning level costs that the Village can hang their hat on. Our team has extensive experience with developing accurate planning level costs to reduce the potential for cost increases and undesirable surprises down the road during detailed design and construction.**

Sustainable Infrastructure

Urban waterway

Separated Storm Sewers

Natural Conveyance & Detention

Structural BMPs

Our team's extensive stormwater master planning experience along with our innovative toolbox of stormwater management strategies will provide Winnetka with a comprehensive solution.

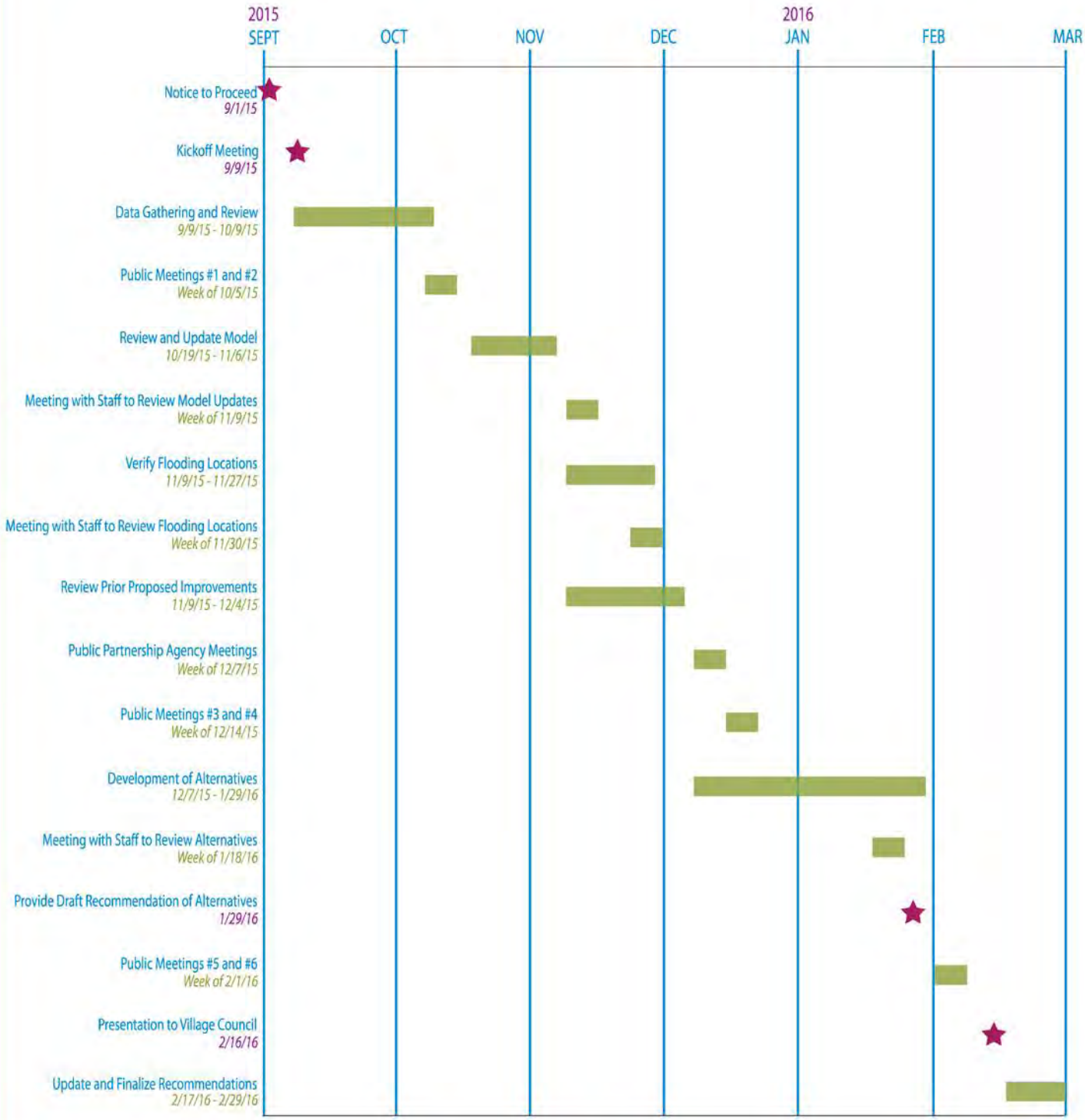
C. SCHEDULE

C. SCHEDULE

The schedule image on the following page provides an overview of our anticipated timeline to complete the Stormwater Management Study within the requested six month timeframe. Our Team is prepared to hit the ground running following a Notice to Proceed (NTP) and has made the following assumptions for this effort:

- The anticipated NTP is September 1, 2015.
- The Kickoff Meeting will be held within seven days of the NTP on or around September 9, 2015.
- The input sessions with the Village Council on the next Council meeting following the Kickoff meeting on September 15, 2015.
- It will take approximately one month to gather and review available hydrologic and hydraulic models, GIS data, engineering studies and reports, and other available historic flood information. Our schedule outlined below assumes all of this requested information would be provided during the Kickoff Meeting. We will submit any additional data needs on October 9, 2015.
- We anticipate holding the first two public meetings the week of October 5th, as part of the data gathering effort or the Awareness Phase.
- Following the receipt of the additional data needs request we will use two weeks to perform the calibration checks, perform necessary field visits to verify model data, develop a memorandum for the proposed improvements, and update and calibrate the existing model. Assuming the additional requested data is provided by October 23, 2015 this task will be complete on November 6, 2015. We anticipate a meeting with the Village to review the findings from this effort the week of November 9th.
- Once the existing model is updated and calibrated we will verify the existing flooding information from known storm events. We anticipate this effort being complete by November 27, 2015 with a meeting the week of November 30th, to review the information with the Village.
- As the review and update of the models is completed we will review and reevaluate the feasibility of the improvements previously proposed in 2011. We anticipate this effort being complete by December 4, 2015.
- We anticipate holding meetings with the Public Partnership Agencies during the week of December 7th. These meetings will allow us to review the previously proposed alternatives and gather information from each agency on what their goals and visions are for their property in these areas.
- We anticipate two public meetings will be held during the week of December 14th as part of the alternatives evaluation effort or the Exploration Phase.
- As we gain input from the Public Agencies and the second round of public meetings we will begin to develop and evaluate potential alternatives. We anticipate this effort lasting 8 weeks with a start date of December 7, 2015 and a completion date of January 29, 2016.
- We anticipate holding a meeting with the Village Staff the week of January 18, 2016 to review the proposed recommendations.
- We anticipate the last two public meetings will be held during the week of February 1st to present the preliminary findings or the Vision Phase.
- We anticipate presenting the final recommendations to the Village Council at the February 16, 2016 meeting.
- Following the Village Council presentation we will update and finalize the proposed recommendations based on input from the public and the Village Council. The final report will be submitted on February 29, 2016.
- Progress reporting will be provided on a weekly and monthly basis through the duration of the project.

STORMWATER MANAGEMENT STUDY SCHEDULE



D. BUDGET

(Budget details in separate envelope)

D. BUDGET

Our proposed fee is located in a separated sealed envelope attached to this proposal. The budget estimate that we provided was based on our team's assumptions regarding the expected scope of work. We are flexible, and we look forward to the opportunity to further define the scope of work and refine our budget to meet your expectations. This is an extremely important project for the Village of Winnetka, our team recognizes the importance of this project and we will work with your staff to define a scope of work and associated engineering fee that meets your expectations.

VILLAGE·OF·WINNETKA

Incorporated in 1869

July 29th, 2015

ADDENDUM NO. 1
REQUEST FOR PROPOSALS
STORMWATER MANAGEMENT STUDY
RFP #015-013
VILLAGE OF WINNETKA

The Request for Proposal for the above referenced project has been amended and/or clarified as follows. The intent of the following addendum is to clarify the limits of the study area to be considered as part of this engagement so that no confusion exists.

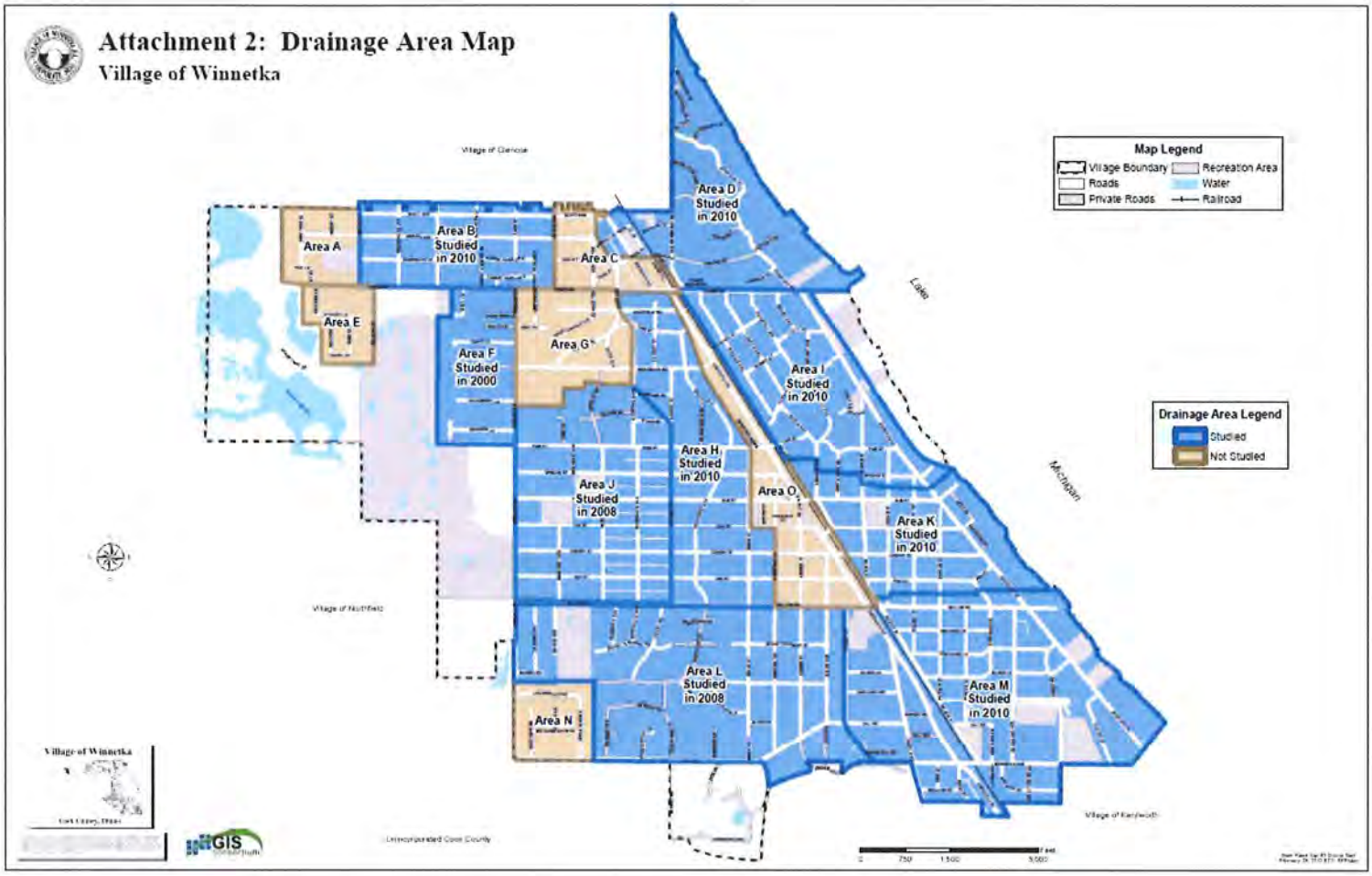
1. Replace the text at the bottom of page 9 of the original RFP document with the following text:

   The desired outcome of this engagement is to identify and evaluate a series of creative, holistic, technically and scientifically sound, sustainable, feasible, and cost-effective improvements that will provide flood risk reduction for the following areas of western Winnetka for appropriate levels of protection up to a 100-year event:

   The three areas to be evaluated are as follows (see exhibit on next page):
   - Area L – South of Willow Road ("southwest Winnetka")
   - Area J & G – North of Willow Road Study Area (the "Tree Streets")
   - Area H –Provident Study Area

2. Replace the map on page 10 of the original RFP document with the following figure:

Remainder of this page intentionally left blank.



3. Replace paragraph #8 on page 12 of the original RFP document with the following text:

> Review prior proposed improvements. Christopher Burke Engineering developed a series of possible alternatives providing protection from a range of storms between the 2-year and the 100-year event. To reiterate, these are known as areas L, H, J, and G respectively referred to as the South of Willow Road study area, the north of Willow Road study area, and the Provident Avenue study area. In 2011, the Village elected to pursue improvements providing protection against a 100-year event. The improvements developed by Christopher Burke for the 100-year protection standard selected by the Village were deemed not feasible based upon the required detention volumes and the inability to place significant stormwater detention on Cook County Forest Preserve property. The Consultant shall review these previously developed improvements for feasibility, including re-visiting discussions with public agencies owning the land on which detention would need to be constructed, including the Winnetka Park District, School District, New Trier High School District, and the Cook County Forest Preserve. The Consultant shall also review and update the preliminary cost estimates prepared by Christopher Burke Engineering to reflect current market conditions.

4. Replace paragraph #9 on pages 12-13 of the original RFP document with the following text:

> Develop alternatives. The Consultant shall identify and develop a series of 3 to 5 feasible stormwater management alternatives to provide protection from stormwater flooding to structures in the study areas. To reiterate, these known as areas L, H, J, and G respectively referred to as the South of Willow Road study area, the north of Willow Road study area, and the Provident Avenue study area. The Village's stormwater goals are to prevent stormwater intrusion into structures, and to reduce overall negative impacts from stormwater flooding, however completely dry streets and yards are not necessarily to be expected. The Consultant shall consider a variety of approaches to reach this goal, including traditional gray infrastructure, green infrastructure, and other approaches. When considering feasibility, the Consultant shall include water quality considerations, construction cost, construction disruption, operating/maintenance costs, sustainability, and land use goals, and technical feasibility. Time-to-implementation shall also be considered, with the possibility of quick implementation of partial improvements or phased implementation to provide relief to affected neighborhoods quickly.

If you have any questions regarding Addendum #1, please contact me at (847)716-3504.

Nicholas A. Mostardo
Financial Services Coordinator

Note to Vendors: Please remember to acknowledge receipt of this addendum by including a signed copy with your proposal submission. Proposals may be rejected if this task is not completed.

Matthew S. Richards
Name

8/3/15
Date

Signature

Strand Associates, Inc.
Firm

VILLAGE·OF·WINNETKA

Incorporated in 1869

August 4th, 2015

ADDENDUM NO. 2
REQUEST FOR PROPOSALS
STORMWATER MANAGEMENT STUDY
RFP #015-013
VILLAGE OF WINNETKA

The Request for Proposal for the above referenced project has been amended and/or clarified as follows:

Q1: Is it possible for us to review the survey(s) that was/ were sent to the residents? Do the questions distinguish whether the resident experienced flooding in the structure versus yard, and if structure flooding' if it was a result of overtopping of the low opening or sewer backups?

A1: The Village will provide copies of survey responses to the selected consultant. The survey does ask for residents to distinguish the flooding mechanism and many, though not all, of the respondents did.

Q2: Does the Village have low opening survey data for structures that have flooded? If so, what is the extent of the data?

A2: The Village does have access to some of the low-entry elevations in critical areas but it is not a complete data set.

Q3: Will the Village provide the working hydrologic/hydraulic modeling that CBBEL performed?

A3: Yes.

Q4: What model was used by CBBEL? I believe this was XPSWMM. Can you confirm? Did they use XSPWMM 2D?

A4: CBBEL's modeling was XPSWMM 2d, and MWH used Infoworks.

Q5: Were flood exhibits performed by CBBEL done in GIS?

A5: CBBEL provided exhibits to the Village in pdf format and the Village does not have the underlying files. The Village will endeavor to provide underlying information to the selected consultant, if needed.

Q6: Will the GIS files for the produced exhibits be provided to the selected consultant?

A6: Please refer to questions #5 above.

Q7: Can we delete the words "independent consultants" from the indemnity clause in art. 4, initial and sign, or can this document be further discussed if we get the project award (in other words, is it possible to submit the proposal with 1. deleted words or 2. without the GIS Data agreement document?).

A7: Once a consultant is selected the Village will begin negotiations on a contract, including review/discussions by the Village's and the selected firm's respective legal counsel.

If you have any questions regarding Addendum #2, limited to clarifications of responses above, please contact me at (847)716-3504. Please note that the question deadline for this RFP has passed, and no new questions will be answered.

Nicholas A. Mostardo
Financial Services Coordinator

Note to Vendors: Please remember to acknowledge receipt of this addendum by including a signed copy with your proposal submission. Proposals may be rejected if this task is not completed.

Philip E. Budde
Name

3/5/15
Date

Signature

Strand Associates, Inc.
Firm

ATTACHMENT #3

Strand Associates Fee Proposal

Village of Winnetka Stormwater Management Study

Strand Associates Proposed Scope and Fee - September 10, 2015

		STRAND ASSOCIATES									HUMAN NATURE				UPLAND DESIGN		Total Hours By Task	Total Cost By Task
		$274.50 Richards	$186.11 Waldron	$203.65 Lyons	$156.43 Shubak	$148.69 Spinelli	$133.56 Williams	$107.51 Glossner	$101.38 Kuhbander	$83.02 Production	$170.00 Wolnitzek	$105.00 Danyluk	$95.00 Planner	$85.00 Designer	$150.00 Kelly	$100.00 Sovan		
Task #	Scope Item	PRINCIPAL	PM	Sr. PE	Sr. PE	PE	PE	PE	PE	Admin	Principal	PM	Planner	Graphic Design	Support	Support		
1	**Project Kick Off**	1	10	13	12	0	0	4	4	3	13	4	0	0	4	0	68	$10,900
	Project Kick Off Prep (develop Agenda, baseline schedule, communication plan, and roles and responsibilities)	1	2	2	2			4	4	2	2	4			4		27	$3,730
	Project Kick Off Meeting (4 hr meeting, travel and preparation time, 4 attendees)		6	11	10						11						38	$6,710
	Prepare Kick Off Meeting Summary/Action Items		2							1							3	$460
2	**Council Input Session**	0	8	11	2	0	2	2	0	2	11	8	4	0	0	0	50	$7,700
	Preparation for Council Input Session		2	2	2		2	2		1	2	8	4				25	$3,220
	Council Input Session (3 small meetings over 2 hours, travel and preparation time, 3 attendees)		5	9							9						23	$4,210
	Prepare Council Input Session Summary/Action Items		1							1							2	$270
3	**Data Gathering**	0	6	4	10	18	38	12	22	0	6	49	32	0	2	4	203	$24,610
	Review Previously Completed Drainage Studies and Reports		4	4	8	4	12		12		4	6	10		2	4	70	$9,180
	Review Available GIS and Utility Information					2	4	10			2	10	10				38	$4,250
	Review Available Geological Maps and Historic Geologic Data				2				8			10	8				28	$2,930
	Perform Site Visits to Verify Conditions (1 field day, 3 people, travel time)					12	16					15					43	$5,440
	Identify and Summarize Data Gaps/Needs		2				6	2	2			8	4				24	$2,810
4	**Progress Reporting**	2	26	8	0	0	0	48	0	4	8	30	0	0	0	8	134	$17,820
	Weekly Progress Updates for Village Staff (24 weekly reports over 6 months - activities completed, issues, next steps)	2	12					12				12				4	42	$5,730
	Monthly Progress Updates for Village Council (6 monthly reports - weekly reports + schedule and budget updates/variances)		6					12				12				4	34	$4,070
	Periodic Summary Report of Findings during Tasks 5, 6, 8, and 9		8	8				24		4	8	6					58	$8,020
5	**Evaluate/Confirm & Update Existing Hydrologic and Hydraulic Model**	0	5	1	9	28	47	20	8	2	0	0	0	0	0	0	120	$16,110
	Review Existing Hydrologic and Hydraulic Model (prepare checking tools, review calibration data, review system records)				4	8	16	12									40	$5,240
	Develop Proposed Model Improvements Memorandum		1	1	1	2	8	8		2							23	$2,940
	Meeting to Review Proposed Model Improvements (2 hour meeting, two attendees, travel time)		4				8										12	$1,810
	Perform Site Visits to Verify Model Data (1 field day, 2 people, travel time)					10	3										13	$1,890
	Update and Calibrate Existing Hydrologic and Hydraulic Model				4	8	12		8								32	$4,230
6	**Modify/Verify Existing Conditions and Existing Flooding Locations**	0	7	0	2	4	24	8	0	0	0	0	0	0	0	0	45	$6,270
	Verify Modeled Flood Depths for Various Storms in Existing System		1		2	2	8										13	$1,860
	Compare Modeled Flood Depths with Known Flood Events		1				8										9	$1,250
	Prepare Maps and Tables Summarizing Flood Risk Areas		1			2	4	8									15	$1,880
	Meeting to Review Flood Risk Areas and Model Updates (2 hour meeting, 2 attendees, travel time)		4				4										8	$1,280
7	**Public Participation**	0	26	29	25	0	0	0	6	5	23	48	80	0	0	0	242	$32,230
	Develop Draft Public Open House Materials (1 set for each meeting)		4	4	2				4	2	3	16	40				75	$8,430
	Develop Final Public Open House Materials (1 set for each meeting)		2	2					2		3	16	40				65	$6,970
	Public Open House #1 (2 hour meeting, 2-3 attendees, travel time)		3	6							9						18	$3,230
	Public Open House #2 (2 hour meeting, 2-3 attendees, travel time)		3		6						9						18	$2,940
	Public Open House #3 (2 hour meeting, 2-3 attendees, travel time)		3	6								4					13	$2,200
	Public Open House #4 (2 hour meeting, 2-3 attendees, travel time)		3		6							4					13	$1,920
	Public Open House #5 (2 hour meeting, 2-3 attendees, travel time)		3	6								4					13	$2,200
	Public Open House #6 (2 hour meeting, 2-3 attendees, travel time)		3		6							4					13	$1,920
	Summarize Resident Comments and Observations for Use in Alternatives Development		2	5	5					3							15	$2,420
8	**Review Prior Proposed Improvements**	0	25	5	44	12	16	32	8	5	20	40	8	0	16	8	239	$32,700
	Review Feasibility of Prior Proposed Improvements (required detention volume, estimate footprint, potential locations)		2	4	8		12	16	8			32			4	8	94	$11,330
	Meetings with Public Agencies Regarding Land Use (5 meetings, 1 hours each, 2 attendees, travel time)		15		24					2	18				12		71	$11,570
	Review and Update Preliminary Cost Estimates		2		4	12	2	8			2	8	8				46	$5,850
	Develop Memorandum Summarizing Feasibility and Cost of Prior Proposed Improvements		2	1	2		2	8		2							17	$2,180
	Meeting to Review Findings with Village (2 hour meeting, 2 attendees, travel time)		4		6					1							11	$1,770
9	**Develop Alternatives**	0	19	14	41	18	54	40	60	4	31	88	58	0	9	8	442	$55,500
	Grey Alternatives Analysis		2		8	8		12	12								42	$5,320
	Sustainable/Green Alternatives Analysis		2	4	8			16	16		16	50	30		4	8	152	$18,000
	Modeling of Alternatives				4		30										34	$4,630
	Cost Estimating of Alternatives		1	2		4		4	8		2	8	10				39	$4,560
	QC of Alternatives		8	2	2						2	8			5		27	$4,140
	Meeting to Review Potential Alternatives (4 hour meeting, 3 attendees, travel time)		4		9						11						24	$3,940
	Draft Technical Memorandum Summarizing Alternatives		1	4	4		8	8	12	2		8	8				55	$6,540
	Update/Refine Alternatives Based on Village Council Input				2	4	12		4			10	10				42	$4,920
	Final Memorandum Summarizing Selected Alternatives (Following Presentation to Village Council)		1	2	4	2	4		8	2		4					27	$3,450
10	**Presentation to Village Council**	0	10	13	4	0	12	4	0	2	11	16	8	32	0	0	112	$14,370
	Develop Graphics and PowerPoint for Village Council Presentation		4	4	2			4			2	12	8				36	$4,660
	Develop 2D Model Simulations for Public Meeting (up to 5 graphic alternatives)				2		12			1				32			47	$4,720
	Village Council/Public Meeting (2 hour meeting, 2 attendees, travel time)		4	9							8						21	$3,940
	Summarize Village Council/Public Meeting Comments		2							1	1	4					8	$1,050
	Manhours:	3	142	98	149	80	193	170	108	27	122	283	190	32	31	28	1619	
	Cost:	$820	$26,430	$19,960	$23,320	$11,900	$25,780	$18,280	$10,950	$2,240	$20,660	$29,670	$18,050	$2,720	$4,650	$2,800	**$218,210**	
	Expenses	$30,000									$7,101				$730		**$37,831**	
	Total With Expenses	**$169,680**									**$78,191**				**$8,180**		**$256,050**	

Strand Expense Summary	
Travel and Field Investigation Expenses	$9,500
Operational Expenses	$7,500
Printing/Public Outreach Boards	$3,500
Subconsultant Expense	$8,500
Misc.	$1,000
Total Expenses	**$30,000**