

ENGINEERING SERVICES AGREEMENT
SEWAGE TREATMENT FACILITY-1
PHOSPHORUS DISCHARGE OPTIMIZATION PLAN
AND
PHOSPHORUS REDUCTION FEASIBILITY STUDY

THIS IS AN AGREEMENT effective as of April 21, 2016 ("Effective Date") between the Village of Hanover Park ("Owner") and Baxter & Woodman, Inc. ("Engineer").

Owner's Project, of which the Engineer's services under this Agreement are a part, is generally identified in Exhibit A ("Project"), attached hereto and incorporated herein by this reference.

Owner and Engineer in consideration of their mutual covenants set forth herein agree as follows:

1. **SERVICES OF ENGINEER**

1.1 Engineer shall provide, or cause to be provided, if part of its scope, the services set forth herein and in Exhibit B, attached hereto and incorporated herein by this reference.

2. **OWNER'S RESPONSIBILITIES**

2.1 Provide the Engineer with all criteria and full information as to the Owner's requirements for the Project, including design objectives and constraints, space, capacity and performance requirements, and any budgetary limitations; and furnish copies of all design and construction standards which Owner will require to be included in the Drawings and Specifications, and furnish copies of Owner's standard forms, conditions, and related documents for Engineer to include in the Bidding Documents, when applicable.

2.2 Furnish the Engineer all available information pertinent to the Project including reports and data relative to previous designs, existing conditions, or investigations at or adjacent to the Site.

2.3 Furnish or otherwise make available additional project related information and data as is reasonably required to enable Engineer to complete the Project.

2.4 Owner warrants that all known hazardous materials on or beneath the site have been identified to the Engineer. The Engineer shall have no responsibility for the discovery, presence, handling, removal or disposal of, or exposure of persons to, unidentified or undisclosed hazardous materials. The Engineer shall not be required by the Owner to provide certifications that soils, including soil mixed with other clean construction or demolition debris, are or are not contaminated unless this service is set forth in Exhibit B.

- 2.5 The Engineer will rely, without liability, upon the accuracy and completeness of all information furnished by the Owner, including its consultants, contractors, specialty contractors, manufacturers, suppliers, and publishers of technical standards pursuant to this Agreement without independently verifying the information.
- 2.6 The Engineer may reasonably rely on the express and implied representations made by contractors, manufacturers, suppliers, and installers of equipment, materials, and products required by the construction documents as being suitable fit for their intended purposes and compliant with the construction documents and applicable project requirements.
- 2.7 Arrange for safe access to and make all provisions for Engineer to enter upon public and private property as required for Engineer to perform services under this Agreement.

3. SCHEDULE FOR RENDERING SERVICES

- 3.1 Engineer is authorized to begin services as of the Effective Date.
- 3.2 Engineer shall complete its obligations within a reasonable time. Specific periods of time for rendering services are set forth or specific dates by which services are to be completed are provided in Exhibit B, and are hereby agreed to be reasonable.
- 3.3 If Owner authorizes changes in the scope, extent, or character of the Project, then the time for completion of Engineer's services, and the rates and amounts of Engineer's compensation shall be adjusted equitably.
- 3.4 If the Engineer is hindered, delayed or prevented from performing under the Agreement as a result of any act or neglect of the Owner (or those for whom the Owner is responsible) or force majeure, the time for completion of the Engineer's work shall be extended by the period of the resulting delay and the rates and amounts of Engineer's compensation shall be adjusted equitably. Force majeure includes, but is not limited to acts of God, wars, terrorism, strikes, labor walkouts, fires, natural disasters, or requirements of governmental agencies.

4. COMPENSATION, INVOICES AND PAYMENTS

- 4.1 The OWNER shall pay the Engineer for the services performed or furnished under Exhibit B, Sections 1-10, a lump sum amount of \$29,950, Engineer's Project No. 160031.30.
- 4.1 The Owner shall pay the Engineer for the services performed or furnished under Exhibit B, Sections 11-16, based upon the Engineer's standard hourly billing rates for actual work time performed plus reimbursement of out-of-pocket expenses including travel, which will not exceed \$19,950, Engineer's Project No. 160031.31. The Engineer may adjust the hourly

billing rate and out-of-pocket expenses on or about January 1 of each subsequent year and will send the new schedule to the Owner.

- 4.2 The Engineer may submit requests for periodic progress payments for services rendered. Payments shall be due and owing by the Owner in accordance with the terms and provisions of the Local Government Prompt Payment Act, Illinois Compiled Statutes, Ch.50, Sec. 505, et. Seq.; and if Owner fails to comply, the Engineer may, after giving seven (7) days written notice to the Owner, suspend services under this Agreement until the Engineer has been paid in full all amounts due for services, expenses, and late payment charges as provided in such Act.
- 4.3 The Owner may, at any time, by written order, make changes to the scope of this Agreement, which changes shall not become effective unless and until Engineer issues its written acceptance of same. If such changes cause an increase or decrease in the Engineer's fee or time required for performance of any services under this Agreement, an equitable adjustment shall be made and this Agreement shall be modified. No service for which added compensation is to be charged will be provided without first obtaining written authorization from the Owner. The parties further agree that if elements of the scope are reduced or eliminated by the Owner, then the Owner agrees to waive, forgive, release, and hold harmless the Engineer from all claims, causes of action, and damages arising from those reduced and/or eliminated services. The Engineer shall not be responsible for the changes made to the project documents by the Owner, contractor, or others without the Engineer's prior review and written approval.

5. **OPINION OF PROBABLE CONSTRUCTION COSTS**

- 5.1 The Engineer's opinion of probable construction costs, if included in its scope of services, represents its reasonable judgment as a professional engineer. The Owner acknowledges that the Engineer has no control over construction costs or contractor's methods of determining prices, or over competitive bidding, or market conditions. The Engineer cannot and does not warranty or guarantee that proposals, bids, or actual construction costs will not vary from the Engineer's opinion of probable cost. Engineer shall not be responsible for any cost variance.

6. **ENGINEER'S PERFORMANCE**

- 6.1 The standard of care for all professional engineering and related services performed or furnished by the Engineer under this Agreement will be the care and skill ordinarily used by members of Engineer's profession practicing under similar circumstances at the same time and in the same locality on similar projects. Engineer makes no warranties, express or implied, under this Agreement or otherwise, in connection with Engineer's services.
- 6.2 Engineer shall be responsible for the technical accuracy of its services and its instruments of service resulting therefrom, and Owner shall not be responsible for discovering deficiencies, if any, in them. Engineer shall correct known deficiencies in its instruments of service without additional compensation except to the extent such action is directly attributable to deficiencies, errors or omissions in Owner-furnished information.
- 6.3 The Engineer will use reasonable care to comply with applicable laws, regulations, and Owner-mandated standards as of this Agreement's Effective Date. Changes to these requirements after the Effective Date of this Agreement may be the basis for modifications to Owner's responsibilities or to Engineer's scope of services, times of performance, or compensation, which shall be adjusted equitably.
- 6.4 Engineer may employ such sub-consultants as Engineer deems necessary to assist in the performance or furnishing of the services, subject to reasonable, timely, and substantive written objections by the Owner.
- 6.5 Engineer shall not supervise, direct, control, or have charge or authority over any contractor's work, nor shall the Engineer have authority over or be responsible for the means, methods, techniques, sequences, or procedures of construction selected or used by any contractor, or the safety precautions and programs incident thereto, for security or safety at the site, nor for any failure of any contractor to comply with laws and regulations applicable to such contractor's furnishing and performing of its work.
- 6.6 Engineer neither guarantees the performance of any contractor nor assumes responsibility for any contractor's failure to furnish and perform the work in accordance with the contract documents, which contractor is solely responsible for its errors, omissions, and failure to carry out the work.
- 6.7 Engineer shall not provide or have any responsibility for surety bonding or insurance-related advice, recommendations, counseling, or research, or enforcement of construction or surety bonding requirements.

- 6.8 Engineer is not acting as a municipal advisor as defined by the Dodd-Frank Act. Engineer shall not provide advice or have any responsibility for municipal financial products or securities.
- 6.9 Engineer shall not be responsible for the acts of omissions of any contractor, subcontractor, or supplier, or of any of their agents or employees or any other person, (except Engineer's own agents, employees, and consultants) at the site or otherwise furnishing or performing any work; or for any decision made regarding the contract documents, or any application, interpretation, or clarification, of the contract documents, other than those made by the Engineer.
- 6.10 Shop drawing and submittal review by Engineer shall apply only to the items in the submissions and only for the purpose of assessing, if upon installation or incorporation in the Project, they are generally consistent with the construction documents. Owner agrees that the contractor is solely responsible for the submissions (regardless of the format in which provided, i.e. hard copy or electronic transmission) and for compliance with the contract documents. Owner further agrees that the Engineer's review and action in relation to these submissions shall not constitute the provision of means, methods, techniques, sequencing or procedures of construction or extend to safety programs of precautions. Engineer's consideration of a component does not constitute acceptance of the assembled item.
- 6.11 Engineer's site observation shall be at the times agreed upon in the Exhibit B. Through standard, reasonable means, Engineer will become generally familiar with observable completed work. If Engineer observes completed work that is inconsistent with the construction documents, that information shall be communicated to the contractor and Owner to address.

7. INSURANCE

7.1 For the duration of the Project, the Engineer shall procure and maintain the following insurance coverage and Certificates of Insurance will be provided the Owner upon written request. The insurance required shall provide coverage for not less than the following amounts, or greater where required by law:

(1)	Worker's Compensation	Statutory Limits
(2)	General Liability	
	Per Claim/Aggregate	\$1,000,000/\$2,000,000
(3)	Automobile Liability	
	Combined Single Limit	\$1,000,000

(4)	Excess Umbrella Liability	
	Per Claim/ Aggregate	\$5,000,000/\$5,000,000
(5)	Professional Liability	
	Per Claim and Aggregate	\$5,000,000/\$5,000,000

7.2 Notwithstanding any other provisions of this Agreement, and to the fullest extent permitted by law, the total liability, of the Engineer and their officers, directors, employees, agents, or consultants to anyone claiming by, through or under Owner for any claims, losses, costs, or damages arising out of, resulting from, of in any way related to the Project or the Agreement for any claim or cause of action, including but not limited to the negligence, professional errors or omissions strict liability, breach of contract, indemnity, subrogation or warranty (express or implied), hereafter referred to as the "Claims", shall not exceed the total remaining insurance proceeds available under the terms and conditions of Engineer's responding insurance policy.

8. INDEMNIFICATION AND MUTUAL WAIVER

- 8.1 To the fullest extent permitted by law, Engineer shall indemnify and hold harmless the Owner and its officers and employees from claims, costs, losses, and damages arising out of or relating to the Project, provided that such claims, costs, losses, or damages are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, but only to the extent caused by the Engineer's negligent acts or omissions.
- 8.2 Owner shall indemnify and hold harmless the Engineer and its officers, directors, employees, agents and consultants from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to the Project provided that any such claims, costs, losses, or damages are attributable to bodily injury, sickness, disease, or death of, or destruction of tangible property, including the loss of use resulting therefrom, but only to the extent caused by the negligent acts or omissions of Owner or its officers, directors, employees, consultants, agents, or others retained by or under contract to the Owner with respect to this Agreement and/or to the Project.
- 8.3 To the fullest extent permitted by law, Owner and Engineer waive against each other, and the other's employees, officers, directors, insurers, and consultants, any and all claims for or entitlement to special, incidental, indirect, exemplary, or consequential damages arising out of, resulting from, or in any way related to the Project or Engineer's services.

- 8.4 In the event claims, losses, damages or expenses are caused by the joint or concurrent fault of the Engineer and Owner, they shall be borne by each party in proportion to their respective fault, as determined by a mediator or court of competent jurisdiction.
- 8.5 The Owner acknowledges that the Engineer is a business corporation and not a professional service corporation, and further acknowledges, accepts, and agrees that the Engineer's officers, directors, and employees shall not be subject to any personal liability for services provided under this Agreement.

9. **TERMINATION**

- 9.1 This Agreement may be terminated, in whole or in part, by either party if the other party fails to fulfill its obligations under this Agreement through no fault of the terminating party. The Owner may terminate this Agreement, in whole or in part, for its convenience. However, no such termination will be effective unless the terminating party gives the other party (1) not less than ten (10) business day's written notice by certified mail of intent to terminate, and (2) an opportunity for a meeting with the terminating party to resolve the dispute before termination.
- 9.2 If this Agreement is terminated by either party, the Engineer shall be paid for services performed to the effective date of termination, including reimbursable expenses. In the event of termination, the Owner will receive reproducible copies of Drawings, Specifications and other documents completed by the Engineer up to the date of termination.

10. **USE OF DOCUMENTS**

- 10.1 All documents (data, calculations, reports, Drawings, Specifications, Record Drawings and other deliverables, whether in printed form or electronic media format, provided by Engineer to Owner pursuant to this Agreement) are instruments of service in respect to this Project, and the Engineer shall retain an ownership and property interest therein (including the copyright and right of reuse at the discretion of the Engineer) regardless of the Project's completion. Owner shall not rely in any way on any document unless it is in printed form, signed or sealed by the Engineer or one of its consultants.
- 10.2 Either party to this Agreement may rely that data or information set forth on paper (also known as hard copy) that the party receives from the other party by mail, hand delivery, or facsimile, are the items that the other party intended to send. Information in electronic format or text, data, graphics, or other types that are furnished by one party to the other are furnished only for convenience and not for reliance by the receiving party. The use of such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies will govern.

- 10.3 Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests and/or procedures within 60 calendar days of receipt, after which the receiving party shall be deemed to have accepted the transferred data thus. Any transmittal errors detected within the 60-day acceptance period will be corrected by the party delivering the electronic files.
- 10.4 When transferring documents in electronic media format, the transferring party makes no representations as to long-term compatibility, usability, or readability of such information resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the creator.
- 10.5 The Engineer's document retention policy will be followed upon Project closeout. Executed copies of agreements, work orders, letters of understanding or proposals; design or other documents created by the Engineer or received from the Owner or a third party; plan review submittals from a third party and the Engineer's review of those submittals; and studies or reports prepared by the Engineer will be kept for a period of 14 years after Project closeout.

11. SUCCESSORS, ASSIGNS AND BENEFICIARIES

- 11.1 Owner and Engineer are hereby bound, as are their respective successors, employees and representatives to the other party to this Agreement with respect to all covenants, terms, promises, and obligations contained herein.
- 11.2 Neither the Owner nor Engineer may assign, sublet, or transfer any rights under or interest (including, but without limitation, monies that are due or may become due) in this Agreement without the written consent of the other, except to the extent that any assignment, subletting, or transfer is required by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any obligation under this Agreement.
- 11.3 Unless expressly provided otherwise in this Agreement, nothing contained shall be construed to create, impose, or give rise to any duty owed by Owner or Engineer to any Contractor, Subcontractor, Supplies, or other individual or entity, or to any surety for or employee of any of them. All duties and responsibilities undertaken to this Agreement will be for the sole and exclusive benefit of Owner and Engineer and not for the benefit of any other party.

12. DISPUTE RESOLUTION

- 12.1 Owner and Engineer agree to negotiate all disputes between them in good faith for a period of 30 calendar days from the date of notice prior to invoking the procedures of paragraph 12.2 or other provisions of the Agreement, or exercising their rights under law.
- 12.2 If the parties fail to resolve a dispute through negotiation under paragraph 12.1, Owner and Engineer agree that they shall first submit any and all unsettled claims, counterclaims, disputes, and other matters in question between them arising out of or relating to this Agreement or the breach thereof ("Disputes") to mediation. Owner and Engineer agree to participate in the mediation process in good faith. The process shall be conducted on a confidential basis, and shall be completed within 120 calendar days of notice if the Dispute unless the parties mutually agree to a longer period. If such mediation is unsuccessful in resolving a Dispute, then the parties may seek to have the Dispute resolved by a court of competent jurisdiction.

13. MISCELLANEOUS PROVISIONS

- 13.1 This Agreement is to be governed by the law of the state or jurisdiction in which the Project is located.
- 13.2 Any notice required under this Agreement will be in writing, addressed to the designated party at its address in the signature page and served personally, by facsimile, by registered or certified mail (postage prepaid), or by a commercial courier service. All notices shall be effective upon the date of receipt.
- 13.3 All express representations, waivers, indemnifications, and limitations of liability in this Agreement will survive its completion and/or termination.
- 13.4 Any provision or part of the Agreement held to be void or unenforceable under any laws or regulations shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the Owner and Engineer, which agree that the Agreement shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that expresses the intention of the stricken provision.
- 13.5 A party's non-enforcement of any provision shall not constitute a waiver of the provision, nor shall it affect the enforceability of that provision or of the remainder of this Agreement.
- 13.6 To the fullest extent permitted by law, all causes of action arising under this Agreement shall be deemed to have accrued, and all statutory periods of limitation shall commence, no later than the date of substantial completion, which is the point where the Project can be utilized for the purposes for which it was intended.

13.7 This Agreement constitutes the entire agreement between Owner and Engineer and supersedes all prior or oral understandings. This Agreement may be amended only by a mutually agreed and executed written instrument.

13.8 With the execution of this Agreement, Engineer and Owner shall designate specific individuals to act as Engineer's and Owner's representatives with respect to the services to be performed or furnished by Engineer and responsibilities of Owner under this Agreement. Such an individual shall have authority to transmit instructions, receive information, and render decisions relative to the Project on behalf of the respective party whom the individual represents.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, the Effective Date of which is indicated on page 1.

Engineer: Baxter & Woodman, Inc.
By: Derek J. Wold
Derek J. Wold, P.E.

Title: Vice President

Date Signed: April 13, 2016

Address for giving notices:

8678 Ridgefield Road
Crystal Lake, IL 60012

Designated Representative:

Christopher F. Buckley, P.E., BCEE
Project Manager

Phone Number: 815-444-3273
Email Address: cbuckley@baxterwoodman.com

Owner: Village of Hanover Park
By: Juliana Maller
Juliana Maller

Title: City Manager

Date Signed: 4-29-16

Address for giving notices:

2121 W. Lake Street
Hanover Park, IL 60133

Designated Representative:

T. J. Moore
Director of Engineering and Public Works

Phone Number: 630-823-5700
Email Address: tjmoore@hpil.org

VILLAGE OF HANOVER PARK, ILLINOIS
SEWAGE TREATMENT FACILITY-1
PHOSPHORUS DISCHARGE OPTIMIZATION PLAN
AND
PHOSPHORUS REDUCTION FEASIBILITY STUDY

EXHIBIT A

PROJECT DESCRIPTION

Act as Village Engineer providing Professional Engineering Services including, but not limited to, the services described below and in Exhibit B attached hereto.

The Village's existing STP 1 consists of an activated sludge treatment system that appears to have been designed to remove nutrients (phosphorus and nitrogen). IEPA is considering imposing nutrient effluent limits that will require improvements at STP 1.

The DuPage River Salt Creek Workgroup (DRSCW) has requested IEPA delay implementation of nutrient effluent limits for two NPDES permit cycles (10 years). IEPA issued a new NPDES Permit for the WRF on September 24, 2015. The Effective Date of this new NPDES Permit is October 1, 2015, and the Expiration Date is September 30, 2020. Hereinafter, this new NPDES Permit is called the "2015 NPDES Permit."

Special Condition 18 of the 2015 NPDES Permit requires the Village of Hanover Park to prepare a Phosphorus Discharge Optimization Plan and a Phosphorus Reduction Feasibility Study.

The purpose of this Project and our professional engineering services is to comply with Special Condition (SC) 18, specifically Items 5, 6, and 7. We understand for this Proposal the Village will work to comply with other items on Special Condition 18.

These services will include serving as the Village's representative, providing consultation and advice, and furnishing customary engineering and construction related services.

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VILLAGE OF HANOVER PARK, ILLINOIS
SEWAGE TREATMENT FACILITY-1
PHOSPHORUS DISCHARGE OPTIMIZATION PLAN
AND
PHOSPHORUS REDUCTION FEASIBILITY STUDY

DETAILED SCOPE EXHIBIT B

SCOPE OF SERVICES

GENERAL

1. ADMINISTRATION & MEETINGS – Confer with the Village’s Public Works Director, Wastewater Treatment Supervisor and staff, from time to time, to clarify and define the general scope, extent, and character of the Project.
2. PROJECT MANAGEMENT - Plan, schedule, and control activities that must be performed to complete the Project. These activities include, but are not limited to, budget, schedule, and scope.

PHOSPHORUS FEASIBILITY STUDY (Special Condition 18, Item 7)

3. DATA ACQUISITION – Collect operating information and plant records from the Village, including, but not limited to, discharge monitoring reports (DMRs), operating reports, laboratory data, previous facility plan reports, and STP 1 Basis of Design.
4. LABORATORY TESTING – For Wastewater Sampling and Characterizations, the Village will, either with its own staff and lab, or by engaging the services of a private laboratory, collect and analyze samples, and prepare a report of the sampling results.
 - a. Baseline Modeling:
 - 1) The Village will collect samples and analyze for chemical oxygen demand (COD), determine the readily biodegradable fraction (rbCOD) and other fractions.
 - 2) The Village will be responsible for collecting samples and having them tested. The testing will be performed on two separate samples collected on different dates.
5. ASSESS PRESENT CONDITIONS
 - a. Phosphorus Reduction Feasibility Study (SC 18, Item 7): Review and determine existing facility capacities. Using BioWin™ software, prepare a simulation and optimization model of the plant to establish baseline operating conditions and evaluate performance limitations. The baseline shall consider and include, but not be limited to, the following:
 - 1) Oxidation Ditch

- 2) Secondary Clarifiers ◊ Chemical Storage and Feed.
 - 3) RAS/WAS Pumping Station
 - 4) Aerobic Digesters
 - 5) Sludge Dewatering
6. BASIS OF DESIGN - Develop a Basis of Design that takes into account existing actual loading conditions and the projected increase in loading using standards and design criteria from the Illinois Recommended Standards for Sewage Works and considering potential phosphorus effluent limits of 1.0, 0.5, and 0.1 mg/L and a nitrogen effluent "goal" of 8.0 mg/L (SC 18, Item 7). This is the Basis of Design on which the BioWin™ modeling will be based.
7. ASSESS FUTURE REQUIREMENTS
- a. Phosphorus Reduction Feasibility Study (SC 18, Item 7): Determine the new treatment processes and modifications necessary to meet phosphorus effluent limits of 1.0, 0.5, and 0.1 mg/L and a nitrogen effluent "goal" of 8.0 mg/L. Modify the BioWin™ model of the plant based on process modifications to simulate, evaluate, and optimize process performance for an A2/O biological nutrient removal (BNR) processes. The model will consider and include, but not be limited to:
 - 1) OXIDATION DITCH/AERATION SYSTEM - Determine activated sludge tank requirements. Size and select zones/tanks for anaerobic, and oxic (aerobic) operation.
 - 2) SECONDARY CLARIFIERS - Determine the impacts of BNR on the size and performance of the secondary clarifiers. Determine if improvement should be made to the existing clarifiers.
 - 3) CHEMICAL STORAGE AND FEED FACILITIES - Determine the chemical storage and feed facilities required for chemical phosphorus removal (Chem-P) and carbon supplementation facilities. Size and select equipment and building.
 - 4) RAS/WAS PUMP STATION, INTERNAL RECYCLE FLOWS, AND SLUDGE FERMENTATION - Determine return and waste activated sludge pumping requirements. Determine the modifications or additions required for internal mixed liquor recycle. Determine whether RAS fermentation is feasible for volatile fatty acid (VFA) generation or whether carbon supplementation will be needed.
 - 5) DIGESTER DECANT - Evaluate impact of the supernatant from decanting the aerobic digester.

- 6) **AEROBIC DIGESTERS** - Determine the impacts of BNR on aerobic digester performance.
- 7) **SLUDGE DEWATERING** – Evaluate the impacts on BNR from the filtrate from dewatering equipment.
- 8) **CONTROL SYSTEM** - Determine required modifications to the existing SCADA system.
- 9) **SYSTEM LAYOUT** – Develop a layout of the modified wastewater treatment system.

8. DEVELOP AND EVALUATE ALTERNATIVES

- a. Perform a cost effective analysis for three alternatives. The three alternatives will be the improvements required to convert the activated sludge system to the A2/O process or similar for each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l). Develop a recommended plan based on discussion with Village’s staff.
9. **COST ESTIMATES** – Prepare opinions of the probable total Project cost including construction, engineering services, contingencies, and, on the basis of information furnished by the Village, allowances for legal services, financial consultants, and any administrative services or other costs necessary for each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l).
10. **PHOSPHORUS REDUCTION FEASIBILITY STUDY REPORT** – Prepare a Planning Report containing schematic layouts, sketches, conceptual design criteria with appropriate exhibits to indicate clearly the considerations involved, and the alternative solutions available to the Village and setting forth the Engineer’s findings and recommendations for the improvements that are required to meet each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l). Provide one softcopy in the form of a pdf file of the Report to the Village for review, comments, and approval.
- a. The Report shall include, but not be limited to, the following:
 - 1) An evaluation of the capacity of existing facilities to meet the each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l) based on operating data and the facility baseline model.
 - 2) A Basis of Design.
 - 3) An evaluation of the cost-effectiveness and feasibility of alternatives based on the proposed facility modification models.

- 4) A process flow diagram for the facility showing existing, proposed, and future facilities for each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l).
 - 5) A schematic layout for the facility showing existing, proposed, and future facilities for each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l).
 - 6) A site plan for the entire STP 1 property owned by the Village showing existing, proposed and future facilities for each of the three levels of Phosphorus effluent limits (1.0, 0.5, and 0.1 mg/l).
 - 7) Cost Estimates (see Item 9)
- b. FINAL REPORT - Incorporate final comments in the Final Report. Provide one hardcopy and one softcopy in the form of a pdf file on electronic media of the Final Report to the Village, for review, comments, and approval.

PHOSPHORUS DISCHARGE OPTIMIZATION PLAN

(Special Condition 18, Item 5 & 6):

11. GENERAL - Evaluate a range of measures for reducing phosphorus discharges from the existing wastewater treatment plant, including possible source reduction measures, operational improvements, and minor low cost facility modifications that will optimize reductions in phosphorus discharges from STP 1.
12. DATA ACQUISITION – Collect operating information and plant records from the Village, including, but not limited to, discharge monitoring reports (DMRs), operating reports, laboratory data, previous facility plan reports, and STP 1 Basis of Design.
13. LABORATORY TESTING – The Village will, either with its own staff and lab, or by engaging the services of a private laboratory, collect and analyze samples, and prepare a report of the sampling results.
 - a. Influent Reduction Measures:
 - 1) The Village will collect samples and analyze for phosphorus.
14. EFFLUENT PHOSPHORUS REDUCTION MEASURES:
 - a. Determine possible measures to reduce phosphorus discharges by optimizing existing treatment processes without causing non-compliance with permit effluent limitations or adversely impacting stream health. These measures will include, but not be limited to:
 - 1) Adjust the solids retention time for biological phosphorus removal.

- 2) Adjust aeration rates to reduce DO and promote biological phosphorus removal.
 - 3) Change aeration settings in oxidation ditch rings by adjusting the water level or by turning off disc aerators in the first ring.
 - 4) Minimize impact on recycle streams by improving aeration within holding tanks.
 - 5) Adjust flow through existing basins to enhance biological nutrient removal.
 - 6) Increase volatile fatty acids for biological phosphorus removal.
- b. Use the BioWin™ model developed for the Phosphorus Feasibility Study (see Item 5 above) to evaluate possible measures to reduce phosphorus discharges by optimizing existing treatment processes.

15. INFLUENT PHOSPHORUS REDUCTION MEASURES:

- a. This task will be a combined effort between the Village and Baxter & Woodman.
- b. General
 - 1) Evaluate the phosphorus reduction potential of users.
 - 2) Determine which sources have the greatest opportunity for reducing phosphorus (e.g., industrial, commercial, institutional, municipal, and others).
 - a) Determine whether known sources (e.g., restaurant and food preparation) can adopt phosphorus minimization and water conservation plans.
 - b) Evaluate implementation of local limits on influent sources of excessive phosphorus.
- c. Identify and Quantify Potential Sources
 - 1) Baxter & Woodman will hold a kickoff meeting with the Village to provide guidance at the start of this effort.
 - a) The Village will provide a categorized list of industrial user surveys accomplished to date.
 - b) Village staff has extensive knowledge of the businesses in the area.
 - 2) Baxter & Woodman will classify the users and will provide guidance on potential phosphorus dischargers.

- 3) The Village will complete any sampling and laboratory analysis necessary to identify phosphorus discharges.
- 4) Baxter & Woodman will use sampling reports, flow data, and discussion with Village staff to determine which users discharge significant amounts of phosphorus.
- 5) Baxter & Woodman will determine which users may have potential to significantly reduce phosphorus discharges.
- 6) The Village and Baxter & Woodman together (one Village employee, one B&W employee) will conduct site inspections with up to 10 dischargers that are believed to have potential to reduce phosphorus in their discharge in order to determine what amount of reduction is practical.
- 7) Of the 10 site inspections, only 3 of them are anticipated to warrant further evaluations to quantify potential phosphorus reductions and further discussion with the user of the practicality of those reductions. A team of at least one Village employee and at least one BWI employee will be used.
- 8) Baxter & Woodman will complete a summary and identify the users with the greatest potential to reduce phosphorus discharge. It will be determined whether sources can adopt phosphorus minimization and water conservation plans.
- 9) Baxter & Woodman will assist the Village in determining if local limits need to be applied to industrial users with phosphorus discharges.

16. PHOSPHORUS DISCHARGE OPTIMIZATION PLAN REPORT: Prepare a Report presenting the findings and recommendations on influent phosphorus reduction measures and effluent phosphorus reduction measures.

- a. The Report shall include, but not be limited to, the following:
 - 1) A description of the work that was done to identify significant phosphorus dischargers and determine the potential level of phosphorus reduction.
 - 2) A statement of the amount of influent phosphorus reduction that can be achieved.
 - 3) A description of the potential measures to reduce effluent phosphorus, which were evaluated and are practical.

- 4) A statement of the measures in the treatment plant that will be taken to reduce effluent phosphorus and the amount of effluent phosphorus reduction that can be achieved.
- b. FINAL REPORT - Incorporate final comments in the Final Report. Provide one hardcopy and one softcopy in the form of a pdf file on electronic media of the Final Report to the Village, for review, comments, and approval.

PROJECT SCHEDULE

Task	Date Completed
Notice-to-Proceed	May 1, 2016
Wastewater Sampling and Characterizations & Review of Industrial Users and Industrial Sampling	June 15, 2016
WWTP Modeling and Evaluations & Review of Industrial User Sampling & Phosphorus Impacts	October 2016
Phosphorus Feasibility Analysis	November 2016
Draft Report Submittal & Review	January 2017
Final Report	February 2017

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