

**Final Implementation Plan
City of Cortland 2014 CDBG #285HR303-14**

I. OVERALL ADMINISTRATION PLAN

The City of Cortland will follow the Implementation Plan to assure integration of grant management with the City's existing organizational structure.

A. Role of Chief Elected Official and Governing Body

The City of Cortland has contracted with Thoma Development Consultants (Thoma) to provide project management services for its fiscal year 2014 Owner-Occupied Housing Rehabilitation Program (the "Program"). The firm has extensive experience managing Community Development Block Grant (CDBG) homeownership and housing rehabilitation programs, specifically with the City of Cortland's various CDBG projects and was selected through a competitive procurement process of Request for Proposals (RFP). Thoma will work with the Mayor, City Common Council, Director of Administration and Finance and the financial office staff, and City Loan Committee, as appropriate, to manage the CDBG program.

It will be the role of the Mayor to develop an informal system of contact and coordination with key Thoma staff during the life of the grant. This will include, but not be limited to email contact with a designated Thoma staff member. A member of Thoma's staff will also attend all City department head meetings to keep the City informed of Community Development issues. Thoma staff will also attend Council meetings, when necessary or requested by the City, or when any Community Development related issue is on the Council's agenda. The Mayor and a City Council member sit on a City Loan Committee whose duties include, but are not limited to finalizing program guidelines and approving participation of program participants. The Mayor will provide approval of agreements with program participants and will be responsible for the approval of the required environmental review record, semi-annual and annual reports, and other reports as required by the CDBG Program. Finally, the Mayor will have oversight of all City staff that is involved in the subject Community Development Program, including the Director of Administration and Finance and City finance staff.

It will be the role of the Mayor to develop an informal system of contact and coordination with the project manager during the grant process. In addition to a Thoma staff member attending all Department Head meetings at the City, Thoma staff will meet with the Mayor at least once a month, if not more often, and will provide updates on the Programs as requested. The duties of the municipality will include, but not be limited to: finalizing program guidelines, approval of agreements with program participants, and approval of the expenditure of funds. The Mayor will also be responsible for the approval of the required environmental review and the status reports, annual reports,

federal assistance expenditure reports and any other report as required under the CDBG Program by the New York State Office of Community Renewal.

After the completion of an applicant's intake the program manager will provide information with respect to the applicant and the pertinent application information to the Loan Committee. The Loan Committee will either approve or deny participation. If the project/applicant is approved for participation in the Program, the rehabilitation specialist will conduct a housing assessment and prepare a work scope, then assist with the contractor bidding process before a final budget is determined. Once the final budget is in place, the program manager/assistant will prepare the necessary documents for signature by the City.

As incurred project costs become due for payment, the program manager will prepare all payment documentation including Request for Funds Forms 1-4, 1-4a and 1-4b, as well as City vouchers and checks. Payment documentation will be presented to the City Finance, which will approve all expenditures and the request for funds. Checks will be approved and held until funds are available. The City's Chief Fiscal Officer is the Director of Administration and Finance. This official and/or his staff will review all documentation and approve all Program payments.

B. The City Attorney will prepare and/or review all proposed agreements for the CDBG Program and will be involved in determining the need for conflict of interest waivers issuing legal opinions with respect to conflicts, if necessary.

C. Program Manager

Refer to Section II below.

D. Identification of key CDBG Program Administrators

Chief Elected Official:

Name: Brian Tobin

Title: Mayor

E-mail address: btobin@cortland.org

Telephone: 607-758-8374

Fax: 607-756-4644

Duties: Oversee CDBG program including all expenditures and oversight of project management firm. See also "Role of Chief Elected Official" above for further detail.

Chief Financial Officer:

Name: Mack Cook

Title: Director, Administration and Finance

E-mail address: mcook@cortland.org

Telephone: 607-756-7312

Fax: 607-753-3295

Duties: Incorporate all financial transactions into City accounting system. Review all drawdown requests, sign drawdown requests, approve payments and payment documentation, establish system to incorporate CDBG financial transactions in

City accounting system and City budget, oversee financial staff in preparation of all CDBG related financial reports and accounting.

Authorized Signatures:

Name: Mack Cook Telephone: 607-756-7312
Title: Director, Administration and Finance Fax: 607-753-3295
E-mail address: mcook@kortland.org

Name: Tracey L. Hatfield Telephone: 607-756-7312
Title: Administration and Finance Assistant Fax: 607-753-3295
E-mail address: thatfield@kortland.org

Name: Constance M. Sorrells Telephone: 607-756-7312
Title: Senior Account Clerk Fax: 607-753-3295
E-mail address: csorrells@kortland.org

Name: Kenneth E. Dye Telephone: 607-753-0872
Title: Deputy Mayor and Common Council Member
E-mail address: ward3@kortland.org

Duties: Approve and/or sign request for funds.

Project Manager:

Name: Richard Cunningham Telephone: 607-753-1433
Thoma Development Consultants Fax: 607-753-6818
Title: Senior Consultant
E-mail address: Rich@thomadevelopment.com

Duties: The Project Manager is Thoma Development Consultants. Thoma will use the services of Program Manager Annette Huskins and Housing Rehabilitation Specialist (HRS) Phil Connery in the administration and delivery of grant services and activities. Other Thoma staff will be involved in the overall management and program delivery of this grant including, but not limited to Ann Hotchkin and Linda Armstrong, Program Managers, Tina Hall, Administrative Assistant, and Pam LeFever, Bookkeeper. The Thoma staff will be responsible for overall project management including but not limited to financial management, marketing, intake and activity management, documentation preparation, and report preparation.

Annette Huskins, Phil Connery, and Tina Hall will be responsible for the day-to-day overall management of this Program. Duties for the rehabilitation activity will include, but not be limited to intake and applicant assessment/qualification; qualification of contractors and MWBE contractor marketing; conflict of interest determination and preparation of requests for waivers when necessary; scheduling and coordination of the housing assessment and lead risk assessment by the HRS; SHPO and flood plain reviews; coordination of other required testing such as

energy audits and asbestos testing; preparation of drawdowns; preparation of status reports, annual reports and other CDBG required reports; reconciliation of the activity budgets, maintaining status of funds and encumbrance system, and oversight of other Thoma staff involved in the rehabilitation activity of the Program.

City Attorney:

Name: Richard Van Donsel

Telephone: 607-756-1761

E-mail address: lawdept@cortland.org

Fax: 607-756-4644

Duties: Preparation and/or review of agreements and program documentation. Advise Mayor and City Council in other legal matters relating to CDBG project. See also I.B. above

E. Conflict of Interest Policy

The City of Cortland will follow federal regulations at 24CFR 85.36 and guidance provided by NYS OCR as outlined in the Grants Administrative Manual with respect to conflicts of interest, to determine possible conflicts of interest and submission of waiver requests. All Program applicants must complete a conflict of interest form (see attached). Any potential participant that has or had a contractual relationship with the City, and/or has or had business or family ties to the City government, and/or is or was an appointed and/or elected official or associate of the City may be deemed to have a potential conflict or perception of a conflict of interest. In some cases, the City Council may decide to seek a waiver of conflict of interest for participants or contractors if such waiver and subsequent participation does not violate State or local law and if the waiver will serve to further the interests of the CDBG Program. This waiver request must be discussed openly at a Council meeting and the City Attorney must conclude in a written Opinion of Counsel letter that the applicant's participation does not violate State or local law. Requests for waivers will be submitted to the NYS OCR for review and determination. Thoma will seek the input of the City Counsel with respect to issues that must be satisfied with a waiver request.

II. PROJECT MANAGEMENT

As noted above, the City of Cortland has retained Thoma Development to provide comprehensive management for the above noted CDBG Program. Although the City is ultimately responsible for compliance with all applicable State and federal laws, Thoma will facilitate the City's compliance with applicable laws, regulations, and contractual requirements that relate to the CDBG grant and the CDBG Program, in general, as outlined in the contract between Thoma and the City. Thoma's duties will include, but will not be limited to the preparation of the environmental review record and guiding the City through the environmental review process; acting as liaison with NYS OCR staff; all activities related to housing rehabilitation processes as described above in I. D. under "Project Manager" and as detailed more fully by heading below; insuring timely completion of the grant; trouble shooting issues; coordination of accounting for the

pProgram with the City's financial staff; reporting to the Mayor and Common Council on progress under the Program; and closeout of the grant.

Thoma has a number of staff members that will be involved in the grant administrative process based on their expertise and what is required during the life of the grant, such as preparation of the environmental review record, preparation of closing documents, accounting and financial processes, report preparation, housing conditions assessment, etc. Annette Huskins has been designated as the lead manager for the housing rehabilitation activity.

Ms. Huskins major responsibilities are to provide intake and applicant qualification; to coordinate the activities of the HRS as they relate to the assessment of the subject home to insure the participant's house qualifies under the Program; coordinate all testing; and work with the HRS in the bidding and awarding of contracts. She will also oversee all other staff that works with the rehabilitation component of the Program. Her duties are described further in I.D. above.

As project costs are incurred and become due for payment, Ms. Huskins and Thoma staff will prepare all payment documentation including Request for Funds Forms 1-4, 1-4a, and i-4b, as well as City vouchers. Payment documentation will be presented to the City's financial staff, which will approve all expenditures and the request for funds. The City will audit requests for payments, and the City will prepare checks.

Housing Rehabilitation Advisory Council

The City of Cortland and its Common Council have not created an advisory board to provide oversight for the CDBG Program. However, the City does have a Housing Committee that provides input into City housing issues and with which Thomas staff meets. Further, the City has an established Loan Committee that reviews all requests for participation.

Marketing

Thoma staff will market the program to potential applicants. After completion of the environmental review record, all pre-applicants on the waiting list will be sent a notice of grant award and will be encouraged to complete a final application. Marketing will not, however, be limited to the waiting list since it is the City's intent to make the Program as inclusive as possible. An advertisement will be placed in the local newspaper and notices will be placed in City Hall, on the City's and Thoma's websites. Further notices are sent to interested agencies and announced at the quarterly meeting of the County's housing consortium of which a Thoma staff is a member. The Program has also been marketed with Access to Independence. City Council members will be encouraged to spread the news of the award by word of mouth to their constituents and will be given applications for their use and/or posing on facebook pages. The Program is also placed on the City's website. After the first marketing notices, future advertisements will be place in the local media periodically until all funds are committed. The goal of the marketing program will be to assure every potential participant has received notice and that a waiting list of future participants is identified.

Applicant Intake

Thoma staff, specifically Annette Huskins, will be responsible for the intake and qualification process. Based upon a verbal or written request from a potential participant, a full application package is sent. The applicant is responsible for completing all required forms and for providing all required information to determine income eligibility. Upon the completion of an eligibility review by the program manger, the City's Loan Committee will make a determination of eligibility. If information is incomplete, the applicant will receive a notice. Every effort will be made to provide technical assistance in completing the application and supplying the needed information, especially with lenders.

Once the applicant has been deemed eligible, a commitment issued, and the house assessed for eligibility, the participants will enter into the work write-up and contractor selection phase of the process. The HRS will work with the participant to determine the work scope to be completed, the selection of contractors to provide bids for the work, and the final selection of the contractors. Once the bidding process is complete, Thoma staff will prepare the necessary contracts and agreements for City, participants' and contractors' signatures. Once all documents are signed, a Notice to Proceed will be sent to the contractors.

The Rehabilitation Specialist will oversee the work in progress, which includes working with the homeowner and overseeing the work of the contractor from project start to completion. As bills for work are submitted for payment, the HRS and participant will review work undertaken thus far. Upon the approval of the participant, an authorization for payment will be made and provided to the City. After all work in a project is complete, the project manager will closeout each participant's file and provide information to the City so the City can tag the property and enter the participant in the City's database-monitoring program.

Financial Management

Financial management is coordinated between Thomas's bookkeeper and the City's financial staff. Thomas will prepare the necessary NYS OCR forms for payment and will provide (1) requests for payment for signatures, (2) drawdown forms, and (3) all back up from contractors and vendors (vouchers and invoices). The NYS OCR forms and back up will be provided to the City, which will prepare the checks and authorize the payments. Both the City and Thomas maintain accounting of Program costs. Thoma also maintains a system of encumbrances and expenditures to insure the budget is not over-spent.

Program Schedule

The program schedule, as included in the application for grant funds, will be followed.

Program Income

The City has an adopted and NYS approved Program Income Plan under which it allocates Program Income.

It is possible that program income may be generated as a result of the recapture of deferred payment loans made under this CDBG Program. If program income is received in excess of \$35,000 per year, it will be used in accordance with the City's approved Program income Plan.

Implementation Plan Adoption

This CDBG Implementation Plan was adopted by the City of Cortland's City Council on November 3, 2015.

Jurisdiction: City of Cortland
Jurisdictional Class:
Adopted:
Revised:

WASTEWATER SCADA/INSTRUMENTATION TECHNICIAN

DISTINGUISHING FEATURES OF THE CLASS:

The work involves responsibility for maintaining the Supervisory Control and Data Acquisition (SCADA) and instrumentation infrastructure of a municipal wastewater treatment facility as well as assisting in the technical aspects of administering a computerized maintenance management system. The incumbent also performs general wastewater operations and general maintenance as directed. The work is performed under the direct supervision of the Wastewater Treatment Plant Operator of Record and the general supervision of the Superintendent of Wastewater.

TYPICAL WORK ACTIVITIES:

- Performs maintenance, repairs and installation of SCADA, process instrumentation and all automated equipment as it pertains to a wastewater treatment plant.
- Assists in maintaining and operating a computerized maintenance management system.
- Performs maintenance, repairs and installation of process equipment at the wastewater treatment plant.
- Assists in maintaining parts and supply inventory.
- Performs laboratory and operator duties if required by Operator of Record or the Superintendent of Wastewater including regular scheduled weekends.
- Performs electrical repairs commensurate with training.

FULL PERFORMANCE KNOWLEDGE, SKILLS, ABILITIES AND PERSONAL CHARACTERISTICS:

- Working knowledge of Allen Bradley PLC hardware and software.
- Working knowledge of general process instrumentation as used in municipal wastewater treatment plants.

Working knowledge of computerized maintenance management systems.

Good knowledge of the principles and practices involved in the operation and maintenance of a wastewater treatment plant;

Good knowledge of federal, state and local laws and regulations applicable to a wastewater treatment plant;

Working knowledge of the tools, equipment and terminology used in the maintenance and repair of wastewater treatment systems;

Working knowledge of the principles and applications of physics, chemistry and bacteriology as applied to wastewater treatment and disposal;

Skill in the operation and repair of pumps, valves and related mechanical and electrical equipment;

Ability to make routine laboratory and field tests for control of plant operations;

Ability to analyze and organize data and prepare records and reports;

Ability to understand and follow oral and written instructions;

Mechanical aptitude;

Physical condition commensurate with the demands of the job.

MINIMUM QUALIFICATIONS:

Knowledge of industrial SCADA systems and instrumentation as it applies to the operation of a municipal wastewater treatment plant.

Must possess high school diploma or high school equivalency diploma (GED).

Must possess a Grade 1A or higher Wastewater Treatment Plant Operator certificate issued by the New York State Department of Environmental Conservation and retain said license for the duration of employment.

SPECIAL REQUIREMENT: Possession of an operator's license issued by the NYS Department of Motor Vehicles. The incumbent must obtain a CDL Class B license within one year of the date of appointment and retain said license for the duration of employment.

**RESOLUTION DETERMINING THAT PROPOSED ACTIONS
ARE TYPE II ACTIONS FOR PURPOSES OF
THE NEW YORK STATE ENVIRONMENTAL QUALITY REVIEW ACT**

By Alderman _____

November 3, 2015

WHEREAS, the Common Council of the City of Cortland, New York (the “City”) is considering financing the cost of certain repair, replacement, maintenance, equipment purchases, capital improvement projects and public safety projects, as described on Exhibit A to this resolution (the “Type II Projects”); and

WHEREAS, pursuant to Article 8 of the Environmental Conservation Law, as amended (the “SEQR Act”), and the regulations adopted pursuant thereto by the Department of Environmental Conservation of the State of New York, being 6 NYCRR Part 617, as amended (the “Regulations”), the City desires to comply with the SEQR Act and the Regulations with respect to each of the Type II Projects;

NOW, THEREFORE, BE IT RESOLVED BY THE MEMBERS OF THE COMMON COUNCIL OF THE CITY OF CORTLAND, NEW YORK AS FOLLOWS:

1. Each of the Type II Projects constitute a “Type II Action” (as defined in the Regulations) and no further action under the SEQR Act and the Regulations is required.
2. This resolution shall take effect immediately.

The foregoing resolution was thereupon declared duly adopted.

Seconded by Alderman

	<u>Ayes</u>	<u>Noes</u>
Alderman Linda Ferguson	<input type="checkbox"/>	<input type="checkbox"/>
Alderman John Bennett	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Clifton Dutcher	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Ken Dye	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Tom Michales	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Carlos Ferrer	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Julie Bird	<input type="checkbox"/>	<input type="checkbox"/>
Alderman Katy Silliman	<input type="checkbox"/>	<input type="checkbox"/>

Carried and Adopted

By _____
Seconded _____

November 3, 2015

BOND RESOLUTION # OF 2015

BOND RESOLUTION OF THE CITY OF CORTLAND, NEW YORK,
AUTHORIZING THE ISSUANCE OF \$1,839,000 SERIAL BONDS
TO FINANCE THE COST OF VARIOUS CAPITAL
IMPROVEMENTS

BE IT RESOLVED by the Common Council of the City of Cortland, New York as follows:

Section 1. The City of Cortland, New York (the "City") is hereby authorized to undertake the various capital projects described below (the "Projects") at an aggregate estimated maximum cost of \$1,970,000, the estimated maximum cost of each Project being as follows:

(a) Otter Creek Culvert Reconstruction. The reconstruction of the Otter Creek culvert including lands or rights in lands and original furnishings, equipment, machinery and apparatus required, at an estimated maximum cost not to exceed \$600,000;

(b) Pedestrian/Bike Trail System. The construction of a pedestrian/bike recreational trail system within the City, including surveys, plans, maps and estimates in connection therewith at a maximum estimated cost not to exceed \$39,000;

(c) Water System Improvements. The acquisition of replacement, furnishings, equipment, machinery and apparatus for the City water system, including water meters at an estimated maximum cost not to exceed \$600,000; and

(d) Road Improvements. The reconstruction or resurfacing of City roads and streets, including curbs, gutters, drainage, landscaping, grading or improving the rights of way, with a pavement more durable than pavement of sand and gravel, water bound macadam or penetration process with single surface treatment, at an estimated maximum cost not to exceed \$600,000.

Section 2. The plan for financing of such maximum authorized cost of \$1,970,000 shall be the issuance of \$1,839,000 in serial bonds (the "Bonds") of the City which are hereby authorized to be issued pursuant to this resolution.

Section 3. It is hereby determined that the period of probable usefulness of the aforesaid specific objects or purposes pursuant to paragraph 4 of Section 11.00(a) of the Local Finance Law are as follows:

<u>Section 1 Subparagraph</u>	<u>Period of Probable Usefulness (Years)</u>	<u>Local Finance Law Section 11.00(a) Paragraph</u>
(a) Otter Creek Culvert	30	3
(b) Pedestrian/Bike Trail System	15	19(c)
(c) Water System Improvements	30	3
(d) Road Improvements	10	20(b)

Section 4. Pursuant to Section 107.00(d)(9) of the Local Finance Law, current funds are not required to be provided prior to issuance of the Bonds or any bond anticipation notes issued in anticipation of issuance of the Bonds.

Section 5. The temporary use of available funds of the City, not immediately required for the purpose or purposes for which the same were borrowed, raised or otherwise created, is hereby authorized pursuant to Section 165.10 of the Local Finance Law, for the capital purposes described in Section 1 of this resolution.

Section 6. The Bonds and any bond anticipation notes issued in anticipation of the Bonds, shall contain the recital of validity prescribed by Section 52.00 of the Local Finance Law and the Bonds, and any bond anticipation notes issued in anticipation of the Bonds, shall be general obligations of the City, payable as to both principal and interest by a general tax upon all the real property within the City without legal or constitutional limitation as to rate or amount. The faith and credit of the City are hereby irrevocably pledged to the punctual payment of the principal of and interest on the Bonds, and any bond anticipation notes issued in anticipation of the Bonds, and provision shall be made annually in the budget of the City by appropriation for (a) the amortization and redemption of the Bonds and bond anticipation notes to mature in such year, and (b) the payment of interest to be due and payable in such year.

Section 7. Subject to the provisions of this resolution and of the Local Finance Law, and pursuant to the provisions of Sections 21.00, 30.00, 50.00 and 56.00 to 63.00, inclusive, of the Local Finance Law, the power to authorize the issuance of and to sell bond anticipation notes in anticipation of the issuance and sale of the Bonds herein authorized, including renewals of such notes, and the power to prescribe the terms, form and contents of the Bonds, and any bond anticipation notes, and the power to sell and deliver the Bonds and any bond anticipation notes issued in anticipation of the issuance of the Bonds, and the power to issue bonds providing for level or substantially level or declining annual debt service, is hereby delegated to the Director of Administration and Finance, the Chief Fiscal Officer of the City.

Section 8. The reasonably expected source of funds to be used to initially pay for the expenditures authorized by Section 1 of this resolution shall be from the City's General Fund. It is intended that the City shall then reimburse such expenditures with the proceeds of the Bonds

and bond anticipation notes authorized by this resolution and that the interest payable on the Bonds and any bond anticipation notes issued in anticipation of the Bonds shall be excludable from gross income for federal income tax purposes. This resolution is intended to constitute the declaration of the City's "official intent" to reimburse the expenditures authorized by this resolution with the proceeds of the Bonds and bond anticipation notes authorized herein, as required by Treasury Regulation Section 1.150-2. Other than as specified in this resolution, no moneys are reasonably expected to be, received, allocated on a long term basis, or otherwise set aside with respect to the permanent funding of the objects or purposes described herein.

Section 9. The Director of Administration and Finance, as Chief Fiscal Officer of the City, is further authorized to sell all or a portion of the Bonds, and any bond anticipation notes issued in anticipation of the Bonds, to the New York State Environmental Facilities Corporation (the "EFC") in the form prescribed in one or more loan and/or grant agreements (the "Agreements") between the City and the EFC; to execute and deliver on behalf of the City one or more Agreements, Project Financing Agreements, and Letters of Intent with the EFC and to accept the definitive terms of one or more Agreements from EFC by executing and delivering one or more Terms Certificates; and to execute such other documents, and take such other actions, as are necessary or appropriate to obtain a loan or loans from the EFC for all or a portion of the costs of the expenditures authorized by this resolution, and perform the City's obligations under its Bonds or bond anticipation notes delivered to the EFC, the Project Financing Agreements and the Agreements.

Section 10. The serial bonds and bond anticipation notes authorized to be issued by this resolution are hereby authorized to be consolidated, at the option of the City's Director of Administration and Finance, the Chief Fiscal Officer, with the serial bonds and bond anticipation notes authorized by other bond resolutions previously or hereafter adopted by the Common Council for purposes of sale in to one or more bond or note issues aggregating an amount not to exceed the amount authorized in such resolutions. All matters regarding the sale of the bonds, including the dated date of the bonds, the consolidation of the serial bonds and the bond anticipation notes with other issues of the City and the serial maturities of the bonds are hereby delegated to the Director of Administration and Finance, the Chief Fiscal Officer of the City.

Section 11. The validity of the Bonds authorized by this resolution and of any bond anticipation notes issued in anticipation of the Bonds may be contested only if:

- (a) such obligations are authorized for an object or purpose for which the City is not authorized to expend money; or
- (b) the provisions of law which should be complied with at the date of the publication of this resolution or a summary hereof are not substantially complied with, and an action, suit or proceeding contesting such validity is commenced within twenty (20) days after the date of such publication; or
- (c) such obligations are authorized in violation of the provisions of the Constitution.

Section 12. The Director of Administration and Finance, as Chief Fiscal Officer of the City, is hereby authorized to enter into an undertaking for the benefit of the holders of the Bonds from time to time, and any bond anticipation notes issued in anticipation of the sale of the Bonds, requiring the City to provide secondary market disclosure as required by Securities and Exchange Commission Rule 15c2-12.

Section 13. This resolution, or a summary of this resolution, shall be published in the official newspapers of the City for such purpose, together with a notice of the Clerk of the City in substantially the form provided in Section 81.00 of the Local Finance Law.

Section 14. This resolution is not subject to a mandatory or permissive referendum.

Section 15. The Council hereby determines that the provisions of the State Environmental Quality Review Act and the regulations thereunder have previously been satisfied with respect to the expenditures authorized by this resolution.

Section 16. This resolution shall take effect immediately upon its adoption.

Approved as to form, November 3, 2015

Richard VanDonsel, Corporation Counsel

ESTOPPEL NOTICE

The bond resolution, a summary of which is published herewith, has been adopted on the 3rd day of November, 2015, and the validity of the obligations authorized by such resolution may be hereafter contested only if such obligations were authorized for an object or purpose for which the City of Cortland, New York (the "City"), is not authorized to expend money or the provisions of law which should have been complied with as of the date of publication of this notice were not substantially complied with, and an action, suit or proceeding contesting such validity is commenced within twenty (20) days after the date of publication of this notice, or such obligations were authorized in violation of the provisions of the Constitution.

Summary of Bond Resolution

1. Class of Objects or Purposes – The City is hereby authorized to undertake the various capital projects consisting of:

(a) Otter Creek Culvert Reconstruction. The reconstruction of the Otter Creek culvert including lands or rights in lands and original furnishings, equipment, machinery and apparatus required, at an estimated maximum cost not to exceed \$600,000;

(b) Pedestrian/Bike Trail System. The construction of a pedestrian/bike recreational trail system within the City, including surveys, plans, maps and estimates in connection therewith at a maximum estimated cost not to exceed \$39,000;

(c) Water System Improvements. The acquisition of replacement, furnishings, equipment, machinery and apparatus for the City water system, including water meters at an estimated maximum cost not to exceed \$600,000; and

(d) Road Improvements. The reconstruction or resurfacing of City roads and streets, including curbs, gutters, drainage, landscaping, grading or improving the rights of way, with a pavement more durable than pavement of sand and gravel, water bound macadam or penetration process with single surface treatment, at an estimated maximum cost not to exceed \$600,000.

2. Period of Probable Usefulness – The periods of probable usefulness of the aforesaid specific objects or purposes set forth above are as follows:

(a) Otter Creek Culvert Reconstruction	30
(b) Pedestrian/Bike Trail System	15
(c) Water System Improvements	30
(d) Road Improvements	10

3. Maximum Amount of Obligations to be Issued - \$1,839,000, the maximum cost of each Project being as follows:

(a) Otter Creek Culvert Reconstruction	\$600,000
(b) Pedestrian/Bike Trail System	\$39,000
(c) Water System Improvements	\$600,000
(d) Road Improvements	\$600,000

The bond resolution herein summarized shall be available for public inspection during normal business hours for twenty (20) days following the date of publication of this notice at the office of the City Clerk, 25 Court Street, Cortland, New York 13045.

Ray Parker, Clerk
City of Cortland, Cortland County,
New York

REVENUE ANTICIPATION NOTE RESOLUTION
DATED NOVEMBER 3, 2015

A RESOLUTION AUTHORIZING THE ISSUANCE OF
\$800,000 IN REVENUE ANTICIPATION NOTES OF THE
CITY OF CORTLAND, CORTLAND COUNTY, NEW YORK
IN ANTICIPATION OF THE COLLECTION OF REVENUES
TO BE COLLECTED DURING THE FISCAL YEAR 2015.

BE IT RESOLVED by the by the Common Council of the City of Cortland, New York as follows:

Section 1. There are hereby authorized to be issued \$800,000 in Revenue Anticipation Notes (the "Notes") which are being issued in anticipation of the receipt of federal and New York State grants in aid for marketing the snow industry in and around the City and an urban development study of the Central Business District.

Section 2. Such revenues are due and payable in the City's fiscal year commencing January 1, 2015 and ending December 31, 2015.

Section 3. The amount of uncollected revenues against which the Notes are authorized to be issued is in excess of \$800,000.

Section 4. The amount of the Notes to be issued is \$800,000.

Section 5. The period of maturity of the Notes will not exceed one year. The Notes may be renewed from time to time, but each renewal shall be for a period not exceeding one year and in no event shall the Notes, or the renewals thereof, extend beyond the close of the second fiscal year succeeding the fiscal year in which the Notes are issued. The Notes shall not be renewed in an amount in excess of the difference between the amount of uncollected or unreceived revenues other than taxes and assessments in anticipation of which they were issued and the amount of any other outstanding revenue anticipation notes issued in anticipation of the collection or receipt of such revenues.

Section 6. The faith and credit of the City shall be and are hereby pledged for the punctual payment of the principal of and interest due on the Notes as the same shall become due and payable.

Section 7. The Notes shall be issued in such amount and have such terms, form and content, and shall be sold in such manner as may be prescribed by the Director of Administration and Finance, the Chief Fiscal Officer, consistent with the provisions of the Local Finance Law. The Director of Administration and Finance is further authorized to enter into an undertaking for the benefit of the holders of the Notes, and any renewals thereof, requiring the City to provide secondary market disclosure as required by Securities and Exchange Commission Rule 15c2-12.

Section 8. This resolution shall take effect immediately.



**RENEWABLE PORTFOLIO STANDARD
CUSTOMER-SITED TIER
ANAEROBIC DIGESTER GAS-to-ELECTRICITY
Program Opportunity Notice (PON) 2828
\$20.4 Available**

Applications accepted through December 31st 2015, 5:00 PM Eastern Time*

Approximately \$20.4 million in New York State Renewable Portfolio Standard (RPS) funding is available through 2015 to support the installation and operation of Anaerobic Digester Gas (ADG)-to-Electricity Systems in New York State. Funding is available on a first-come, first-served basis; up to \$2 million is available per project, depending on the project specifications. Application Packages must be received by NYSEERDA on or before 5:00 PM Eastern Standard Time on December 31, 2015 or prior to the exhaustion of the available funding, whichever comes first.

Potential applicants are strongly encouraged to avail themselves of the ADG technical assistance that can be made available free of charge to those considering building an ADG-to-Electricity project in NYS. Assistance can include project technical evaluation, project planning, electrical grid interconnection assistance, sourcing of ADG feedstocks and other aspects of ADG-to-Electricity project development. Contact Tom Fiesinger or Steve Hoyt (contact information below) for more information regarding ADG technical assistance.

Application Submission: Applications must be clearly labeled. Two (2) hard copies and one (1) electronic copy of all Application Package materials and any supporting information must be sent to the following address:

Roseanne Viscusi, PON 2828
NYS Energy Research and Development Authority
17 Columbia Circle
Albany, NY 12203-6399

Application Packages must be received by NYSEERDA on or before 5:00 PM Eastern Standard Time on December 31, 2015 or prior to the exhaustion of the available funding, whichever comes first. All Program Questions should be directed to: Tom Fiesinger, (518) 862-1090, ext. 3218, twf@nyserda.ny.gov, or Steve Hoyt, ext. 3587, sah@nyserda.ny.gov. All Contractual Questions should be directed to: Venice Forbes, ext. 3507, vwf@nyserda.ny.gov.

*Late, incomplete, or unsigned applications will be returned. Faxed or e-mailed applications will not be accepted. Applications will not be accepted at any other NYSEERDA location other than the address above. If changes are made to this solicitation, notification will be posted on NYSEERDA's website at www.nyserda.ny.gov.

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I. INTRODUCTION

The ADG-to-Electricity Program is included in the Customer-Sited Tier (CST) portion of New York State's Renewable Portfolio Standard (RPS) program. The CST is available to support projects commonly described as "behind the meter;" electric generation that is sited and used at the electric customer's location.

RPS funding is made available to NYSERDA on an annual basis from the New York State Public Service Commission. The approximate amounts allocated for the years 2014-2015 are \$10.2 million (2014), and \$10.2 (2015). Funding is available through the program on a first-come, first-served basis, until all funding is fully committed. If funding for a particular year is exhausted, eligible projects will be held in queue until the next year's funding becomes available (per the procedure outlined in Section V).

II. INCENTIVES

A total of up to \$2 million is available per project depending on project specifications. This consists of up to \$2 million in combined Performance, Major Component Capacity, Project Enhancement Capacity and Interconnection Incentives; these categories of incentives are described in detail in the following paragraphs. NYSERDA has developed an *Incentive Calculation Tool*, located in Appendix B (Section C), for Applicants to use in determining the incentives for which their project

may be eligible. Please note that Appendix C outlines in detail how the incentive values are determined by the *Incentive Calculation Tool*.

PERFORMANCE INCENTIVES

Performance Incentives are designed to offset on-going operational costs for ADG-to-Electricity projects. They are paid in annual installments over a period of 10 years. A budget for these incentives is calculated in the *Incentive Calculation Tool*, and are calculated based on a fixed incentive value per kWh for each Performance Incentive and the projected power generation production from the project. Actual Performance Incentive payments are based on the verified electricity generated by the ADG-to-Electricity System (as described in Appendix C *Using the Incentive Calculation Tool*). Therefore, the total Performance Incentives actually paid to any particular project could be less than the amount budgeted using the *Incentive Calculation Tool*.

ANAEROBIC DIGESTER COMPONENT AND POWER GENERATION COMPONENT CAPACITY INCENTIVES

Capacity Incentives are intended to offset the capital costs of the anaerobic digester and power generation equipment. A list of eligible anaerobic digester and power generation components is included in Appendix B (Section C). In the *Incentive Calculation Tool*, these capacity incentives are based on a fixed incentive element and a variable incentive rate element applied to the proposed power generation capacity of the ADG System.

PROJECT ENHANCEMENT COMPONENT CAPACITY INCENTIVES

Greater power generation can result from the incorporation of certain enhancements to a digester system, including equipment and/or management/operational techniques. Enhancements for which incentives are available are listed in Appendix B (Section C).

INTERCONNECTION REVIEW INCENTIVE

In order to interconnect with the electrical grid, ADG-to-Electricity projects generally require a Coordinated Electrical System Interconnection Review (CESIR) to be completed by the utility per NYS Standard Interconnection Requirements (SIR). For many farms New York State's net-metering laws limit interconnection costs (including the cost for completing the CESIR) to \$5,000. However, farms that plan to install power generation capacity that will exceed 20% of the grid line capacity, as well as non-farm projects, must generally cover the full cost of any required grid upgrades, including the CESIR costs associated with such upgrades. The Interconnection Review Incentive can pay up to 75% of the cost to complete a CESIR for the project up to a maximum incentive of \$50,000 per project, provided that the ADG project proposal has been determined to be complete and compliant with the requirements of this PON.

INTERCONNECTION IMPLEMENTATION INCENTIVE

Significant grid interconnection costs have been barriers to implementing some ADG-to-Electricity projects. As noted above, New York State's net-metering laws limit interconnection costs for many farms to \$5,000. For projects where interconnection implementation costs are not limited by net-metering laws, the Interconnection Implementation Incentive is intended to offset 50% of the interconnection cost estimated by the CESIR up to a maximum incentive of \$300,000 per project (within the total project cap of \$2,000,000 according to the limitations described below). However Interconnection Implementation Incentives payments will be limited to reimbursement of 50% of *actual costs incurred* upon completion of the interconnection or \$300,000, whichever is less.

Determining Total Incentives:

In determining the total incentives available to a project, a Performance Incentives budget is calculated first. Any funds remaining after subtracting the Performance Incentives budget from the \$2 million cap are available for Interconnection and then Capacity Incentive budgets. Refer to the *Incentive Calculation Tool* in Appendix B (Section C) and Appendix C *Using the Incentive Calculation Tool*.

Limitations on Incentives:

- If previous NYSERDA funding was received for the purchase and/or installation of ADG-to-Electricity System components, the maximum available funding through this solicitation will be reduced by the amount of the previous funding received or in a manner to be determined by NYSERDA based on factors such as useful equipment life.
- Funding cap per project/site: Total funding awarded through the RPS CST ADG Program is limited to \$2 million per installation (previously-awarded NYSERDA funding in support of ADG-to-Electricity activities at a given site may be counted toward this funding cap, thereby diminishing the amount of new funds that a subsequent project may qualify for). Once a project supported through a previous award has operated successfully for a period of 18 months or longer beyond the start of the Performance Period of its Agreement, it will be considered to be its own installation (as opposed to being a previous phase of an ongoing installation) and therefore its previously-awarded funding will no longer count against the \$2 million cap of a proposal to launch a subsequent installation. For example, if a project that was awarded the maximum \$2 million CST ADG incentive for a new digester and generator has successfully operated for 18 months, and the site has secured additional feedstock and can produce more biogas, the site could then propose a separate additional project for an additional generator and would be eligible for an additional \$2 million.
- Projects that have or will receive Federal 1603 Treasury Grant funding, USDA REAP, or NRCS/EQIP anaerobic digester funding will have their total awards under PON 2828 reduced by 50% of that additional funding. Award reductions may be applied to Performance, Interconnection or Capacity Incentives in a manner to be determined by NYSERDA.
- To be eligible for Interconnection Review and Interconnection Implementation Incentives, total project interconnection costs, including the CESIR, grid upgrades, safety relays, transformers, etc. must exceed \$5,000. NYSERDA will review the CESIR interconnection implementation cost estimate provided by the utility and reserves the right to request an additional review by one of its technical consultants and/or the NYS Department of Public Service and may reduce the amount of any Interconnection Implementation Incentive if a less expensive interconnection design is found to be acceptable.

If a proposed project does not fit into the constraints of the *Incentive Calculation Tool* (e.g., Applicants have received prior NYSERDA funding), but the proposed project meets the requirements of the Program, NYSERDA will consider alternative methods of estimating incentives available to such a proposed project on a case by case basis. Please contact Tom Fiesinger or Steve Hoyt to discuss (contact information provided above).

III. ELIGIBILITY

In order to participate in this program, Applicants/Program Participants must comply with all program rules, procedures, and eligibility requirements, submit all required forms and supplemental documentation, and enter into a Standard Performance Contract Agreement with NYSERDA (see Appendix E). Program Participants must also adhere to all Quality Assurance/Quality Control (QA/QC) requirements throughout the term of the Agreement. QA/QC is the process of documenting that the system has been installed and commissioned as specified in the contract; and also specifies the process by which electrical generation shall be monitored, measured, and verified (see Appendix D).

Proposed projects must include one or more of the following:

- Proposed new ADG-to-Electricity system installations* that will result in new ADG-fueled electricity generation at the site (where none had been before) or;
- Proposed new ADG-to-Electricity system installations* that will result in an incremental increase in ADG-fueled electricity generation over any existing ADG-to-Electricity generation at the site or;
- New equipment applied to existing systems as noted under the Project Enhancement component section of Appendix B (Section C). Requirements for the Project Enhancement component are detailed in Appendix C.

Note that the incremental increase over any existing ADG-to-Electricity generation at the site will be determined considering the maximum electric output of the power generation system, in a manner acceptable to NYSERDA.

* Proposed new ADG-to-Electricity system installations can include either new (not previously operated other than for manufacturer testing) engine-generators and anaerobic digester equipment; or previously operated engine-generators and anaerobic digester equipment that have been adequately reconditioned and upgraded to NYSERDA's satisfaction.

Additionally, to participate in the Program, the following criteria must be met:

- Host sites must be located in New York State.
- Generally, systems must be located at or serving sites owned or operated by electric utility customers who currently pay the NYS RPS surcharge for electric service.
- ADG Systems must consist of Commercially Available Technologies, which are defined as technologies that have operated satisfactorily for a minimum of one year at similar scale, with similar inputs and with similar output as described in the Application Package; or which can be otherwise demonstrated to NYSERDA's satisfaction of having a proven operating history specific to the ADG System design described in the Application Package. Additionally if someone other than the supplier of the Commercially Available Technology will construct and/or install the technology, NYSERDA strongly prefers that the supplier provide on-site supervision of the construction and installation process and that the supplier verify that the new system has been installed to a standard consistent with the supplier's previous installations.
- Applicants must have submitted an application to the electric utility for interconnection to the grid and received a completed Preliminary Review (as per STEP 4 of the NYS Standardized

Interconnection Requirements (SIR) for systems from 50 kW to 2 MW), if applicable, from the utility *before* applying to this program. Applicants must include a completed Preliminary Review, if applicable, from the electrical utility or documentation from the utility that a Preliminary Review has been deemed unnecessary as part of their Application Package (see Appendix A). Note that the SIR requires the utility to respond to a completed interconnection application with a Preliminary Review within 15 business days. A copy of the SIR is included in the Appendix G to this PON or can be accessed from the Department of Public Service website: <http://www.dps.ny.gov/>. Applicants should note they will need to identify all power generation sources at the site when applying for interconnection, including solar and back-up power generation.

- To participate in this PON, the proposed new ADG-to-Electricity system installation must have a power generation capacity of 50 kW or more, unless the application is solely for installation of certain Project Enhancements, specified in Appendix B, for existing ADG-to-Electricity power generation capacity.
- Applicants who have applied for funding under PON 2828 but have not yet been approved for funding may proceed with their project at their own risk. However, NYSERDA will not approve funding for any major components of the ADG system that have already been delivered to the site or a staging area prior to NYSERDA receiving the application for funding under PON 2828.
- NYSERDA will not fund projects that are determined by NYSERDA to be incapable of meeting the projected energy production or that cannot demonstrate reasonable financial sustainability for at least the first 10 years of operation.
- Eligible Biomass Feedstocks include manure, agricultural residues and biomass, industrial organic wastes (e.g., food wastes), municipal wastewater and municipal organic solids. [Note: Electricity generated by landfill biogas is not eligible for the ADG-to-Electricity Program.]
- Contracted Capacity is the real power production capacity of the new equipment as determined by the rated kW output of the generator at a power factor of 1.0, except as may be limited by (a) a lower power output of the engine at 100% load, with consideration of the generator efficiency, (b) equipment limiting generator output, (c) existing power generation associated with Project Enhancement incentives (Appendix B) and, (d) any other factors, all as determined in a manner satisfactory to NYSERDA. In most cases, NYSERDA will limit the Contracted Capacity of the project to the greater of (a) the eligibility capacity limit in the current Net Energy Metering Law (for projects eligible for Net Energy Metering)(PSL § 66-j) or (b) the approximate Peak Connected Load at the Customer's meter. However, where there are recognized public benefits (such as a project which accepts food wastes from the region that might otherwise be landfilled), or where practical considerations suggest, NYSERDA may approve a larger Contracted Capacity. For example, NYSERDA may approve a Contracted Capacity larger than the Customer's Peak Connected Load due to the incremental sizes of electric power generation and ancillary equipment currently available, or to effectively use the maximum volume of biogas produced.
- Applicants/program participants (and host sites owners, if different) must comply with all applicable:
 - Federal, State and Local codes and regulations;

- Federal, State and Local permitting requirements;
- Federal, State and Local emissions limits; and
- Concentrated Animal Feeding Operation (CAFO) requirements.

Additional Eligibility Notes:

Third Party Ownership Third party ownership of an ADG-to-Electricity System is permitted under this program contingent upon: the electric power generation equipment being located at or serving a site owned or operated by an electric utility customer who currently pays the RPS surcharge; and the host site or site being served by the power generation (e.g., farm, waste water treatment plant or business) agreeing to contract terms with the third party. Generally, ADG-fueled electricity must be generated and used by the host site in conjunction with a utility meter that is interconnected with the grid.

ADG Fuel from Pipeline Electric generation equipment fueled by ADG from a dedicated ADG pipeline may be eligible to participate in the Program; please contact Tom Fiesinger or Steve Hoyt to discuss (contact information provided above).

IV. HOW THE PROGRAM WORKS

This section describes the steps of participation in the ADG-to-Electricity Program, from submitting an application to requesting Performance Incentive payments for verified ADG-fueled electricity generation.

1. Submit Application Package

A complete Application Package must be submitted to NYSERDA. Detailed Application Package requirements are included in Appendix A. NYSERDA will conduct a review of the proposal and may request additional information in support of the Application Package and/or may conduct a site inspection to verify the accuracy of the information provided. NYSERDA will determine if the proposal meets all eligibility requirements and fulfills program requirements.

2. Sign Standard Performance Contract Agreement

After approval of the Application Package, NYSERDA will send the Applicant a Standard Performance Contract Agreement for signature. The Agreement will specify the dollar amount that has been awarded to the project; going forward this will be referred to as the “Total Contracted Project Incentive”. NYSERDA will not commit funds to a project until the signed Agreement has been received from the Applicant. Funding will be committed to Applicants who return a signed Standard Performance Contract Agreement on a first - come, first – served basis until funding is exhausted. NYSERDA reserves the right to rescind contract offers that have not been signed within 30 days of mailing.

Once NYSERDA countersigns the agreement it will be considered “fully executed” with an assigned “Effective Date.” A copy of the fully executed Agreement will be mailed to the program participant. (For your reference, a sample agreement is included in Appendix F.) Once the agreement has been fully executed, NYSERDA will assign a Technical Consultant to the project.

3. Develop Quality Assurance/Quality Control (QA/QC) Plan

A QA/QC Plan must be developed for the project. The plan can either be developed by the Technical Consultant, or by the Program Participant in conjunction with the Technical Consultant. Guidance on developing the QA/QC Plan is included in Appendix E *QA/QC and Reporting Requirements*. A sample QA/QC Plan can be requested from Tom Fiesinger or Steve Hoyt (contact information provided above).

PLEASE NOTE: Specific electric metering and gas measuring equipment is required by NYSERDA. The specifications for this equipment are included in Appendix D. Unless the required equipment has been installed, payment of incentives may be withheld by NYSERDA until such time as a full year of data has been recorded with acceptable instrumentation.

4. Procurement and Installation Milestones

Contracted projects must meet procurement and installation milestone requirements or risk contract termination. Please refer to requirements within Appendix F *Sample Standard Performance Contract Agreement* for a detailed description of the milestone requirements.

5. Incentive Payment Distributions

Performance, Capacity and Interconnection Incentive payment distributions are estimated in the *Incentive Calculation Tool* (Appendix B) and payment descriptions and requirements are outlined in Appendix C.

V. APPLYING FOR THE PROGRAM

APPLICATION PACKAGE

Detailed Application Package requirements are included in Appendix A.

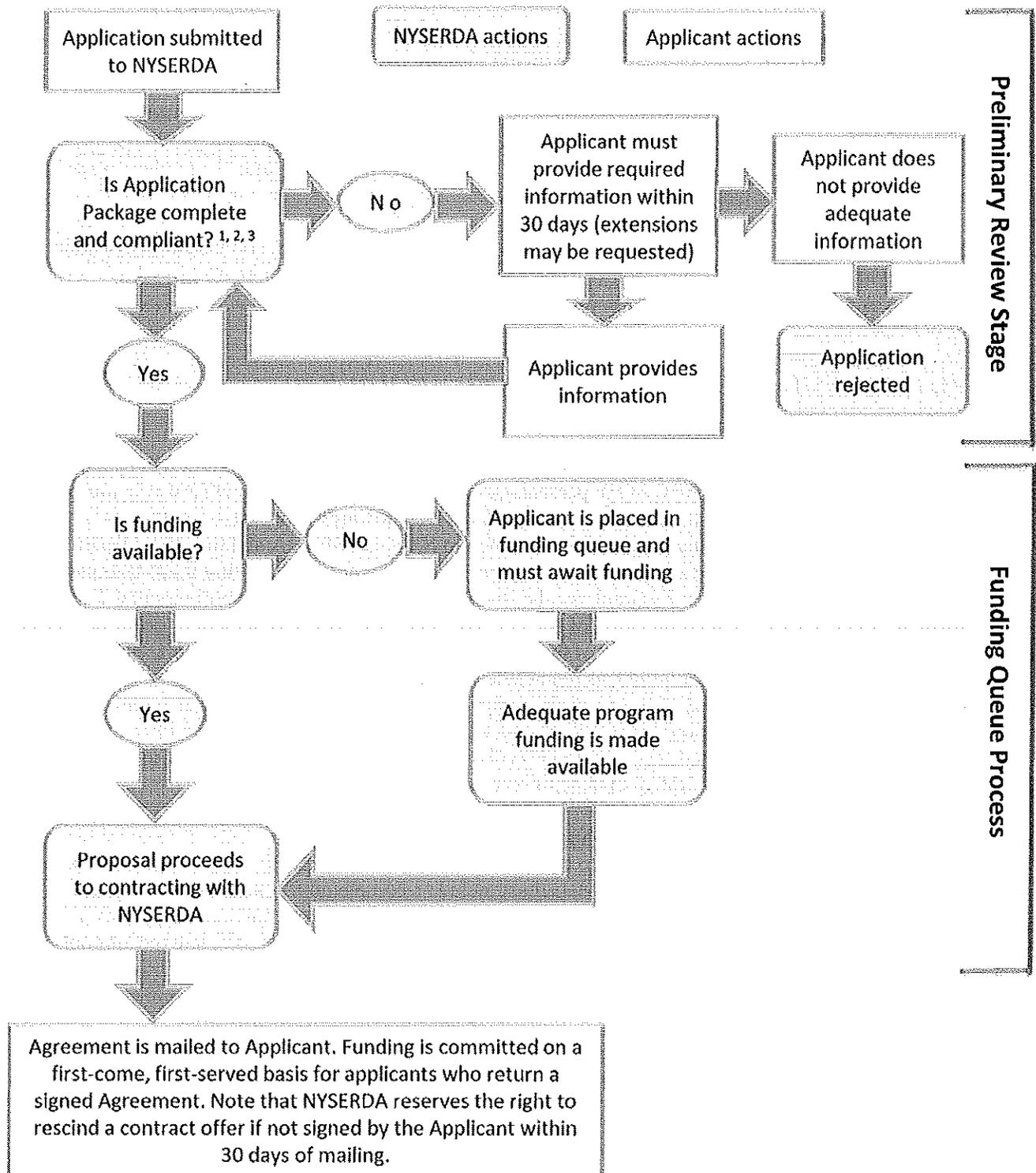
APPLICATION PACKAGE REVIEW AND APPROVAL

NYSERDA will date-stamp and log all program materials as they are received. NYSERDA recommends that all program materials be sent via delivery service, certified mail or registered mail. It is the sole responsibility of the Applicant to ensure that the application is received by NYSERDA by the due date. Applicants should retain proof of delivery (such as a return receipt for certified, registered, or overnight mail) for all program materials submitted. NYSERDA will accept Application Packages until December 31, 2015 at 5:00 PM Eastern Standard Time, or until all funding has been fully committed, whichever comes first. If funding is fully committed prior to the December 31, 2015 date, NYSERDA will post this information on its website: www.nyserdera.ny.gov.

Upon receiving an Application Package, NYSERDA will review the materials to ensure that the project meets all eligibility requirements of this PON. To secure the earliest possible position in the funding queue (in the event that funding for a particular year is exhausted), please ensure that your submitted application package is complete and fully compliant with all PON requirements.

Application Package Review will proceed according to the following process:

Application Package Review Process



1. If at any time NYSERDA determines that a proposed project changes significantly (e.g., design, scale, ownership, location, etc.), the Application Package may be returned to the beginning of the

review process, regardless of when the proposal was submitted or the position of the proposal in the funding queue.

2. In the Application Review Process, projects are technically and financially evaluated. If additional information is required, Applicants will have 30 days to provide such information. Applicants that fail to provide the required information will have their application rejected as incomplete. Extensions to this 30 day period may be requested and can be granted at NYSERDA's sole discretion. Applications will only be considered complete and compliant when all required information has been provided to NYSERDA's satisfaction and until such time, the application will have no standing in the Queue Process for funding.

3. Not all possible circumstances have been foreseen in preparing this PON. If circumstances arise where a waiver of any provision of the PON is determined by NYSERDA to be warranted, NYSERDA at its sole discretion may grant a request for such a waiver for documented good cause.

VI. ADDITIONAL INFORMATION AND REQUIREMENTS

RPS ASSESSMENT AND REPORTING

Orders issued by the NYS Public Service Commission provide that the RPS Program will support and promote the increase, to 30%, of the percentage of the energy consumed in NYS that comes from renewable sources. When assessing and reporting on progress towards that goal, or on the composition of the energy generated and/or consumed in NYS, NYSERDA and the NYS Department of Public Service will include all electrical energy created by any project receiving funds through the NYS RPS Customer-Sited Tier Program, for the life of such projects, and the environmental attributes associated with the production of such electrical energy, whether metered or projected, as a part of any report, evaluation, or review of the RPS Program, whenever any such report, evaluation, or review may be conducted or issued, as renewable energy consumed in NYS. No party, including but not limited to host sites, owners, lessees/lessors, operators, and/or associated contractors, shall agree to or enter any transaction that would or may be intended to result in the export or transmission of any electrical energy created by any project receiving funds through the NYS RPS Customer-Sited Tier Program to any party or system outside of New York State.

STATE ENVIRONMENTAL QUALITY REVIEW ACT (SEQRA)

NYSERDA is required, under SEQRA, to consider the environmental implications of all projects receiving NYSERDA funding. All proposals must include a completed SEQRA Environmental Assessment Form along with supporting documentation. If any local governmental entity has discretionary permitting or approval authority, the program participant must complete the appropriate SEQRA Environmental Assessment Form and submit it to that local governmental entity. A copy of the completed and signed Environmental Assessment Form must be attached to the Application Package. SEQRA forms are available from: <http://www.dec.ny.gov/permits/6191.html>

EMISSION STANDARDS FOR BIOGAS-FUELED DISTRIBUTED GENERATION SYSTEMS

The applicant is responsible to comply with all applicable State and Federal emission standards and regulations for biogas-fueled distributed generation. The U.S. Environmental Protection Agency has adopted numerical emission standards and requirements for spark ignition engines: *Standards of Performance for Stationary Compression Ignition and Spark Ignition Internal Combustion Engines* (Federal Register June 28, 2011 <http://www.epa.gov/ttn/atw/nsps/sinsps/fr28jn11.pdf>). Likewise, the

NYS Department of Conservation generally requires biogas-fueled spark ignition engines to have an Air Facility Registration. Assistance in understanding and complying with these regulations may be available, free of charge, via the NYS Environmental Facilities Corporation's "Small Business Environmental Assistance Program" www.efc.ny.gov/sbeap.

For all technologies proposed, NYSERDA reserves the right to review emissions performance and determine whether the technology meets all environmental standards. NYSERDA prefers the use of the cleanest technologies available.

PREVENTION OF FUGITIVE DIGESTER EMISSIONS

New Systems should be designed and installed in accordance with standard engineering practice and the manufacturer's recommendations. The installation must include a flare (with a capacity equal to or greater than the anticipated maximum biogas production) to burn collected gas whenever such gas cannot be beneficially used, unless an alternative method of biogas emissions control is approved by NYSERDA. **NYSERDA may withhold payment from any project determined by NYSERDA to be emitting or venting significant quantities of methane not combusted by a flare or other means.**

VII. GENERAL CONDITIONS

Proprietary Information - Careful consideration should be given before confidential information is submitted to NYSERDA as part of your proposal. Review should include whether it is critical for evaluating a proposal, and whether general, non-confidential information, may be adequate for review purposes.

The NYS Freedom of Information Law, Public Officers law, Article 6, provides for public access to information NYSERDA possesses. Public Officers Law, Section 87(2)(d) provides for exceptions to disclosure for records or portions thereof that "are trade secrets or are submitted to an agency by a commercial enterprise or derived from information obtained from a commercial enterprise and which if disclosed would cause substantial injury to the competitive position of the subject enterprise." Information submitted to NYSERDA that the proposer wishes to have treated as proprietary and confidential trade secret information, should be identified and labeled "Confidential" or "Proprietary" on each page at the time of disclosure. This information should include a written request to except it from disclosure, including a written statement of the reasons why the information should be excepted. See Public Officers Law, Section 89(5) and the procedures set forth in 21 NYCRR Part 501 <http://nyserderda.ny.gov/~media/Files/About/Contact/NYSERDAREgulations.ashx>. However, NYSERDA cannot guarantee the confidentiality of any information submitted.

Omnibus Procurement Act of 1992 - It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority- and women-owned business enterprises, as bidders, subcontractors, and suppliers on its procurement Agreements.

Information on the availability of New York subcontractors and suppliers is available from:

Empire State Development
Division For Small Business
625 Broadway

Albany, NY 12207

A directory of certified minority- and women-owned business enterprises is available from:

Empire State Development
Minority and Women's Business Development Division
625 Broadway
Albany, NY 12207

State Finance Law sections 139-j and 139-k - NYSERDA is required to comply with State Finance Law sections 139-j and 139-k. These provisions contain new procurement lobbying requirements which can be found at:

<http://www.ogs.ny.gov/aboutogs/regulations/advisoryCouncil/StatutoryReferences.html>.

The attached Proposal Checklist calls for a signature certifying that the proposer will comply with State Finance Law sections 139-j and 139-k and the Disclosure of Prior Findings of Non-responsibility form includes a disclosure statement regarding whether the proposer has been found non-responsible under section 139-j of the State Finance Law within the previous four years.

Contract Award - NYSERDA anticipates making multiple awards under this solicitation. It may award a contract based on initial applications without discussion, or following limited discussion or negotiations. Each offer should be submitted using the most favorable cost and technical terms. NYSERDA may request additional data or material to support applications. NYSERDA will use the Sample Agreement to contract successful proposals.

Limitation - This solicitation does not commit NYSERDA to award a contract, pay any costs incurred in preparing a proposal, or to procure or contract for services or supplies. NYSERDA reserves the right to accept or reject any or all proposals received, to negotiate with all qualified sources, or to cancel in part or in its entirety the solicitation when it is in NYSERDA's best interest.

Disclosure Requirement - The proposer shall disclose any indictment for any alleged felony, or any conviction for a felony within the past five years, under the laws of the United States or any state or territory of the United States, and shall describe circumstances for each. When a proposer is an association, partnership, corporation, or other organization, this disclosure requirement includes the organization and its officers, partners, and directors or members of any similarly governing body. If an indictment or conviction should come to the attention of NYSERDA after the award of a contract, NYSERDA may exercise its stop-work right pending further investigation, or terminate the agreement; the contractor may be subject to penalties for violation of any law which may apply in the particular circumstances. Proposers must also disclose if they have ever been debarred or suspended by any agency of the U.S. Government or the New York State Department of Labor.

VIII. OTHER OPPORTUNITIES

Projects eligible under this RPS CST Program may also be eligible under the RPS Main Tier or other NYSERDA programs. However, once a project application or proposal has been approved by NYSERDA or becomes the subject of an award under this CST Program, for which funds are available, that project is ineligible for funding under the RPS Main Tier Program or other programs.

Applicants will not be permitted to withdraw or cancel a project application or proposal, or seek to nullify a contract in order to apply or pursue an application or proposal in the RPS Main Tier or other NYSERDA programs for the same project (or for the same portion of the project).

NY Sun Competitive PV Program – PON 2860

NYSERDA administers this competitive program which has made available \$150 million for customer-sited solar photovoltaic projects and renewable biogas-fueled electric generation projects greater than 200 kW in the region including Zones G, H, I & J of the NY Independent System Operator (NYISO). For each year from 2011 through 2015 up to \$30 million will be made available each year; \$5 million of which is to be awarded for projects installed in Zones G&H (including parts of Albany, Greene, Ulster, Dutchess, Orange, Putnam and Westchester counties), and \$25 million for projects in Zone I&J (parts of Westchester and NYC). Incentives will be awarded based on evaluation of proposals submitted in response to the PON. Funding under this program can support projects that inject an amount of biogas into the natural gas pipeline that can subsequently supply a power generation project with an equivalent amount of pipeline gas under certain circumstances outlined in PON 2860. It is anticipated that in addition to PON 2860, subsequent PONs will be issued through 2015. A map of NYISO zones can be found at this NYISO web address: http://www.nyiso.com/public/webdocs/market_data/zone_maps_graphs/nyca_zonemaps.pdf Further information on the PON can be found at NYSERDA's website at www.nyserda.ny.gov.

RPS – Main Tier Program

NYSERDA also administers the RPS Main Tier Program which consists primarily of medium to large-scale electric generation facilities that deliver their electrical output into either (1) a market administered by the NYISO for end-use in New York State; (2) through a wholesale meter under the control of a utility, public authority or municipal electric company such that it can be measured, and such that consumption within New York State can be tracked and verified by such entity or by the NYISO; or (3) through a Bid Facility dedicated generation meter, which shall be approved by and subject to independent verification by NYSERDA, to a customer in New York State (excluding customers in the service territory of the Long Island Power Authority) whose electricity was obtained through the NYISO/utility system as of January 20, 2011. Electricity produced from anaerobic digestion is an eligible technology. Information on Main Tier solicitations and upcoming program announcements can be found at NYSERDA's website: <http://www.nyserda.ny.gov/Energy-Data-and-Prices-Planning-and-Policy/Program-Planning/Renewable-Portfolio-Standard/Main-Tier/Main-Tier-Solicitations.aspx>

IX. APPENDICES

Appendix A: Application Package Requirements

Appendix B: Application Form

Appendix C: Using the Incentive Calculation Tool

Appendix D: Disclosure of Prior Findings

Appendix E: Quality Assurance/Quality Control (QA/QC) and Reporting Requirements

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City of Cortland Wastewater Treatment Plant, NY Anaerobic Digester Project

1.0 INTRODUCTION

The City of Cortland owns and operates a wastewater treatment plant located at 251 Port Watson Street, Cortland that serves the City of Cortland, Village of Homer, Village of McGraw, and a large portion of the Town of Cortlandville. The plant utilizes an activated sludge process with primary and secondary treatment. The effluent is seasonally disinfected and discharged to the Tioughnioga River (See Figure 1). The waste solids from the process are treated and reduced by the two existing anaerobic digesters. Byrne Hollow Farms, located in Cortlandville, NY, in addition to other neighboring Byrne production facilities is interested in bringing its dissolved air floatation (DAF) waste along with acid whey to the City of Cortland's wastewater treatment plant. Due to the high organic strength and the physical characteristics of this waste, it can't be directly discharged to the municipal system primarily because the waste cannot be properly treated with the existing anaerobic digesters. Cedarwood Engineering Services, PLLC (Cedarwood) was tasked by the City of Cortland to design an anaerobic digester that would treat this high strength waste and design a system to convert the biogas to electricity. This project would allow for a reliable and environmentally sound way for Byrne Dairy to dispose of their DAF float and acid whey while allowing the City of Cortland to offset their electrical consumption. NYSERDA has a program to support the generation of electricity through its Program Opportunity Notice (PON) program. A completed PON application is attached to this report as Appendix B.

2.0 EXISTING WASTEWATER TREATMENT PLANT

The original wastewater treatment plant was constructed in the 1930's and has undergone many improvements and upgrades since that time. One major upgrade was performed in the 1970's which introduced secondary treatment and the other occurred in 1994. The 1994 upgrade consisted of new primary sedimentation tanks, new aeration tanks and conversion of the old primary tanks to secondary sedimentation tanks. The present system is a conventional activated sludge process that consists of: influent flow measurement and screening, grit removal, primary clarification, complete mixed activated sludge, secondary clarification, and seasonal disinfection. Currently, the plant is undergoing an upgrade aimed at improving nutrient removal, digester retention time and solids handling as well as overall energy efficiency.

Specifically, the current upgrade project incorporates the following major improvements and/or upgrades:

- Conversion of the existing activated sludge basins to sequencing batch reactors (SBRs) to improve effluent quality.
- Installation of a new influent mechanical bar screen.
- Yard piping modifications.
- Chemical feed system for phosphorous removal.
- Liquid chlorine conversion.
- Complete mix digester.
- New primary tank sludge pumps.
- Digester gas mixers.
- New gas engines, support equipment and building.
- Instrumentation coordination and supply.
- Gravity Belt Thickener (GBT) and building.

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2.1 TEMPORARY ACID WHEY MBR TREATMENT SYSTEM

To treat the initial deliveries of acid whey from Byrne's Cortlandville facility, a membrane bioreactor (MBR) has been installed at Cortland's WWTP. The whey MBR treatment unit is located in one of the off-line sludge thickeners adjacent to the plant's secondary clarifiers. The sludge thickening tank has a working capacity of approximately 101,000 gallons. The MBR treatment consists of a 200 plate Toray® MBR unit. In addition to the MBR unit, approximately 315 fine bubble diffusers have been installed in the sludge thickener tank. This system was installed to reduce the influent BOD loading to the WWTP, as acid whey has a typical BOD concentration of 30,000 to 35,000 mg/l. Effluent BOD from the whey MBR is typically less than 2,000 mg/l, which significantly reduces the BOD loading to the influent of the facility. Currently, the MBR treatment system has been taken off-line due to a significant increase in fats, oils and grease (FOG) in Byrne's wastewater. The FOG content has increased to over 1,000 mg/l, causing the MBR plates to foul. Reportedly, the rise in FOG is due to the increase in demand of regular-fat yogurt, versus the non-fat variety. Currently, the wastewater plant operators are using the existing primary digesters to process this waste.

3.0 PROPOSED ANAEROBIC DIGESTER

To properly process the acid whey and DAF float waste, a full scale anaerobic digester needs to be constructed (see drawings G-1 and PR-1). The digester should be designed for a minimum hydraulic retention time (HRT) of 15 days to allow for complete conversion of the waste. Digesters designed for whey treatment can be designed for shorter HRTs than typical municipal digesters due to the fact that the whey can be quickly utilized. However, DAF float requires that the digestion times be longer. The flow from Byrne Dairy has been revised from previous projections of approximately 30,000 gallons per day (GPD) of only acid whey. The estimates of these new flow projections are summarized in the following table for both acid way and DAF:

Location	Daily Acid Whey (GPD)	Daily DAF Float (GPD)	Total Daily Flows (GPD)
Byrne/ICC	None	3,838	3,838
Ultra	None	4,850	4,850
BHF (C'Ville)	6,360	4,420	10,780
Total	6,360	13,108	19,468

After considering the flows, safety factors, and available space for the digester, it was determined that a 450,000 to 500,000 gallon digester would be suitable to achieve a desired hydraulic retention time (HRT). A digester with the following dimensions is proposed (dimensions assume the use of a pre-stressed concrete tank):

Inner Diameter	46.0 feet
Outer Diameter	50.17 feet
Wall Height	40.0 feet
Maximum Surface Water Depth	38.0 feet
Floor Slope	12H:2.5V
Working Capacity	490,000 Gallons

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Using a digester with a volume of 490,000 gallons, the HRT for the design flows are as follow:

Flow (in GPD)	HRT for 490,000 Gallon Digester (in Days)
10,000	49.0
20,000	24.5
30,000 (peak)	16.3

A digester of this capacity is adequately sized for all average flow conditions and still provides the required HRT at peak flows. The DAF float and acid whey will be pumped from a tanker truck into the holding tank which will have a maximum working capacity of 60,000 gallons (see drawings G-1 and PR-1). Nozzle mixers along with a heat exchanger will be installed to keep the waste from separating and solidifying. Positive displacement pumps will be used to convey the waste from the holding tank to the digester.

3.1 ORGANIC LOADING AND BIOSOLIDS PRODUCTION

Since the proposed digester is designed for the handling of acid whey and DAF float, there will be negligible biomass entering the digester. Therefore, instead of determining volatile suspended solids (VSS) destruction of biomass which is normally done for most municipal anaerobic digesters in addition to anaerobic VSS creation, only the creation of anaerobic VSS needs to be calculated. The following parameters are assumed for the following equations, while the lab results for the DAF float and acid whey grab samples can be seen in Appendix A:

BOD₅ of Acid Whey = 32,000 mg/l
 COD of Acid Whey = 60,000 mg/l
 BOD₅ of DAF Float = 95,000 mg/l
 COD of DAF Float = 128,300 mg/l
 Combined BOD₅ of DAF plus Whey = 74,210 mg/l
 Combined COD of DAF plus Whey = 105,600 mg/l

Daily Average Flow = 20,000 gallons/day
 Maximum Average Daily Flow = 30,000 gallons/day
 Digester Efficiency = 90 Percent
 Methane Concentration is 60 percent of Total Biogas

The steady state mass balance equation is as follows:

$$COD_{in} = COD_{eff} + COD_{vss} + COD_{methane}$$

Where:

COD_{in} = influent COD
 COD_{eff} = portion of influent COD in effluent
 COD_{vss} = influent COD converted to cell mass
 $COD_{methane}$ = influent COD converted to methane

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To determine the influent COD loading for 20,000 gallons/day of acid whey and DAF float:

$$\text{COD}_{\text{in}} = (105,600 \text{ mg/l} \times 20,000 \text{ gallons/day} \times 8.34 \text{ lbs/gallon})/10^6 = 17,614 \text{ lbs COD/day}$$

To determine the effluent COD at 20,000 gallons/day, assuming 90 percent digester efficiency:

$$\text{COD}_{\text{eff}} = ((105,600 \text{ mg/l} \times 20,000 \text{ gallons/day} \times 8.34 \text{ lbs/gallon})/10^6) \times 1-0.9 = 1,761.4 \text{ lbs COD/day}$$

To determine the biomass creation, assuming 90 percent digester efficiency, the following calculation is performed:

$$\text{COD}_{\text{vss}} = (1.42 \text{ lbs COD/lb VSS}) \times (0.04 \text{ lbs VSS/lb COD}) \times 0.9 \times 17,614 \text{ lbs COD}_{\text{in}} = 900.4 \text{ lbs VSS at } 20,000 \text{ gallons/day}$$

3.2 METHANE AND BIOGAS PRODUCTION

To determine the amount of methane produced, the following equations are used:

$$\text{COD}_{\text{methane}} = \text{COD}_{\text{in}} - \text{COD}_{\text{eff}} - \text{COD}_{\text{vss}}$$

$$17,614 \text{ lbs/day} - 1,761.4 \text{ lbs/day} - 900.4 \text{ lbs/day} = 14,952 \text{ lbs/day at } 20,000 \text{ gpd}$$

From the amount of biosolids produced, the volume of methane created can be calculated by the ideal gas law assuming a digester temperature of 35 degrees Celsius (95 degrees F):

$$V = nRT/P$$

Where:

V = Volume in Liters

n = Number of Moles (1)

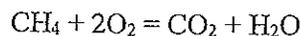
R = Universal Gas Constant (0.08206 atm L/mole K)

T = Temperature in Kelvin (273.15 + 35)K

P = Pressure (0.972 atm at 1,100 feet elevation + internal digester pressure of 0.2 psi)

$$V = (1 \times 0.08206 \times (273.15 + 35))/0.972 = 26.01 \text{ Liters}$$

The balanced stoichiometric formula describing COD is shown below:



It can be shown that it takes 64 grams of O₂ (16 g/mole x 4 moles) per mole of CH₄ (methane) produced. The volume of methane created is 26.01 l/mole x 64 g of COD/mole CH₄ = 0.406 L CH₄ per gram of COD. Converting this back to US conventional units, the value computes to 6.24 ft³ of methane per pound of COD by the following conversion:

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$$(0.406 \text{ L CH}_4/\text{g COD}) \times (0.0353 \text{ ft}^3/\text{liter}) \times (453.6 \text{ g/l lb}) = 6.24 \text{ ft}^3 \text{ CH}_4/\text{lb COD}$$

Total methane flow is calculated by the following:

$$14,952 \text{ lbs/day COD at } 20,000 \text{ gpd} \times 6.24 \text{ ft}^3 \text{ CH}_4/\text{lb COD} = 93,301 \text{ ft}^3/\text{day CH}_4$$

Finally, calculating the total biogas flow is calculated by the following:

Current biogas production from existing digesters: 20 ft³/min

$$93,301 \text{ ft}^3/\text{day CH}_4 \text{ at } 20,000 \text{ gpd}/0.6 = 155,503 \text{ ft}^3/\text{day biogas or } 108 \text{ ft}^3/\text{min, total gas production will be } 128 \text{ ft}^3/\text{min with the existing gas flow}$$

There are typically 600 BTUs of thermal energy in 1 cubic foot of biogas, assuming a 60 percent methane concentration. Therefore, to calculate the BTU/day of biogas:

$$184,320 \text{ ft}^3/\text{day biogas} \times 600 \text{ BTU}/\text{ft}^3 = 110,592,000 \text{ BTU}/\text{day biogas, or } 4,608,000 \text{ BTU}/\text{hr}$$

This calculated amount of raw biogas from the existing primary digesters and the proposed digester will be piped to the existing secondary digester. A new membrane gas collector will be installed to ensure reliable and safe gas collection along with maintaining proper gas pressure. From the secondary digester, the raw biogas will be treated for moisture, siloxane and sulfur removal with a skid mounted gas treatment system. This will be installed in a new building as seen in Drawing G-1.

To determine the amount of biosolids produced from the process the following calculations are performed. It is assumed that typical anaerobically digested sludge contains three (3) percent solids (30,000 mg/l) and has a specific gravity of 1.02:

$$\text{Volume of Sludge Produced (gal/day at } 20,000 \text{ gpd feed rate)} = (900.4 \text{ lbs VSS}/30,000 \text{ mg/l VSS}/8.34 \text{ lbs}/\text{gal}/1.02) \times 10^6 = 3,528 \text{ gallons}/\text{day of sludge}$$

It can be observed from the calculations that the sludge production from the anaerobic process contributes a minimal amount to their overall sludge loading. The waste sludge will be combined with the sludge from the existing anaerobic digesters and conveyed to the existing belt filter press.

The sludge will be drawn from the bottom of the proposed digester and will be pumped to the existing 2 meter belt press by the existing sludge pumps. The volume of digester effluent which will be returned to the head of the plant is calculated by subtracting the influent flow from the generated VSS sludge flow. For the design 20,000 gpd influent flow, the volume is 16,471 gal/day. As stated, this will be recycled back to the plant influent, reducing loading on the existing facilities.

3.3 BIogas ELECTRICAL ENERGY GENERATION

As calculated above, the total raw gas production is estimated to be 4,608,000 BTU/hr. Since there is no carbon dioxide removal in the gas conditioning equipment, gas losses are negligible. Biogas generators at full run speed typically generate 1 KW per 9000 BTU/hr of biogas (assuming 600 BTU/ft³), with decreasing efficiency as the generator is turned down. Biogas generators typically are 30 to 40 percent electrically efficient, depending on turndown, and 43 to 48 percent thermally efficient. A Dresser Rand Gauscor Model

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SFGLD 360 is being considered for the project (see Appendix C). This is an outdoor enclosed unit that would likely be installed west of the electrical substation that feeds the wastewater treatment plant (see Drawing G-1). The generator has a maximum power output of 677 KW and has a maximum turndown rate to 266 KW. In addition to producing electrical energy, the engine heat is recoverable, allowing the generator to be used for heating the digesters and influent holding tank. Assuming a 9,500 BTU/hr of gas required to generate 1 KW, the total KW production is shown in the calculation below:

$$4,608,000 \text{ BTU/hr} / 9,500 \text{ BTU/(hr-KW)} = 485 \text{ KW of electricity}$$

The estimated amount of heat produced from the generator is 2,293,000 BTU/hr, assuming 47 percent thermal efficiency. It is proposed that the generator be tied into the main plant power system due to its significant electrical generation capacity. The electrical substation that feeds the plant is 4,160 volts and the generator selected for the project is able to generate this voltage. National Grid does not currently allow any benefit for net feeding electricity due to the City not being a farm customer. However, the electrical demand of the existing plant, plus the proposed digester equipment is large enough that the generator output will be used entirely for plant operations (see Appendix E for historical electrical usage). National Grid has also stated that the substation is owned by the City of Cortland. Discussions are continuing to determine how to tie the generator into this substation.

3.4 DIGESTER HEATING AND MIXING

The anaerobic digester needs to be properly mixed and heated to keep the biomass active and to maintain a constant temperature throughout the digester. A mixing system with chopper pumps and nozzle mixers is being proposed for use as it promotes even mixing with reducing the change for excessive foaming, which is a concern with DAF float. With a proposed digester volume of 490,000 gallons, a mixing rate of 1,000 to 2,000 gallons per minute will be required to ensure proper digester mixing. A side stream heat exchanger and pumping system will be required to control digester heating. Three sets of nozzle mixers will be installed to keep the digester contents properly mixed (see Appendix C for equipment information sheets). To properly size the heat exchangers, the heating requirements for the influent holding tank, existing digesters and proposed digesters calculations are as follows:

For the existing digesters:

12-inch thick concrete wall, non-insulated = 0.15 BTU/ft² °F h

Steel cover, non-insulated = 0.30 BTU/ft² °F h

12-inch thick concrete floor, moist earth = 0.50 BTU/ft² °F h

Digester inner diameter = 36 feet

Wall digester height = 21 feet

Coldest outdoor temperature = -20 °F

Specific heat of waste sludge = 1.00 BTU/lb/°F

Estimated density of waste sludge = 8.51 lbs/gal

Calculating the areas of the walls, roof and floor:

Wall surface area = $\pi \times 36 \text{ ft} \times 21 \text{ ft} = 2,374.97 \text{ ft}^2$

Concrete roof area = $\pi \times (18 \text{ ft}^2 + 4 \text{ ft}^2) = 1,067.60 \text{ ft}^2$

Floor surface area = $\pi \times 18 \text{ ft} \times (18 \text{ ft} + \text{sqrt}(8 \text{ ft}^2 + 18 \text{ ft}^2)) = 2,131.69 \text{ ft}^2$

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At -20 °F:

$$q = 15,500 \text{ gal/day} \times 8.51 \text{ lbs/gal} = 131,905 \text{ lbs/day} \times (95 - 40) \text{ °F} \times 1.00 \text{ BTU/lb °F} = 7,254,775 \text{ BTU/day,}$$

or 302,282 BTU/hr

Calculating the heat loss for each surface:

Walls: $q = 0.9 \text{ BTU/ft}^2 \text{ °F h} \times 2,375 \text{ ft}^2 \times (95 \text{ °F} - (-20 \text{ °F})) = 245,813 \text{ BTU/hr}$

Roof: $q = 0.88 \text{ BTU/ft}^2 \text{ °F h} \times 1,067.60 \text{ ft}^2 \times (95 \text{ °F} - (-20 \text{ °F})) = 108,041 \text{ BTU/hr}$

Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ °F h} \times 2,131.69 \text{ ft}^2 \times (95 \text{ °F} - 5 \text{ °F}) = 95,926 \text{ BTU/hr}$

Total digester heat loss = 449,780 BTU/hr at -20 °F

Total loss digester + sludge: 449,780 BTU/hr + 302,282 BTU/hr = 752,062 BTU/hr

At 50 °F:

$$q = 15,500 \text{ gal/day} \times 8.51 \text{ lbs/gal} = 131,905 \text{ lbs/day} \times (95 - 55) \text{ °F} \times 1.00 \text{ BTU/lb °F} = 5,276,200 \text{ BTU/day,}$$

or 219,833 BTU/hr

Calculating the heat loss for each surface:

Walls: $q = 0.9 \text{ BTU/ft}^2 \text{ °F h} \times 2,375 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 96,188 \text{ BTU/hr}$

Roof: $q = 0.88 \text{ BTU/ft}^2 \text{ °F h} \times 1,067.60 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 42,277 \text{ BTU/hr}$

Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ °F h} \times 2,131.69 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 47,963 \text{ BTU/hr}$

Total digester heat loss = 186,428 BTU/hr at 50 °F

Total loss digester + sludge: 186,428 BTU/hr + 219,833 BTU/hr = 406,261 BTU/hr

At 90 °F:

$$q = 15,500 \text{ gal/day} \times 8.51 \text{ lbs/gal} = 131,905 \text{ lbs/day} \times (95 - 80) \text{ °F} \times 1.00 \text{ BTU/lb °F} = 1,978,575 \text{ BTU/day,}$$

or 82,440 BTU/hr

Calculating the heat loss for each surface:

Walls: $q = 0.9 \text{ BTU/ft}^2 \text{ °F h} \times 2,375 \text{ ft}^2 \times (95 \text{ °F} - 90 \text{ °F}) = 9,500 \text{ BTU/hr}$

Roof: $q = 0.88 \text{ BTU/ft}^2 \text{ °F h} \times 1,067.60 \text{ ft}^2 \times (95 \text{ °F} - 90 \text{ °F}) = 4,697 \text{ BTU/hr}$

Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ °F h} \times 2,131.69 \text{ ft}^2 \times (95 \text{ °F} - 90 \text{ °F}) = 5,329 \text{ BTU/hr}$

Total digester heat loss = 19,526 BTU/hr at 90 °F

Total loss digester + sludge: 82,440 BTU/hr + 19,526 BTU/hr = 101,966 BTU/hr

For Proposed Influent Holding Tank:

12-inch thick concrete wall, non-insulated = 0.9 BTU/ft² °F h

Aluminum hatch cover, non-insulated = 0.95 BTU/ft² °F h

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18-inch thick concrete floor, moist earth = 0.5 BTU/ft² °F h

Coldest outdoor temperature = -20 °F

Temperature around interior walls = 55 °F

Specific heat of whey plus DAF float ~0.956 BTU/lb/°F

Estimated density of whey and DAF float = 8.2 lbs/gal

Heat requirement for DAF float and whey at 20,000 gpd volume at -20 °F, worst case temperature scenario:

$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 70) \text{ °F} \times 0.956 \text{ BTU/lb °F} = 3,919,600 \text{ BTU/day,}$$

or 163,317 BTU/hr

Calculating the areas of the walls, roof, and floor:

Wall surface area = 32 ft x 20 ft x 3 interior walls = 1,920 ft²

Wall surface area = 32 ft x 20 ft x 1 exterior wall = 640 ft²

Aluminum cover = 32 ft x 32 ft = 1,024 ft²

Floor surface area = 32 ft x 32 ft = 1,024 ft²

Calculating the heat loss for each surface:

Interior walls: $q = 0.90 \text{ BTU/ft}^2 \text{ °F h} \times 1,920 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 77,760 \text{ BTU/hr}$

Exterior wall: $q = 0.90 \text{ BTU/ft}^2 \text{ °F h} \times 640 \text{ ft}^2 \times (95 \text{ °F} - (-20 \text{ °F})) = 66,240 \text{ BTU/hr}$

Roof: $q = 0.95 \text{ BTU/ft}^2 \text{ °F h} \times 1,024 \text{ ft}^2 \times (95 \text{ °F} - (-20 \text{ °F})) = 111,872 \text{ BTU/hr}$

Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ °F h} \times 1,024 \text{ ft}^2 \times (95 \text{ °F} - 35 \text{ °F}) = 30,720 \text{ BTU/hr}$

Holding tank loss: 286,592 BTU/hr

Total loss holding tank + waste: 286,592 BTU/hr + 163,317 BTU/hr = 449,909 BTU/hr

Heat requirement for DAF float and whey at 20,000 gpd volume at 50 °F, yearly average temperature scenario:

$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 80) \text{ °F} \times 0.956 \text{ BTU/lb °F} = 2,351,760 \text{ BTU/day,}$$

or 97,990 BTU/hr

Calculating the heat loss for each surface:

Interior walls: $q = 0.90 \text{ BTU/ft}^2 \text{ °F h} \times 1,920 \text{ ft}^2 \times (95 \text{ °F} - 60 \text{ °F}) = 60,480 \text{ BTU/hr}$

Exterior wall: $q = 0.90 \text{ BTU/ft}^2 \text{ °F h} \times 640 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 25,920 \text{ BTU/hr}$

Roof: $q = 0.95 \text{ BTU/ft}^2 \text{ °F h} \times 1,024 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 43,776 \text{ BTU/hr}$

Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ °F h} \times 1,024 \text{ ft}^2 \times (95 \text{ °F} - 50 \text{ °F}) = 23,040 \text{ BTU/hr}$

Holding tank loss: 153,216 BTU/hr

Total loss holding tank + waste: 153,216 BTU/hr + 97,990 BTU/hr = 251,206 BTU/hr

Heat requirement for DAF float and whey at 20,000 gpd volume at 90 °F (yearly maximum temperature scenario):

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$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 90)^\circ\text{F} \times 0.956 \text{ BTU/lb }^\circ\text{F} = 783,920 \text{ BTU/day,}$$

or 32,663 BTU/hr

Calculating the heat loss for each surface:

$$\text{Interior walls: } q = 0.90 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,920 \text{ ft}^2 \times (95^\circ\text{F} - 75^\circ\text{F}) = 34,560 \text{ BTU/hr}$$

$$\text{Exterior wall: } q = 0.90 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 640 \text{ ft}^2 \times (95^\circ\text{F} - 90^\circ\text{F}) = 2,880 \text{ BTU/hr}$$

$$\text{Roof: } q = 0.95 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,024 \text{ ft}^2 \times (95^\circ\text{F} - 90^\circ\text{F}) = 4,864 \text{ BTU/hr}$$

$$\text{Floor: } q = 0.50 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,024 \text{ ft}^2 \times (95^\circ\text{F} - 65^\circ\text{F}) = 15,360 \text{ BTU/hr}$$

Holding tank loss: 57,664 BTU/hr

$$\text{Total loss holding tank + waste: } 57,664 \text{ BTU/hr} + 32,663 \text{ BTU/hr} = 90,327 \text{ BTU/hr}$$

For the proposed digesters:

$$\text{12-inch thick concrete wall, non-insulated} = 0.15 \text{ BTU/ft}^2 \text{ }^\circ\text{F h}$$

$$\text{Fixed concrete cover, insulated} = 0.30 \text{ BTU/ft}^2 \text{ }^\circ\text{F h}$$

$$\text{12-inch thick concrete floor, moist earth} = 0.50 \text{ BTU/ft}^2 \text{ }^\circ\text{F h}$$

$$\text{Digester inner diameter} = 46 \text{ feet}$$

$$\text{Digester wall height} = 40 \text{ feet}$$

$$\text{Coldest outdoor temperature} = -20^\circ\text{F}$$

$$\text{Specific heat of whey plus DAF Float} \sim 0.956 \text{ BTU/lb}^\circ\text{F}$$

$$\text{Estimated density of whey and DAF float} = 8.2 \text{ lbs/gal}$$

Heat requirement for the waste at 20,000 gpd at -20°F (worst case temperature scenario):

$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 80)^\circ\text{F} \times 0.956 \text{ BTU/lb }^\circ\text{F} = 2,351,760 \text{ BTU/day,}$$

or 97,990 BTU/hr

Calculating the areas of the walls, roof, and floor:

$$\text{Wall surface area} = \pi \times 48 \text{ ft} \times 40 \text{ ft} = 6,031.68 \text{ ft}^2$$

$$\text{Concrete roof area} = \pi \times (24 \text{ ft}^2 + 4 \text{ ft}^2) = 1,859.78 \text{ ft}^2$$

$$\text{Floor surface area} = \pi \times 24 \text{ ft} \times (24 \text{ ft} + \text{sqrt}(11 \text{ ft}^2 + 24 \text{ ft}^2)) = 3,800 \text{ ft}^2$$

Calculating the heat loss for each surface:

$$\text{Walls: } q = 0.15 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 6,032 \text{ ft}^2 \times (95^\circ\text{F} - (-20^\circ\text{F})) = 104,052 \text{ BTU/hr}$$

$$\text{Roof: } q = 0.30 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,860 \text{ ft}^2 \times (95^\circ\text{F} - (-20^\circ\text{F})) = 64,170 \text{ BTU/hr}$$

$$\text{Floor: } q = 0.50 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 3,800 \text{ ft}^2 \times (95^\circ\text{F} - 5^\circ\text{F}) = 171,000 \text{ BTU/hr}$$

Digester heat loss = 339,222 BTU/hr

$$\text{Total loss digester + waste: } 339,222 \text{ BTU/hr} + 97,990 \text{ BTU/hr} = 437,212 \text{ BTU/hr}$$

Heat requirement for the waste at 20,000 gpd at 50°F , yearly average temperature scenario:

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$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 85)^\circ\text{F} \times 0.956 \text{ BTU/lb }^\circ\text{F} = 1,567,840 \text{ BTU/day, or } 65,327 \text{ BTU/hr}$$

Calculating the heat loss for each surface as calculated above:

Walls: $q = 0.15 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 6,032 \text{ ft}^2 \times (95^\circ\text{F} - 50^\circ\text{F}) = 40,716 \text{ BTU/hr}$
 Roof: $q = 0.30 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,860 \text{ ft}^2 \times (95^\circ\text{F} - 50^\circ\text{F}) = 25,110 \text{ BTU/hr}$
 Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 3,800 \text{ ft}^2 \times (95^\circ\text{F} - 50^\circ\text{F}) = 85,500 \text{ BTU/hr}$

Total digester heat loss = 151,326 BTU/hr

Total loss building + sludge: 151,326 BTU/hr + 65,327 BTU/hr = 216,653 BTU/hr

Heat requirement for the waste at 20,000 gpd at 90 °F, high temperature scenario:

$$q = 20,000 \text{ gal/day} \times 8.2 \text{ lbs/gal} = 164,000 \text{ lbs/day} \times (95 - 90)^\circ\text{F} \times 0.956 \text{ BTU/lb }^\circ\text{F} = 783,920 \text{ BTU/day, or } 32,663 \text{ BTU/hr}$$

Calculating the heat loss for each surface as calculated above:

Walls: $q = 0.15 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 6,032 \text{ ft}^2 \times (95^\circ\text{F} - 90^\circ\text{F}) = 4,524 \text{ BTU/hr}$
 Roof: $q = 0.30 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 1,860 \text{ ft}^2 \times (95^\circ\text{F} - 90^\circ\text{F}) = 2,790 \text{ BTU/hr}$
 Floor: $q = 0.50 \text{ BTU/ft}^2 \text{ }^\circ\text{F h} \times 3,800 \text{ ft}^2 \times (95^\circ\text{F} - 55^\circ\text{F}) = 76,000 \text{ BTU/hr}$

Total digester heat loss = 83,314 BTU/hr

Total digester + waste: 83,314 BTU/hr + 32,663 BTU/hr = 148,640 BTU/hr

Heating Requirements for the holding tank and digester are summarized in the following table:

Temperature	Heat Loss in Holding Tank (BTU/hr)	Heat Loss in Proposed Digester (BTU/hr)	Heat Loss in Existing Digesters (BTU/hr)	Total Heat Requirement (BTU/hr)
-20 Degrees F	449,909	437,212	752,062	1,639,183
50 Degrees F	251,206	216,653	406,261	874,120
90 Degrees F	90,327	148,640	101,966	340,933

It can be seen from the above table that the heat generated from the biogas generator should be sufficient to heat the digesters as the proposed generator can produce approximately 2,293,000 BTU/hr. The existing natural gas and biogas boilers will be used for backup or supplemental heating should the need arise. The influent holding tank needs to be heated to keep the DAF float and acid whey homogenous.

4.0 ESTIMATED PROJECT COST AND ECONOMIC ANALYSIS

The following cost summarizes the estimated costs for the anaerobic digester, mixing, electrical generation and associated work:

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Item	Estimated Equipment Cost	Estimated Installed Cost
New Anaerobic Digester Tank	\$525,000	\$750,000
Steel Cover with Safety Equipment	\$260,000	\$375,000
Digester Tank Mixing Package	\$200,000	\$400,000
Membrane Gas Holder	\$255,000	\$400,000
Gas Conditioning Equipment	\$250,000	\$400,000
New Digester Boilers	\$300,000	\$450,000
Yard Piping and Site Pipe Relocation	\$300,000	\$1,000,000
Building for Gas Conditioning Equipment	\$200,000	\$200,000
Digester Heating Equipment	\$250,000	\$400,000
Biogas Generator	\$900,000	\$1,200,000
HVAC Upgrades	\$400,000	\$800,000
Electrical Upgrades	\$500,000	\$1,000,000
Site Work	\$450,000	\$450,000
Construction Subtotal		\$7,825,000
Contingency	15 Percent	\$1,173,750
Total Estimated Cost		\$8,998,750
Engineering and Construction Oversight		\$600,000
Project Permitting		\$50,000
Bond Counsel		\$40,000
Total Estimated Project Cost		\$9,688,750
NYSERDA Grant	From PON Application	\$2,000,000
Total Cost with Grant		\$7,688,750

If the performance goals of the NYSERDA PON program are met, the total grant is estimated to be \$2,000,000, reducing the total estimated project cost to \$7,688,750. The full amount will be reimbursed when the electrical generation goal of 485 KW is met.

Assuming a total project cost of \$7,688,750, an electrical generation output of 485 KW and a 75 percent generator run time, the annual electrical cost savings is approximately \$238,984. This is based on the current electrical rate of 7.5 cents per KWh. The anaerobic pumping, heating, mixing and conditioning systems equipment requires a maximum electrical usage of approximately 100 hp, or 74.6 KW, and an estimated annual O&M cost of \$40,000 for contaminant removal media replacement, pump and compressor maintenance, generator maintenance, and miscellaneous items. The payback period has been calculated to be 47.4 years to recover the project capital and O&M costs. Although the payback period is approximately 50 percent longer than the typical estimated life cycle of the equipment (30 years), it is a benefit to have Byrne Dairy in the Cortland Area. Byrne Dairy is a large local employer and creates tax revenue for the Town of Cortlandville. The Cortland WWTP becomes more of an asset to Byrne Dairy by having a reliable digester facility to dispose of its DAF float and acid whey in close proximity. The payback period will decrease as electrical rates increase and as other acceptable waste sources are accepted. Byrne is expected to increase production and possibly bring an ice cream manufacturing facility to the City of Cortland, which would be a benefit for both Byrne and the City of Cortland.

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5.0 ANTICIPATED PROJECT SCHEDULE

Currently the biogas project is in the design phase. The project scope is being refined as design progresses. The project is anticipated to be out for bid at the end of 2015, with awarding of the project bid and equipment ordering and construction commencing January 2016. Project construction is scheduled to take approximately 10 months, which will result in project construction completion anticipated in the fall of 2016. Testing of equipment is scheduled to take approximately two weeks. Following testing, the system will be seeded with anaerobic bacteria and the new waste stream will be introduced. Once the biogas generation is acceptable, the generator will be started.

6.0 ENVIRONMENTAL ASSESSMENT

The anaerobic digester project has been deemed an Unlisted Action under SEQR. A long form environmental assessment has been completed for this project and it has been determined that this project would have no significant impact on the environment. The determination is attached to this report as Appendix F.

7.0 CONCLUSIONS

Based on the calculated conversion of Byrne's dairy waste to approx. 485 KW of electric power at a capital cost of \$9.6M, this is a viable and feasible project especially if a NYSERDA grant can be secured for \$2M. Both the City of Cortland and Byrne Dairy strongly support this project to convert waste to energy by the construction of an anaerobic digester and this project will greatly benefit both entities. Byrne Dairy benefits by having a local disposal site for its high strength DAF and acid whey waste stream. The direct benefit to the City of Cortland is its ability to produce electrical energy from dairy waste that will significantly offset the City of Cortland's WWTP electrical operational costs. Equally as important is the positive transformational effect this project will have, resulting from the stabilization of sewer rates by the significant reduction of the plant's electric operational cost. The stabilization of residential, commercial and industrial sewer rates for the communities served by Cortland's WWTP will have a beneficial impact by further stimulating economic development and job creation.