RYAN M. COX, MAYOR
JOHN E. SHAY, CITY MANAGER
DEBORAH L. LUSKIN, CITY CLERK
LINDA J. ROGERS, CITY TREASURER

CITY OF LUDINGTON
400 SOUTH HARRISON STREET
LUDINGTON, MICHIGAN 49431
PHONE (231) 845-6237
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REQUEST FOR PROPOSALS
DESIGN AND CONSTRUCTION ENGINEERING SERVICES

2017 ROAD, UTILITIES AND OUTFALL PIPE RECONSTRUCTION PROJECT
CITY OF LUDINGTON

The City of Ludington (City) is soliciting written proposals from selected engineering firms to provide design and construction engineering services and to assist the City in completing an application for U.S. Department of Agriculture – Rural Development (USDA-RD) funding for the following proposed projects:

Removal and Replacement of Water Main, Sanitary Sewer Main, Storm Sewer Main and Road Reconstruction, as appropriate, for:

- **Project 1: Diana Street between North Staffon Street and North Washington Avenue**
- **Project 2: North Washington Avenue between Diana Street and Resseguie Street**
- **Project 3: Resseguie Street between North Washington Avenue and North Lavinia Street**
- **Project 4: North Lavinia Street between Resseguie Street and Pere Marquette Street**
- **Project 5: Pere Marquette Street between North Lavinia Street and North James Street**
- **Project 6: North James Street between Pere Marquette Street and Court Street**
- **Project 7: Extend the existing outfall pipe (that conveys treated effluent from the wastewater treatment plant to the Pere Marquette River) to a new discharge point.**

The project is intended to be completed by September 30, 2017 or sooner. The projects will be funded with bonds issued by USDA-RD. It is the City's intent to bid Projects 1-3 in one construction contract, bid Projects 4-6 in a second construction contract and bid Project 7 in a third construction contract.

Six (6) copies of sealed proposals by engineering firms shall be submitted by Tuesday, January 19, 2016 at 2:00 p.m. local time, at which time they will be publicly opened and read. Proposals shall be divided into two parts and each part shall be placed in separate sealed envelopes. The first part shall contain the firm's qualifications, experience, references and any other information that would highlight the firm's ability to perform the services requested in this Request for Proposals. The second part shall contain the firm's fee to assist the City in applying for financing from USDA-RD and to provide design-engineering services and construction-engineering services, as outlined below in this Request for Proposals. Proposals may be mailed in advance and plainly labeled "Proposal for Engineering Services for 2017 Road, Utilities and Outfall Pipe Reconstruction Project" to:

John Shay, City Manager
City of Ludington
400 South Harrison Street
Ludington, Michigan 49431

Responses to this request will be reviewed and a short list of firms to be interviewed will be developed. Those firms to be interviewed are required to visually inspect the project sites prior to any interview. All key personnel that will be involved in this project are required to attend the interview. The interviews are tentatively scheduled to be held on Monday, February 1, 2016. The City will contact all responding firms by Monday, January 25, 2016 to inform them if they have made the short list or not.

Following the interview phase, the City will then select the proposals from approximately three firms who, in the City's sole opinion, best meet the requirements contained in this Request for Proposals. The City will then open the envelope containing these firms' actual cost bids to determine which firm should be selected. It is expected that the City Council will approve the winning firm's proposal on February 8, 2016.

The City reserves the right to accept and/or reject any proposal, waive any requirements or irregularities in the bidding, negotiate with one or more firms prior to selecting a bid and award to whichever firm the City feels is to be in the best interests of the City. Further negotiations will be undertaken with the ultimately selected firm. The City is not liable for any costs incurred by the bidding firm prior to the issuance of any contract. Notwithstanding its selection as the successful bidder, no contract or other binding agreement of any sort will exist between the City and the selected firm until the final contract(s) is signed by the City and the selected firm.

Project 1: Diana Street between North Staffon Street and North Washington Avenue

This portion of Diana Street is approximately 1,300 feet long and 30 feet wide. There are approximately 1,240 feet of curb and gutter.

Approximately 1,300 feet of 6" cast iron water main will be replaced with 8" ductile iron pipe. All valves and valve boxes will also be installed as part of this project. All water service lines on this portion of the water main up to the edge of the right-of-way line shall be replaced.

Approximately 1,300 feet of 15" clay-tile sanitary sewer main will be replaced with 15" plastic (SDR 35), which will include the replacement of about six (6) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that will need to be replaced if they are made of brick and/or are in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

Project 2: North Washington Avenue between Diana Street and Resseguie Street

The portion of North Washington Avenue between Diana Street and Resseguie Street is approximately 300 feet long and 30 feet wide. There are approximately 600 feet of curb and gutter, which would be replaced.

Approximately 300 feet of 8" cast iron water main will be replaced with 8" ductile iron pipe. About three 8" valves and valve boxes will also be installed as part of this project. All water service lines on this portion of the water main up to the edge of the right-of-way shall be replaced.

Approximately 300 feet of 12" clay-tile sanitary sewer main will be replaced with 15" plastic (SDR 35), which will include the replacement of about three (3) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that will need to be replaced if they are made of brick and/or in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Because of its proximity to the schools, this project must be started and completed during the summer months when school is out of session.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

Project 3: Resseguie Street between North Washington Avenue and North Lavinia Street

The portion of Resseguie Street between North Washington Avenue and North Lavinia Street is approximately 700 feet long and 30 feet wide. There are approximately 1,400 feet of curb and gutter on Resseguie Street between North Washington Avenue and North Lavinia Street, which would be replaced.

Approximately 700 feet of 6" cast iron water main will be replaced with 8" ductile iron pipe. About three 8" valves and valve boxes will also be installed as part of this project. All water service lines on this portion of the water main up to the edge of the right-of-way shall be replaced.

Approximately 700 feet of 42" clay-tile sanitary sewer main will be replaced with plastic (SDR 35) at a proper size to be determined by the engineer, which will include the replacement of about three (3) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that may need to be replaced if they are made of brick and/or in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

Project 4: North Lavinia Street between Resseguie Street and Pere Marquette Street

The portion of North Lavinia Street between Resseguie Street and Pere Marquette Street is approximately 370 feet long and 30 feet wide. There are approximately 740 feet of curb and gutter on North Lavinia Street between Resseguie Street and Pere Marquette Street.

Approximately 370 feet of 6" cast iron water main will be replaced with 8" ductile iron pipe. About three 8" valves and valve boxes will also be installed as part of this project. All water service lines on this portion of the water main up to the edge of the right-of-way shall be replaced.

Approximately 370 feet of 48" brick sanitary sewer main will be replaced with plastic (SDR 35) at a proper size to be determined by the engineer, which will include the replacement of about three (3) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that may need to be replaced if they are made of brick and/or in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

Project 5: Pere Marquette Street between North Lavinia Street and North James Street

The portion of Pere Marquette Street between North Lavinia Street and North James Street is approximately 1,500 feet long and 30 feet wide. There are approximately 1,120 feet of curb and gutter.

Approximately1,500 feet of 6" cast iron water main will be replaced with 8" ductile iron pipe. All valves and valve boxes will also be replaced as part of this project. All water service lines on this portion of the water main from the water main to the edge of the right-of-way shall be replaced.

Approximately 1,500 feet of 54" brick sanitary sewer main will be replaced with plastic (SDR 35) at a proper size to be determined by the engineer, which will include the replacement of about six (6) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that may need to be replaced if they are made of brick and/or in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

Project 6: North James Street between Pere Marquette Street and Court Street

The portion of North James Street between Pere Marquette Street and Court Street is approximately 370 feet long and 30 feet wide. There are approximately 740 feet of curb and gutter.

Approximately 370 feet of 6" cast iron water main will be replaced with 8" ductile iron pipe. All valves and valve boxes will also be replaced as part of this project. All water service lines on this portion of the water main from the water main to the edge of the right-of-way shall be replaced.

Approximately 370 feet of 60" brick sanitary sewer main will be replaced with plastic (SDR 35) at a proper size to be determined by the engineer, which will include the replacement of about two (2) concrete structures (manholes). All laterals from the sanitary main to the edge of the right-of-way shall be replaced.

The existing storm sewer will not be replaced. There are several catch basin and manhole structures that may need to be replaced if they are made of brick and/or in poor condition.

Sidewalk will be replaced as needed to replace sidewalks in poor condition or to fill in gaps between existing sidewalks. ADA-compliant ramps will be installed as needed to meet current standards.

It may be necessary to coordinate the temporary relocation of residents' underground irrigation lines.

Removal and Reconstruction

All of the existing pavement, curb and gutter will be removed and replaced. If applicable, new curb and gutter will be installed where none currently exists. The existing water main, water service lines (if any), valves, corporation stops, curb boxes and related appurtenances will be removed and replaced with ductile iron water main and related appurtenances. The existing sanitary sewer main, sewer laterals and related appurtenances will be replaced. It is intended that the street will be detoured during construction, however, vehicular access must be maintained for local residents.

The construction cost estimate for Projects 1-6, excluding any contingencies, is $2,458,400. The construction cost estimate is not itemized by project number.

Project 7: Extend the existing outfall pipe (that conveys treated effluent from the wastewater treatment plant to the Pere Marquette River) to a new discharge point.

The existing 24" concrete outfall pipe conveys treated effluent from the wastewater treatment plant to an oxbow of the Pere Marquette River. This project entails extending this pipe from an existing sanitary sewer manhole located on the north side of Conrad Road 1,800 feet to the west alongside Conrad Road and then 1,300 feet south alongside the Pere Marquette Highway to an existing bridge over the Pere Marquette River. The entire 3,100 feet of pipe will be located entirely within the Mason County Road Commission right-of-way north of Conrad Road and the Michigan Department of Transportation right-of-way east of Pere Marquette Highway (Business US-31) and will be placed at minimum grade through standard open-cut operation. The existing headwall will be removed from the oxbow, and a new headwall will be installed at the existing bridge over the Pere Marquette River. See Option B on pages 3-4 of the attached letter from Fishbeck, Thompson, Carr & Huber dated June 15, 2015 for additional information on this project.

The construction cost estimate for Project 7, including contingencies, is $453,675.

Scope of Work

Assisting the City in completing an application for USDA-RD funding will follow the USDA funding application checklist (Michigan Guide 2) and will include but not be limited to:

1. Application. Assisting the City with preparing all of the USDA forms for the City's signature. The City will provide the DUNS information and identify who will be the authorized representative for the purpose of signing documents.
2. State and Regional Clearinghouse. The engineer shall complete this for the City.
3. Certification of Commercial Credit. The engineer shall complete this form with input from the City.
4. Audit Report. The engineer shall submit the most current report to USDA.
5. Public Notice. The engineer shall prepare the public notice, which the City shall publish in the local newspaper.
6. Customer Information Sheet. The engineer shall complete this for the City.
7. Poverty Interest Rate Documentation. The engineer shall complete this with input from the City.
8. Leveraging of Funding. N/A.
9. Consistent with Area Comprehensive Plan. The engineer shall complete this for the City.
10. Preliminary Engineering Report (PER). The engineer shall complete this for the City, which will be based on the Water Reliability Study prepared in February 2014 as a starting point. The report will result in a recommended project and project budget, which will be incorporated into the remainder of the USDA funding application documents.
11. Environmental Report. RCAP will complete this report.
12. Draft Engineering Agreement. The engineer will prepare a draft agreement to be included in the application.
13. Legal Services Agreement. The engineer shall coordinate the providing of a draft legal services agreement with the City Attorney.
14. Obtain CAGE #. The engineer shall assist the City on obtaining a CAGE # from the federal System for Award Management.

Preliminary design will include but not be limited to:

1. Design of this project shall be based on the MDOT's most current Standard Specifications for Construction, the most recent Michigan Manual of Uniform Traffic Control Devices (MMUTCD) and the attached City of Ludington Standard Specifications for Water Main Construction and Standard Specifications for Sanitary Sewer Construction.
2. Survey work, including topographic survey, to the extent necessary to provide full design plans.
3. Soil borings and pavement cores shall be included approximately every 500 feet to a depth that you judge necessary to provide the information necessary to design this project. All existing water mains are approximately 5 feet below grade. All existing sanitary sewer mains are approximately 6-20 feet below grade.
4. Utilities identified and clearly shown on the plans.

5. Property lines and road ROW shown on the drawings and any land purchase or easements necessary for construction.
6. Legal descriptions for above as necessary.
7. Develop maintaining traffic plans, staging plans, signage plans, road and utility work and special provisions.
8. Prepare required plans, typical cross-sections, details, specifications and cost estimates required for design and construction. The construction drawings should be at a scale of 1" = 40'.
9. Utilities in conflict clearly identified on the plans and necessary coordination addressed with the appropriate agency or company prior to grade inspection.
10. Apply for and obtain all permits as required from any applicable state or local agency (soil erosion), etc.
11. Meet with City staff on two (2) occasions on an as-needed basis.

Final design will include but not limited to:

1. The engineer shall advertise the project for bids and answer questions from prospective bidders during the advertisement period.
2. The engineer shall issue any necessary addendums to the construction bid documents.
3. The City does not plan to solicit bids from a prequalified list of contractors.
4. The engineer shall provide an appropriate number of copies of plans and specifications to prospective bidders in either electronic or paper format.
5. The engineer shall be present at the opening of bids, review and tabulate the bids and recommend award of the construction contract.
6. The engineer shall review bonds and insurance certificates and prepare contract documents for signature.
7. All necessary changes to estimates, drawings and special provisions.
8. Appropriate material submitted to the City for bidding purposes.
9. Review and approval of all structural shop drawings, whether temporary or permanent as required.
10. Budget compliance: Any budget increases must be discussed, justified and approved by the City.

The final-design phase shall be completed and a bid package for construction bids be sent out no later than January 9, 2017. This requires the USDA-RD application to be submitted at such a time that USDA-RD approves the application and authorizes the City to send out a bid package for construction bids no later than January 9, 2017.

Construction Phase

Construction Engineering shall include but not be limited to:

1. The engineer shall chair the preconstruction meeting, provide meeting agendas and prepare and distribute meeting minutes.
2. The engineer shall complete a preconstruction video of the project area.

3. Construction staking and layout as needed. The benchmark and elevations used for construction staking shall be under NAVD 1988 Datum to match the other newer utilities and street work in the City.
4. Day-to-day inspection. Inspection of underground construction, road construction and restoration shall be at the following levels that ensure that the project will be completed pursuant to the construction contract: The proposal shall reflect having two (2) inspectors present 50 hours per week for 20 weeks. The proposal shall specify the hourly rate for inspection services in the event that actual inspection times (and, therefore, actual inspection costs) are more or less than this duration.
5. Onsite and offsite materials inspection. Density testing of backfill and aggregate shall be done pursuant to MDOT standards. The onsite and laboratory inspection of concrete shall be done pursuant to MDOT standards.
6. Shop drawing review and approvals.
7. Preparation of progress reports, change orders, recommendations, applications for payment and estimates. The written progress reports shall be provided to the City every two weeks and can be in the form of an e-mail.
8. The engineer shall keep daily inspection reports.
9. Final review of project records, punch lists and input in any contractor-claim proceedings.
10. Preparation of three (3) full-size copies of as-built plans in hard copy and PDF formats.

Indicate the capability and willingness of your firm to provide design- and construction-engineering services for this project. At a minimum include:

1. References for similar size projects you have done during the last three years. Include professional fees and construction costs.
2. Names and qualifications of key individuals who would be assigned to the project and evidence of qualifications and experience.
3. Your firm's ability to extend general liability insurance, including bodily injury, automobile liability, property damage and errors and omissions insurance to the City of Ludington at a minimum of $1 million per occurrence. Your firm must also provide workers' compensation insurance coverage.
4. Proposals should be complete but brief.

The criteria for selection will include but not be limited to:

1. Extent and quality of experience with similar projects.
2. Understanding of services needed.
3. Ability to complete project on time and on budget.
4. Availability and qualifications of your team.
5. Demonstrated experience working with Federal, State and Local agencies.
6. Location of your offices.
7. Cost of services.

Please submit your cost proposal in a separate sealed envelope with the cost proposal in the following format:

Fee to Prepare
USDA-RD Application: $_____

Design
Engineering Fee: $_____

Construction
Engineering Fee: $_____

Total Fee: $_____

All proposals shall be irrevocable for sixty (60) days from January 19, 2016. Your proposal must be submitted by Tuesday, January 19, 2016 at 2:00 p.m. local time. An award is expected to be made on or about Monday, February 8, 2016.

The City is an equal opportunity employer and the successful firm will be required to covenant, on behalf of itself and each of its subcontractors, that it will not discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions or privileges of employment or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, or marital status and shall cause a similar covenant to be placed in all contracts with subcontractors. A breach of this covenant will be considered a material breach of the contract.

Please submit all questions in writing to City Manager John Shay at jshay@ci.ludington.mi.us.

Sincerely,

John Shay
City Manager

Dated: December 9, 2015

June 15, 2015
Project No. G140690

Mr. John Shay
City Manager
City of Ludington WWTP
400 S Harrison Street
Ludington, MI 49431

Re: City of Ludington - Evaluation of Wastewater Treatment Plant (WWTP) Improvement Options

Dear Mr. Shay:

The City of Ludington has been negotiating the effluent discharge parameters for their wastewater treatment plant with the Michigan Department of Environmental Quality (MDEQ) for approximately two years. The MDEQ has provided the City with two options for the effluent limitations of the WWTP based on the location of the plant outfall. The City retained Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) to examine the project budget implication based on the following four options:

Option A: Extend the outfall pipe the shortest possible distance to allow the discharge directly into the Pere Marquette River.

Option B: Extend the outfall pipe through the existing public right-of-way to the Pere Marquette River by installing a new pipe heading west under Conrad Road, then south on Pere Marquette Highway to the river.

Option C: Upgrading the WWTP based on current discharge limits and the plant upgrades listed in the draft Project Plan dated September 2013.

Option D: Upgrading the WWTP based on the proposed discharge limits for the current outfall location contained in the draft permit submitted earlier this month by the MDEQ. The upgrades would entail those listed in the previous review of the Project Plan dated September 2013.

Project Background

The City owns and operates an aerated lagoon-style WWTP. The plant consists of two aerated treatment cells, two enclosed final clarifiers, chemical phosphorus treatment, and disinfection using chlorine. The original plant was constructed in the mid-1970s and has been upgraded periodically. At that time, the plant effluent discharged directly into the Pere Marquette River. In the mid-1980s, the Pere Marquette River changed its course. This resulted in the outfall of the WWTP to begin to discharge into the oxbow left after the river course changed. The WWTP discharge has been flowing into the oxbow since the mid-1980s. The MDEQ recently expressed concern about the discharge point of the WWTP and is modifying the future effluent discharge limits for the oxbow. The City is currently faced with an upgrade to the WWTP. The investment into the treatment plant will depend on the comparison of the expected costs for relocating the effluent pipe to allow for the continuation of current WWTP effluent discharge limits, or enhancing the level of treatment by the WWTP to allow the effluent discharged to meet the more restrictive discharge limits proposed for the oxbow.

FTCH reviewed the four options requested by the City to determine whether relocation of the outfall or improvements to the WWTP provides the City with a more affordable investment to improve the WWTP.

1515 Arboretum Drive, SE | 616.575.3824 | Fishbeck, Thompson, Carr & Huber, Inc.
Grand Rapids, Michigan 49546 | www.ftch.com | engineers I scientists I architects I constructors

Considerations

There are several project elements that will be part of the City's investment into the improvement of the WWTP for all of the options considered. These include:

1. New Headworks: The WWTP does not have a headworks to protect the plant from the rags, sticks, and other stringy material that can settle and accumulate in the lagoon basins taking away available volume for treatment.
2. New or Repaired Lagoon Liner: The existing liner may need to be repaired or be replaced with a geotextile liner that will improve the impermeability of the treatment cell for Lagoon Basin No. 1.
3. Replace the existing aeration header and diffuser system: The buried aeration header appears to show signs of leaking air and the existing diffuser system has significant deficiencies that require both to be replaced.
4. Replace and Repair the Final Clarifiers: The existing final clarifiers require repairs to the concrete structure and replacement of the clarifier mechanism.
5. Disinfection System: Minor improvements to the chlorine disinfection system may be necessary to improve the control of the chlorine used to disinfect the plant effluent.
6. Lagoon Cleaning: Sludge and other solids that have accumulated in the lagoons will need to be removed, possibly to the existing sludge lagoon, so that the work within the lagoons can be accomplished. The cleaned lagoons will again have the full treatment volume available in each cell. A survey of the lagoon will need to be performed to gain information about the sludge volume to determine the exact cost of sludge removal and disposal. The budget is an estimate based on the previous draft report.
7. Electrical Reliability: Electrical gear in the basement of the Control Building will need to be relocated to grade to prevent flooding from affecting the overall reliability of the WWTP.
8. Power Reliability: The WWTP does not have a stand-by emergency power generator for the WWTP. A generator needs to be installed to meet the United States Environmental Protection Agency (USEPA) reliability requirements.

The treatment options evaluated for this review were based on a 50 percent increase in the current average annual daily flow (ADF) treated by the WWTP. The current ADF is approximately 2.0 million gallons per day (mgd). Table 1 below provides the parameters used for the basis of design for the comparison of treatment options C and D based on a 3.0 mgd ADF.

Table 1 - Basis of Design

Flow	
Average Daily Flow	3 mgd
Organic Load	
Biochemical Oxygen Demand	310 mg/L
Total Suspended Solids	363 mg/L
Phosphorus	9 mg/L
$NH_4 - N$	12 mg/L

mgd million gallons per day
mg/L milligrams per liter

Options Analysis

Option A - Extend the outfall pipe the shortest possible distance into the Pere Marquette River. This Option would require easements from the DNR and a private property owner.

The shortest route from the existing outfall to the Pere Marquette River lies approximately 800 feet to the southeast through an existing wetland. This path does not appear to have much visible standing water; however, the ground is quite saturated and is thick with cattails. A hand auger in a few spot locations along this path shows organic material down to approximately 5 feet where a mix of silt and sand was encountered. Soil borings will be necessary prior to design to verify soil compositions and depths. It is our understanding that the MDEQ has allowed construction activities to take place within wetlands without mitigation for these types of operations, if the disturbed area is less than 1/3-acre. We can achieve this if the construction activities are limited to a width of 15 feet. With that in mind, we have estimated an open-cut operation with ductile iron pipe for the relocated outfall through the wetlands. Directional drilling of HDPE pipe is also an option; however, with variables such as access of drill equipment and sustaining pipe grade through organic material, open-cut operation may be easier as well as comparable in cost, given the conditions. Dewatering will be necessary for open-cutting a trench to a depth where stable soils exist, with sand backfill to the proposed pipe elevation.

Option A involves the least amount of new construction activity; however, the existing conditions for construction could cause permitting issues and negatively impact construction costs. A 30% contingency was added to the estimate to account for the potential additional complications. Accessibility of the new outfall may be an issue for maintenance purposes, as well as the possibility of the river changing courses again in the future. An easement will need to be obtained for the new outfall.

Option B - Extend the outfall pipe through existing public right-of-way to the Pere Marquette River. This Option diverts the pipe where it crosses Conrad Road, installing a new pipe heading west under Conrad Road, then south on Pere Marquette Highway to the river.

As-builts show that an existing sanitary structures lies on the north side of Conrad Road prior to traveling under the road and heading to the existing outfall. This structure will serve as the diverging point to take the outfall 1,800 feet to the west to Pere Marquette Highway, and travel south 1,300 feet to the bridge over the Pere Marquette River. The sewer will be located entirely within the right-of-way north of Conrad Road and east of Pere Marquette Highway. The 3,100-foot length of pipe will be placed at minimum grade and still be above the identified normal water elevation identified in the wastewater treatment plant as-builts. Standard open-cut operation will be adequate for this installation with all construction activities accessible by roadways.

Option B involves considerably more construction activity than Option A. Every portion of the proposed system is located within the existing public right-of-way and is easily accessible by adjacent roadways should future maintenance be required. Accessibility during construction allows for the construction costs to be lower based on improved existing soil conditions due to the close proximity of the roadways. A 15% contingency was added to this budget since construction impacts are expected to be less. The location of the new outfall at an existing bridge minimizes the concern over the river changing routes; however, the existing area located on the west side of the bridge is historically designated for recreational fishing activities and may not be well received by the public.

Table 2 provides a side-by-side comparison breakdown of the budgetary costs for Option A and Option B.

Table 2 – Ludington WWTP Upgrades Budget Comparison

Project Item	Option A Budget Estimate	Option B Budget Estimate
1. Remove Headwall from Oxbow	$ 15,000	$ 15,000
2. Install New Outfall to Pere Marquette River	$ 281,000	$ 316,000
3. New Headwall at Pere Marquette River	$ 20,000	$ 20,000
4. Soil Erosion and Sedimentation Control	$ 10,000	$ 5,000
5. Landscaping Restoration	$ 6,000	$ 21,000
6. Pavement Removal and Replacement	N.A.	$ 7,500
7. Traffic Control	N.A.	$ 10,000
8. Dewatering	$ 30,000	N.A.
9. Contingencies	$ 108,600	$ 59,175
Total	$ 470,600	$ 453,675

Option C **- Upgrade the WWTP based on current discharge limits and the plant upgrades listed in the draft Project Plan dated September 2013.**

Our understanding is that the proposed discharge limits for the discharge to the Pere Marquette River will be similar to the final effluent limitations listed in the July 2007 National Pollutant Discharge Elimination System (NPDES) permit.

It would be best for the City to initially proceed with improvements to bring the existing plant back to a condition that restores full treatment capabilities. Reuse of the existing aeration blower system will allow the City to avoid the initial capital cost to upgrade this equipment. The City can delay the upgrade until such time that the City's asset management program identifies this equipment for replacement. The project involves reuse of Lagoon Basin No. 2 and repurposing Lagoon Basin No. 1 for sludge storage. Lagoon No. 2 would be divided into three parallel treatment trains each sized to handle a flow of 1.5 mgd. In concept, the treatment trains would accommodate a Biological Phosphorus (Bio-P) treatment zone to allow the plant staff to manage the use of chemical precipitation of phosphorus to achieve the plant effluent requirements. Aeration would be supplied by 20 floating headers, each equipped with seven, 4-aeration diffuser assemblies. The headers would be anchored along the perimeter of the lagoon basin. For maintenance of the diffusers, the operations staff would coil the floating header to the edge of the lagoon basin without the need to remove the basin from service. The project will include a new headworks, upgrading the aeration system in Lagoon No. 2, repairing the final clarifier structures and replacing the final clarifier equipment, replacement of pumping systems, and upgrading the electrical system.

Option D - Upgrade the WWTP based on the proposed discharge limits contained in the MDEQ draft permit . The upgrades would entail those listed in the previous review of the Project Plan dated September 2013.

In the past, the existing WWTP, as configured, has operated well and was able to consistently meet most of the current NPDES permit discharge limits. It is reported that the past performance of the WWTP has, on occasion, caused an excursion of the proposed toxicity limit. The build-up of solids in a lagoon basin and the lack of oxygen caused by an insufficient volume of air to be supplied to the lagoons could cause these treatment issues. To confirm the probable cause of the toxicity in the plant effluent, the City can

perform a Toxicity Reduction Evaluation to identify the waste characteristic(s) to treat or identify specific modifications to the plant that can reduce or eliminate the problem. This option assumes that additional treatment of ammonia is necessary to mitigate the effluent toxicity that is causing excursions from the treatment plant into the oxbow wetland tributary to the Pere Marquette River.

This plant design will need to incorporate advanced treatment to assure the effluent quality will meet the proposed limits for the outfall discharge to the oxbow. The proposed design incorporates both an Integrated Fixed Film Activated Sludge (IFAS) process and tertiary treatment to provide the effluent quality expected for the oxbow outfall.

Table 3 provides a side-by-side comparison breakdown of the budgetary costs for Option C and Option D.

Table 3 – Ludington WWTP Upgrades Budget Comparison

Project Item	Option C Budget Estimate	Option D Budget Estimate
1. Remove sludge from Cells Nos. 1 and 2	$ 1,680,000	$ 1,680,000
2. Install new liner in Cell No. 1	N.A.	$ 2,500,000
3. Install New Liner in Cell No. 2	N.A.	N.A.
4. Replace aeration equipment, diffusers, and headers in Cells Nos. 1 and 2	N.A.	$ 1,600,000
5. Add IFAS and Tertiary Filters	N.A.	$ 4,600,000
6. Replace aeration equipment, diffusers and headers in Cell No. 2	$ 1,800,000	N.A.
7. Upgrade existing clarifiers	$ 1,670,000	$ 1,670,000
8. Construct headworks improvements	$ 1,900,000	$ 1,900,000
9. Replace outfall to discharge to the Pere Marquette River	$ 455,000	N.A.
10. Electrical upgrades	$ 1,200,000	$ 1,200,000
11. Contractor General Conditions	$ 1,800,000	$ 2,700,000
Total	$ 10,505,000	$ 17,850,000

We recommend that the City plan a budget of $11 to $17 million for the improvements and upgrades of the wastewater treatment plant to cover the expected capital costs and the final selection for the outfall location.

If you have any questions or require additional information, please contact me at 616.464.3814 or jcrafter@ftch.com.

Sincerely,

FISHBECK, THOMPSON, CARR & HUBER, INC.

John C. Rafter, Jr., PE, BCEE

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cc: Mr. Chris Cossette – Ludington WWTP