



Real People. Real Solutions.

7656 Design Road  
Suite 200  
Baxter, MN 56425-8676

Ph: (218) 825-0684  
Fax: (218) 825-0685  
Bolton-Menk.com

## Crosslake WWTF Improvement Project

**Date:** July 5, 2018  
**To:** City Council  
**From:** Mike Rardin, PE *MR*  
**Cc:** Ted Strand - Public Works Director  
**Subject:** Monthly Project Update

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### Project Description

The Project can generally be described as follows:

1. Pretreatment improvements including replacing the existing mechanical fine screen, addition of a self-priming grit pump, adding a new blower for the aerated grit removal system, and adding a new handrail and grating system.
2. Construct a new 82,000 gallon equalization basin.
3. Construct a new rapid mix manhole with ferric chloride addition.
4. Construct a new control structure to feed the final clarifiers.
5. Construct a new effluent metering manhole.
6. Miscellaneous electric actuator valve replacements.
7. Re-routing the existing WAS line into the biosolids storage tanks.
8. Furnish and install new blowers for the existing aerated biosolids storage tank
9. Furnish and install a new backwash blower
10. Construct a 30,000 gallon backwash supply water storage tank.

### Work Progress - Seventh Project Update

On September 15, 2017 the City of Crosslake awarded the 2017 Waste Water Treatment Plant Improvement Project to Eagle Construction Company, Inc. of Little Falls, MN for the amount of \$2,227,000.00. The contractor began to mobilize equipment and materials to the site on October 5 in order to prepare for the construction of the treatment plant improvements.

October thru May - the contractor completed the concrete work for the EQ Basin and Water Storage Tanks and installed most of the process piping and water mains, all of the blowers, most of the electrical conduit and some of the associated electrical wiring.

June - the electrical subcontractor installed most of the remaining underground electrical conduit and much of the electrical wiring for new equipment hookup. A meeting with the City, Engineer, and Contractor was held on June 20, 2018 to discuss BMI Proposal Request #4 - Minor Electrical Modifications (Minor Wiring and Conduit Additions at WWTP, Transfer Switch Modifications at PW Bldg, and Emergency Lighting Revisions at PW Bldg). Consensus was City should approve requested changes with not to exceed cost provisions, inform the State of Minnesota of past inappropriate electrical inspections, and request Crow Wing County to share in the costs associated with power and electrical upgrades for the Public Works Facility. Further details can be obtained in the meeting summary (**attached - Project Request #4 Meeting Summary**).

Specific progress to date can be summarized as follows:

1. Pretreatment Bldg Improvements - in progress
2. Construct a new 82,000 gallon equalization basin - complete except for final pumps and controls
3. Construct a new rapid mix manhole with ferric chloride addition - in progress
4. Construct a new control structure to feed the final clarifiers - in progress

5. Construct a new effluent metering manhole - in progress
6. Miscellaneous electric actuator valve replacements - complete except for controls
7. Re-routing the existing WAS line into the biosolids storage tanks - complete
8. Furnish and install new blowers for the existing aerated biosolids storage tank - complete except for controls
9. Furnish and install a new backwash blower - complete except for controls
10. Construct a 30,000 gallon backwash supply water storage tank - complete except for final pumps and controls

No additional contract changes were identified during June. Authorized and proposed changes are summarized in the “Costs” section below.

### Project Schedule

The contractor’s proposed schedule (**attached - Project Schedule - 02.02.18**), has not changed the past several months and overall construction still is estimated to take about forty (40) weeks - with a projected substantial completion date of August 31, 2018. Based on the contractor’s proposed schedule, the following is a brief summary of future construction activities:

**July** - Mechanical Fine Screen installation, Water Storage Tank pump installation, Control Structure concrete and piping, Rapid Mix Manhole and piping construction, Meter Manhole and piping construction, and electrical conduit, wiring, and controls.

**August** - electrical and system controls, Site Grading/ Fencing/ Restoration and punchlist items.

SCADA, system controls, and associated electrical equipment has been designed, ordered, and has begun arriving at the site. Due to nationwide demand for this type of equipment and extended winter conditions, this work is slightly behind schedule. An updated project schedule has been requested.

The contractor generally appears to be on or slightly behind the schedule they proposed for this project. Minor concern has been raised by the contractor that completion may be delayed into September or possibly even October.

### Completion Dates

The contract calls for substantial completion (defined as operation of all new structures and equipment with the ability to treat wastewater as intended) by August 31, 2018.

### Costs

Approved and proposed changes to date have the potential to increase construction costs for the waste water portion of the project by \$60,097.32 as follows:

Approved Changes	Cost
1 - Field Order #1 - Add Rebar: Water Storage Tank Base Slab	\$ 424.00
2 - Field Order #2:	
a - RAS Piping Relocation to EQ Basin	\$ 11,923.13
b - Remove and Replace Three (3) Four Inch Plug Valves	\$ 2,464.93
c - Relocate 6" Oxidation Ditch Drain Line	\$ (4,221.27)
3 - Field Order #3 - Pipe Insulation (EQ Basin to Oxidation Ditch)	\$ 1,822.51
4 - Relocate 6" RW Piping to South Oxidation Ditch	TBD - \$2,500
5 - Pipe Insulation (extra as needed)	TBD - \$2,000
6 - Sludge Tank Diffuser Modifications (revised from coarse to fine nozzles)	TBD - \$2,500
7 - Field Order #4:	

a - Modify Clarifier Splitter Box	TBD - \$500
b - Clarifier Tank Weir Gates (2)	TBD - \$1,000

The following information is provided for the items identified above:

1. During construction review of the Water Storage Tank plans, additional rebars were needed for the base slab - cost determined to be \$424.00. This work is complete.
2. Field Orders:
  - a. Staff found the existing 6" RW piping to be improperly installed and full of solids. As a result, it was decided the existing RAS piping should be relocated / extended to the EQ Basin to avoid future use of this piping - cost estimated at \$11,923.13. This work is complete.
  - b. RAS pump inlet isolation valves (3) have been identified by staff as failing. These can be replaced as a part of the project - cost determined to be \$2,464.93. This work is complete.
  - c. The oxidation ditch drains are being relocated to a location which avoids a building conflict - contractor has offered a credit (deduct) of \$4,221.27 for this change. This work is complete.
3. EQ Basin and Oxidation Ditch pipe connections will result in less than 7-ft of bury depth. To prevent freezing, 4-inch thick insulation 4-ft wide is to be placed over these pipes where there is less than 7-ft of cover. \$1,822.51 of work has been completed.
4. The new 12" EQ basin pipe conflicted with the existing 6" RW pipe to the south oxidation ditch. No records from the original construction plan were found during design or by City staff that show the RW pipe elevation. The 6" RW pipe was raised / reinstalled when it was encountered - contractor is to submit costs associated with this work for review and approval. Costs are tentatively estimated at about \$2,500.
5. Some additional existing tank and pipe connections may result in less than a 7-ft of bury depth. To prevent freezing, 4-inch thick insulation 4-ft wide is to be placed over pipe locations with less than 7-ft of cover - costs to be determined where this situation is encountered. Costs are tentatively estimated at \$2,000 or less.
6. Sludge Tank Diffuser Modifications - BMI design called for coarse nozzle diffusers, City staff directed those be changed to fine nozzle diffusers. Final costs for this change remain to be determined, but are tentatively estimated at \$2,500 or less. This work is essentially complete at this time.
7. Field Order #4:
  - a. Modify Clarifier Splitter Box - modifications provide for temporary pipe closures and structure drainage while structure remains unused. Costs should be minimal, not expected to be more than \$500. Work is in progress.
  - b. Clarifier Tank Weir Gates - gates provided were based on faulty as-built information. The gates provided allow for 12" lift while the existing gates provide for 18" lift. BMI directed gates be modified to provide for the 18" lift needed to operate the clarifiers. Costs to modify the gates are estimated at about \$1,000.00. This work is complete.

<b>Proposed Changes</b>	<b>Cost</b>
8 - BMI Proposal Request #4 - Minor Electrical Modifications	
a - Minor Wiring and Conduit Additions at WWTP	\$4,417.97
b - Transfer Switch Modifications at PW Bldg	\$21,601.98
c - Emergency Lighting Revisions at PW Bldg	\$4,657.30
9 - EQ Basin Mixer	\$16,086.86
10 - SCADA System - Computer Modifications (deduct)	(\$7,580.09)

The following information is provided for the items identified above:

8. BMI Proposal Request #4 - Minor Electrical Modifications requested by BMI.
  - a. Minor Wiring and Conduit Additions at WWTP - provides for wiring and conduits to grit pump and EQ Blower that were not shown in the plans. Estimated cost of this work is \$4,417.97 based on a proposal provided by Eagle (**attached - Proposal PR#4**). This work is complete.
  - b. Transfer Switch Modifications at PW Bldg - this work is necessary to power the PW Bldg from the new stand by generator. Location of the new switch in the PW Bldg must be revised from that shown in the plans due to location of main power line feeding the PW Bldg. Cost of this work will be paid for on a Time and Materials basis with a not to exceed cost of \$21,601.98 based on a proposal provided by Eagle (**attached - Proposal PR#4**). This work will not be undertaken without Council approval.
  - c. Emergency Lighting Revisions at PW Bldg - Cost of this work will be paid for on a Time and Materials basis with a not to exceed cost of \$4,657.30 based on a proposal provided by Eagle (**attached - Proposal PR#4**). Emergency lighting, per code, is to be on a dedicated circuit which is not currently the case for the existing lighting. This work will not be undertaken without Council approval.
9. EQ Basin Mixer - as a result of the RAS Piping rerouting (change 2.a described above) a mixer should be installed in the EQ Basin to avoid solids settlement issues. Estimated cost of this work is \$16,086.86 based on a proposal provided by Eagle (**attached - Proposal PR#5**). Council approval will be needed before this work is ordered.
10. SCADA System - Computer Modifications (deduct) - the existing computer at the WWTP can be used versus a new one planned to be supplied by the contractor. A credit of \$7,580.09 will be provided the city for continued use of their existing computer for SCADA purposes based on a proposal provided by subcontractor In Control (**attached - Computer Allowance**).

Items 1 through 5 above have been previously reviewed by staff and City Council and these changes have been found to be acceptable. Changes 6 and 7 were authorized by city staff and BMI to allow work to continue without delay. Items 8 and 9 are fairly recent issues and will not be undertaken without Council approval. Item 10 is noncontroversial and will be approved by city staff and BMI. Changes 1 through 3 have been authorized by BMI and have been incorporated into pay requests as appropriate (totaling \$12,413.30). Costs for changes 4 through 7 will be reported back to Council and incorporated into pay requests when final costs have been determined (estimated at \$8,500.00). Costs for changes 8 and 9 are estimated at \$46,764.11. Item 10 provides for a contractor deduct (city credit) of about \$7,580.09.

A construction allowance of \$75,000 to pay for possible contract changes was incorporated into the construction contract for this project. So far, \$12,413.30 has been charged towards that allowance. Assuming all changes above are approved and costs remain as estimated, the charges towards the construction allowance would increase to \$ \$60,097.32.

Well construction has been completed and final costs are \$67,940, which is \$455 less than contracted for.

Engineering services for the project have been continuing as agreed to according to the existing “Not to Exceed” contract. No cost changes are anticipated at this time.

Total project costs to date and estimated final costs can be summarized as follows:

<b>Total Estimated Project Cost</b>	<b>Original Cost</b>	<b>Changes</b>	<b>Costs to Date</b>	<b>Estimated Final Costs</b>
WWTF Construction	\$2,152,000	\$ 60,097	\$1,565,485	\$ \$2,212,097
Well Construction	\$ 68,395	\$ (455.00)	\$ 67,940	\$ 67,940
Engineering	\$ 198,400	\$ (514.00)	\$ 194,753	\$ 197,886
<b>Totals</b>	<b>\$ 2,418,795</b>	<b>\$ 59,128</b>	<b>\$ 1,828,178</b>	<b>\$ 2,477,923</b>
<b>Other City Costs (pre 2018)</b>			<b>\$188,016</b>	<b>\$2,667,455</b>

Please see project cost summary (**attached - Project Cost Summary - 07.05.18**) for project cost details.

#### **Attachments**

1. Project Schedule - 02.02.18
2. Project Cost Summary - 07.05.18
3. Project Request #4 Meeting Summary
4. Proposal PR#4
5. Proposal PR#5
6. Computer Allowance

[illegible]

\*\*\*\* Disclaimer: Construction schedule is for informational purposes only subject to alterations by contract amendment. Contractual dates are as specified in the Contract Agreement. Interim activities and their durations are an approximation and not contractual.



City of Crosslake Waste Water Treatment Facility Project BMI Project # - M25.113425  Project Cost Summary July 5, 2018				
Item	Contract Amounts	Changes	Estimated Final Amounts	Notes
Eagle - Contract Amount				
Construction	\$ 2,152,000.00		\$ 2,152,000.00	construction amount
Allowance	\$ 75,000.00			contingency
Contract Changes				
1 - Field Order #1 - Add Rebar: Water Storage Tank Base Slab		\$ 424.00	\$ 424.00	required - requested by BMI
2 - Field Order #2:				
a - BMI Proposal Request #1 - RAS Piping Relocation to EQ Basin		\$ 11,923.13	\$ 11,923.13	optional - requested by city
b - BMI Proposal Request #2 - Remove and Replace Three (3) Four Inch Plug Valves		\$ 2,464.93	\$ 2,464.93	optional - requested by city
c - Eagle Proposal Request #1 - Relocate 6" Oxidation Ditch Drain Line (deduct)		\$ (4,221.27)	\$ (4,221.27)	optional - requested by Eagle
3 - Field Order #3 - Pipe Insulation (Eq Basin to Oxidation Ditch)		\$ 1,822.51	\$ 1,822.51	optional - requested by city
4 - Relocate 6" RW Piping to South Oxidation Ditch		\$ 2,500.00	TBD	required - requested by BMI
5 - Pipe Insulation (additional - as needed)		\$ 2,000.00	TBD	optional - requested by city
6 - Sludge Tank Diffuser Modifications (revised from coarse to fine nozzles)		\$ 2,500.00	TBD	optional - requested by city
7 - Field Order #4:				
a - Modify Clarifier Splitter Box		\$ 500.00	TBD	required - requested by BMI
b - Lengthen Clarifier Weir Gates (2)		\$ 1,000.00	TBD	required - requested by BMI
8 - BMI Proposal Request #4 - Minor Electrical Modifications				
a - Minor Wiring and Conduit Additions at WWTP		\$ 4,417.97	\$ 4,417.97	required - requested by BMI
b - Transfer Switch Modifications at PW Bldg (T & M - NTE)		\$ 21,601.98	\$ 21,601.98	required - requested by BMI
c - Emergency Lighting Revisions at PW Bldg (T & M - NTE)		\$ 4,657.30	\$ 4,657.30	required- Electrical Inspector
9 - EQ Basin Mixer		\$ 16,086.86	\$ 16,086.86	optional - requested by city
10 - SCADA System - Computer Modifications (deduct)		\$ (7,580.09)	\$ (7,580.09)	required - requested by Eagle
Totals	\$ 2,227,000.00	\$ 60,097.32	\$ 2,203,597.32	
Pay Request # / Date	#10 - 06/26/18			
Eagle - Work Completed to Date	\$ 1,565,485.30			
Eagle - Paid to Date	\$ 1,480,461.76			
Eagle - Retainage	\$ 78,274.26			
Eagle - Pay Request	\$ 6,749.28			
Item	Contract Amounts	Changes	Final Amounts	
Blue Water Wells - Construction Costs				
Construction	\$ 68,395.00	\$ -	\$ 68,395.00	
Contract Changes				
1 - Test Pump		\$ (2,000.00)	\$ (2,000.00)	
2 - Water Analysis		\$ (1,750.00)	\$ (1,750.00)	
3 - Casing		\$ (1,080.00)	\$ (1,080.00)	
4 - Open Hole		\$ (1,125.00)	\$ (1,125.00)	
5 - Increase Pump and Casing Sizes (to 500 gpm capacity)		\$ 5,500.00	\$ 5,500.00	
Totals	\$ 68,395.00	\$ (455.00)	\$ 67,940.00	
Pay Request # / Date	#1 (Final) - 9/18/17		\$ 67,940.00	
Item	Contract Amount	Changes	Cost to Date	Estimated Final Amounts
BMI - Design and Construction Services Costs				
Task 1 - Site Work Design	\$ 8,400.00	\$ (9.00)	\$ 8,391.00	\$ 8,391.00
Task 2 - Waste Water Facility Design	\$ 82,000.00	\$ -	\$ 82,000.00	\$ 82,000.00
Task 3 - Bidding Services	\$ 8,000.00	\$ (505.00)	\$ 7,495.00	\$ 7,495.00
Task 4 - Water Supply Well and Storage Tank Design (Alternate)	\$ 30,000.00	\$ -	\$ 30,000.00	\$ 30,000.00
Task 5 - Construction Services	\$ 70,000.00	\$ -	\$ 66,867.41	\$ 70,000.00
Totals	\$ 198,400.00	\$ (514.00)	\$ 194,753.41	\$ 197,886.00
Total Estimated Project Cost	Original Cost	Changes	Costs to Date	Estimated Final Amounts
WWTF Construction	\$ 2,152,000.00	\$ 60,097.32	\$ 1,565,485.30	\$ 2,212,097.32
Well Construction	\$ 68,395.00	\$ (455.00)	\$ 67,940.00	\$ 67,940.00
Engineering	\$ 198,400.00	\$ (514.00)	\$ 194,753.41	\$ 197,886.00
Totals	\$ 2,418,795.00	\$ 59,128.32	\$ 1,828,178.71	\$ 2,477,923.32
Other Related City Costs:			Costs to Date	Estimated Final Amounts
City costs prior to 2016 - WIP at 12/31/2016			\$ 142,416.61	\$ 142,416.61
Other 2017 City Costs - USA Bluebook, Fiber Upgrades, Elite Fence and Deck, Etc			\$ 45,599.90	\$ 45,599.90
Totals			\$ 188,016.51	\$ 188,016.51
	TOTAL CITY COSTS		\$ 2,016,195.22	\$ 2,665,939.83

Legend:

- Proposed change or estimated cost

- Authorized / approved changes / costs



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**PROJECT REQUEST#4 MEETING**  
**Wastewater Treatment Plant Improvements - City of Crosslake**  
**BMI Project No. M25.113425**  
**3:00 p.m., Wednesday, June 20, 2018**

**Attendees:** John Graupman, Phil Martin, and Mike Rardin - Bolton & Menk, Inc.; Ted Strand, Dave Nevin, and Dave Schrupp - City of Crosslake; and, Matt Garding - Holden Electric

The following is a summary of the meeting to discuss electrical issues with Public Works Building (Record Drawing E6.1 attached for reference):

**1. Discussion topics:**

**a. Public Works Building Existing Emergency Lighting**

- 1.Existing panels, switch and wiring was previously approved by state electrical inspectors. Emergency panel should only serve emergency lights. Additional circuits are not allowed on emergency lighting switches and panels
- 2.The wiring was assumed to be code compliant since it had been inspected and approved twice and panel was not labelled as emergency service
- 3.Now determined by regional inspector not to be code compliant regarding both non-essential circuits and wire feed size. It is not grandfathered in and must be corrected.
- 4.Various options to remedy the situation discussed including battery powered emergency lights.
- 5.Consensus was to upgrade wiring to code for emergency lights as best and lowest cost option- approximate cost \$4,300
- 6.Question whether Crow Wing County should participate in the cost to correct this building deficiency
- 7.Electrician willing to work on not to exceed time and material basis to try to reduce cost

**b. Public Works Building Proposed Transfer Switch**

- 1.Transfer switch would power whole building. Deemed critical since this is base of operations in emergencies for both City and local county vehicles and staff. This would provide heat, power to doors, fuel pumps, etc. in power outage.
- 2.Primary power comes under the floor rather than from exterior and cannot be moved. Electrical inspector would not allow any unfused wire requiring moving a panel to fit transfer switch.
- 3.Changes necessary to provide space to install new switch are additional wiring and labor. All materials or labor in bid will still be utilized. This is all additional wire and related labor.
- 4.Consensus was to install new switch with changes as proposed - approximate cost \$22,000
- 5.Question whether Crow Wing County should participate in the cost to upgrade power to the building (generator and switch costs)



6. Electrician willing to work on not to exceed time and material basis to try to reduce cost

**2. Follow Up Actions:**

**a. BMI**

1. Work with contractor to revise PR #4 to cover emergency lighting revisions and installation of proposed transfer switch - approximate cost \$26,300
2. Request new PR for needed wiring at WWTP (initially included in PR#4) - approximate cost \$4,400
3. Provide the City with a written summary of the past emergency lighting inspection / code compliance issue

**b. City**

1. Contact State of Minnesota regarding past inappropriate electrical inspections
2. Contact Crow Wing County regarding cost participation in PW Building power upgrade







## PROPOSAL

## REQUEST

OWNER ☐  
ENGINEER ☐  
CONSULTANTS ☐  
CONTRACTOR ☐  
FIELD ☐  
OTHER ☐

PROJECT: Crosslake WWTP Improvements  
(name, address)

PROPOSAL REQUEST NO: 4

OWNER: City of Crosslake, Minnesota

DATE: 5-1-18

TO: (CONTRACTOR)

Eagle Construction Company  
515 9<sup>th</sup> Avenue NW  
Little Falls, MN 56345

ENGINEER'S PROJECT NO: M25.113425

CONTRACT FOR: \$2,227,000

CONTRACT DATED: August 15, 2017

Please submit an itemized quotation for changes in the Contract Sum and/or Time incidental to proposed modifications to the Contract Documents described herein.

THIS IS NOT A CHANGE ORDER NOR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED HEREIN.

Description: (Written Description of the Work)

1. Electrical contractor to use VFD cable for Grit Pump GP-1 feeder. Size conduit per cable requirements. **14.4% \$4,417.97**
2. Electrical contractor to provide a 1" control conduit with the 1-1/2" conduit to future EQ Blower #1.

3. Refer to Sheet 7.01: **70.4% \$21,601.98 T&M NTE**

A. Move two (2) existing (HP-1A/B) panels from west wall to the east wall. Extend circuits in wireway as required.

B. Relocate four (4) lighting contactors as required for installation of new transfer switch.

C. Existing 60A/3P Life Safety transfer switch to remain. Provide 4-#4+GRND conductors from new generator to existing transfer switch. Extend existing 2" conduit to south side of building for connection to 60A/3P Life Safety disconnect.

D. Provide and install a new 60A/3P Life Safety disconnect on new generator.

E. Contractor shall relocate non-emergency circuits from the Life Safety system to the general transfer switch. **15.2% \$4,657.30 T&M NTE**

F. The contractor shall re-circuit one emergency lighting and exit sign in the electrical room so that the circuit feeding the lighting in the room also feeds the emergency and exit illumination.

Attachments: (List Attached Documents that Support Description)

None

ENGINEER: John Graupman

DATE: 5-1-18

M25.113425 - Crosslake, MN  
Crosslake WWTF Improvements

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# PROPOSAL

# REQUEST

OWNER ☐  
ENGINEER ☐  
CONSULTANTS ☐  
CONTRACTOR ☐  
FIELD ☐  
OTHER ☐

PROJECT: Crosslake WWTP Improvements  
(name, address)

PROPOSAL REQUEST NO: 5

OWNER: City of Crosslake, Minnesota

DATE: 5-17-18

TO: (CONTRACTOR)  
Eagle Construction Company  
515 9<sup>th</sup> Avenue NW  
Little Falls, MN 56345

ENGINEER'S PROJECT NO: M25.113425

CONTRACT FOR: \$2,227,000

CONTRACT DATED: August 15, 2017

Please submit an itemized quotation for changes in the Contract Sum and/or Time incidental to proposed modifications to the Contract Documents described herein.

THIS IS NOT A CHANGE ORDER NOR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED HEREIN.

## Description: (Written Description of the Work)

1. Provide mixer in equalization basin splitter box with local VFD controller in weather rated enclosure. See attached cut sheet and mixer information. No grout required at this time, grout may be added in future if needed.
2. Provide \_ conduit and wire from \_ to feed VFD. Mount adjacent to Equalization Tank outside of Class 1-Div. 1 envelope.
3. Provide a GFI 110-volt convenience outlet at VFD controller (alternate option at light pole)

Attachments: (List Attached Documents that Support Description)

ENGINEER: John Graupman

DATE: 5-17-18

**PROPOSAL**  
**PR #5**



Eagle Construction Company, Inc.  
515 9th Ave NW  
Little Falls, MN 56345

ATTN: John Graupman - BMI  
1960 Premier Drive  
Mankato, MN 56001

Project: Crosslake WWTF Improvements  
Date: 6/13/18

**Description:** Per PR #5 to provide and install a submersible mixer within the equalization basin splitter box structure. Associated costs with this work are as follows:

DESCRIPTION	Qty	Units	RATE	TOTAL
KSB Model Amamix C222/14xdg, 1.7 hp, 460/3 submersible mixer.	1	EA	\$9,642.27	\$9,642.27
Labor for Installation	4	MHS	\$75.00	\$300.00
		Mark-Up 15%		\$1,491.34
Electrical Installation	1	LS	\$4,250.00	\$4,250.00
		Mark-up 5%		\$212.50
		Cost of Bond 1.2%		\$190.75

**TOTAL AMOUNT** **\$16,086.86**

Thank you for the opportunity to Quote this work for you.

Regards,

Jayd Newman  
Eagle Construction Company, Inc.  
320-632-5429

# QUALITY FLOW SYSTEMS, INC.

800 6<sup>th</sup> Street NW  
New Prague, MN 56071

Phone (952)758-9445  
Fax (952)758-9661

May 10, 2018

To: John Graupman  
Bolton & Menk

Subject: Submersible Mixer

Dear John;

Please find below our KSB's mixer selection pricing proposal with the 2" mast system.

## KSB Submersible Mixer & Rail System:

One	(1)	"KSB" Model Amamix C222/14XDG, 1.7hp, 460/3 submersible mixer complete with 50' of power cord.
One	(1)	2" X 2" stainless steel mixer mast system complete.
One	(1)	"Mitsubishi VFD
One	(1)	J hook
One	(1)	Freight to jobsite
One	(1)	Start-up and training

**Total Delivered Selling Price - \$8,980.00 (+ tax)**  $7.375\%$   $(\$662.27) = \$9,642.27$   
(freight allowed to the jobsite)

If you have questions or wish for our proposal to be quoted different, please give me a call.

Sincerely,

***Pat Malay***

Pat Malay



Phone: 218-829-4759 Fax: 218-829-4121

## CROSSLAKE WTP IMPROVEMENTS : PR CHANGE MIXER

Totals (Summary) - Bid Summary: Default

Material	
Non-Quoted	\$642.03
Quotes	0.00
Sales Tax (7.88%)	50.59
Total Material	\$692.62
Labor	
Direct (39.11 hours @ \$77.00)	\$3,011.47
Non-Productive Labor	0.00
Total Labor (39.11 hours)	\$3,011.47
Direct Job Expenses	\$0.00
Tools and Miscellaneous Materials	0.00
Subcontracts	0.00
Job Subtotal (Prime Cost)	\$3,704.09
Overhead (0.00%)	0.00
Profit (15.00%)	555.61
Job Total	\$4,259.70

Actual Bid Price	\$4,259.70
------------------	------------

Material to Direct Labor ratio: 0.19

Prime Cost per square foot	\$0.00
Job Total per square foot	\$0.00
Actual Bid Price per square ft	\$0.00
Labor cost per square foot	\$0.00
Labor hours per square foot	0.00
Gross Profit %	13.04
Gross Profit \$	\$555.61
Net Profit %	13.04

\$4,250.<sup>00</sup>

Phone: 218-829-4759 Fax: 218-829-4121

## CROSSLAKE WTP IMPROVEMENTS : PR CHANGE MIXER

Job Number: CO29361-2

## Extension By Phase

Item #	Description	Quantity	Price U	Ext Price	Labor Hr U	Ext Lab Hr
--- 01 Raceway, Fittings & Boxes ---						
1348	3/4" GRC Elbow	2.00	361.89 C	7.24	0.30 E	0.60
1349	1" GRC Elbow	2.00	510.51 C	10.21	0.36 E	0.72
1587	3/4" Locknut	2.00	15.86 C	0.32	0.07 E	0.14
1588	1" Locknut	2.00	28.61 C	0.57	0.08 E	0.16
2357	1" Conduit Hanger w/Bolt	37.50	55.66 C	20.87	12.50 C	4.69
	--- 01 Raceway, Fittings & Boxes Total ---			39.21		6.31
--- 02 Wire & Cable ---						
2788	#10 THHN CU Solid Wire	1,260.00	170.85 M	215.27	6.25 M	7.88
	--- 02 Wire & Cable Total ---			215.27		7.88
--- 06 Underground/Site ---						
2061	3/4" PVC Male Adaptor	2.00	25.52 C	0.51	0.09 E	0.18
2062	1" PVC Male Adaptor	2.00	40.70 C	0.81	0.06 E	0.12
2115	3/4" PVC Coupling	32.00	13.85 C	4.43	0.03 E	0.96
2116	1" PVC Coupling	32.00	18.62 C	5.96	0.04 E	1.28
24065	3/4" PVC Conduit	300.00	31.69 C	95.07	1.50 C	4.50
24351	1" PVC Conduit	300.00	42.98 C	128.94	1.75 C	5.25
	--- 06 Underground/Site Total ---			235.72		12.29
--- 07 Misc ---						
3107	1/8" Poly Pull Line	315.00	5.80 M	1.83	2.00 M	0.63
28018	PLOWING	300.00	0.50 E	150.00	0.04 E	12.00
	--- 07 Misc Total ---			151.83		12.63
	Job Total			642.03		39.11

## Data sheet



Customer item no.:  
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### Amamix C 2222/14 XDG

Version no.: 1

#### Medium

Pumped medium

Sludge  
Activated sludge (agitator)  
Not containing chemical and  
mechanical substances which  
affect the materials  
62.428000 lb/ft<sup>3</sup>  
68.0 °F

Dry substance content [DS] 1.00 %  
Loss on ignition 70.00 %  
Sludge volume index (SVI) 80.00 ml/g  
Viscosity 2.42 lb/(ft h)  
Share rate 189.00 1/s

Density  
Operating temperature

#### Tank

Liquid volume 6032.29 gal US  
Material Concrete  
Tank shape Rectangular tank (E)  
Fill level 3.84 ft  
Tank depth 6.00 ft

Basin length 21.00 ft  
Basin width 10.00 ft  
Number of mixers 1  
Energy density 1.09 W/ft<sup>3</sup>

#### Creation of flow

Average flow velocity required 0.984 ft/s  
Calculated minimum average  
flow velocity 0.984 ft/s

The average flow velocity can only be achieved if inflows are  
oriented in flow direction.

#### Design

Max. temperature 104.0 °F  
weight 77 lbm  
Type Amamix C 2222 / 1 4  
Execution of drive direct  
Number of blades 2  
Propeller diameter 8.86 in  
Propeller speed 1715 rpm  
Absorbed power P1 at  
operating point based on pure  
water 1.18 HP  
Shaft seal 2 mech. seals in tandem  
arrangement with oil reservoir  
Sealing plan T Tandem mechanical seal  
Manufacturer KSB

Type (propeller side) MG  
Material code (propeller side) SIC/SIC/FPM  
Mixer standard KSB-Aggregate North  
American execution  
Ex protection Yes  
Description Explosion protection to NEC  
Class1, Div 1, Gr.C, D T3  
Norm Explosion protection to NEC  
Device category Class I.Div.1, GroupsC&D  
Temperature classes T3  
aggregate  
additional leakage control  
Weight Without  
36.5

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**Amamix C 2222/14 XDG**

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**Motor**

FI operation permitted	Yes (acc. motor manufacturer)	Winding	460 V
Driver type	Electric motor	Poles	4
Motor manufacturer	KSB	Starting mode	Direct-on-line starting
Motor generation	D	Starting mode	
Motor supplied by	Standard motor supplied by KSB - mounted by KSB	Connection mode	Star
Rated voltage	460 V	Cooling method	Surface cooling
Frequency	60 Hz	Motor version	X
Motor speed	1715 rpm	Operation with Frequency Inverter.	No
Rated power	1.70 HP	Cable design	Rubber hose
Rated current	2.7 A	Cable entry	Sealed along entire length
Starting current ratio	4.9	Sales description power cable	AWG 15-7
Insulation class	F to IEC 34-1	Number of power cables	1
Type of protection	XP/II/1/CD	Motor moisture sensor	1
Motor enclosure	IP68	Cable length	49.21 ft
Temperature classes	T3	Number of additional cable support including catch hook	0
Temperature sensor	PTC resistor		

**Material variant**

Axial propeller (ECB)	Stainless steel A 276 Type 316 Ti	Motor housing	Cast iron A 48 Class 35 B
Gear casing		Shaft	Stainless steel A 276 Type 316 Ti
Jet pipe	Without	Studs	A4
Gasket	FKM 80		

**Nameplates**

Nameplates language	International	Duplicate nameplate	With
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**Installation parts**

Scope of supply	Mixer without installation parts	Additional fastening set	Without
Type of Installation	Universal Instalation (Accessories 22)	lower holder	Without
Holder for square guide rail	Yes	Number of center supports	0
Claw material	Grey cast iron EN-GJL-250	Adapter for tilt adjustment	Without
Bracket	Without		

## Data sheet



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**Amamix C 2222/14 XDG**

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### Please note

KSB quotations and the selection of mixers are exclusively based on the operating parameters specified above as well as the relevant physical variables. Consequently, KSB only accepts warranty obligations for the mixing equipment to the extent of the data provided. It is therefore important that the customer verifies whether the system data considered by KSB in the mixer data sheet does, in fact, conform with the data of the application, and that KSB is informed of any deviations. As the overall function substantially depends on the correct positioning of the mixing equipment, KSB does not accept any warranty claims resulting from a mixer positioning which has not explicitly been approved of by us. Neither low-flow areas (flow separation) resulting from the tank geometry nor the hydraulic solids transportation of the overall system are subject to the KSB warranty. Furthermore, the utilisation of KSB mixers in protected procedures, and any resultant infringement of the industrial property rights of third parties, are similarly excluded.

Possible unexpected on-site conditions may result in the reduction of the average flow velocity. In addition, tolerances in the average flow velocity may occur when conforming with the mixer-relevant standards and directives.

Please observe that velocities higher than the average flow velocity may be present locally.

The required flow velocity for a sediment-free operation is determined by the operational quality of the systems upstream of the tank, essentially by the quantity of solids reaching the tank. Activated sludge flocs settle at flow velocities < 10 cm/s or in case of lack of local turbulence.

Without addition of polymeric flocculation aid.

Mixer(s) positioning in accordance with the system drawing!

## Motor data sheet



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### Amamix C 2222/14 XDG

Version no.: 1

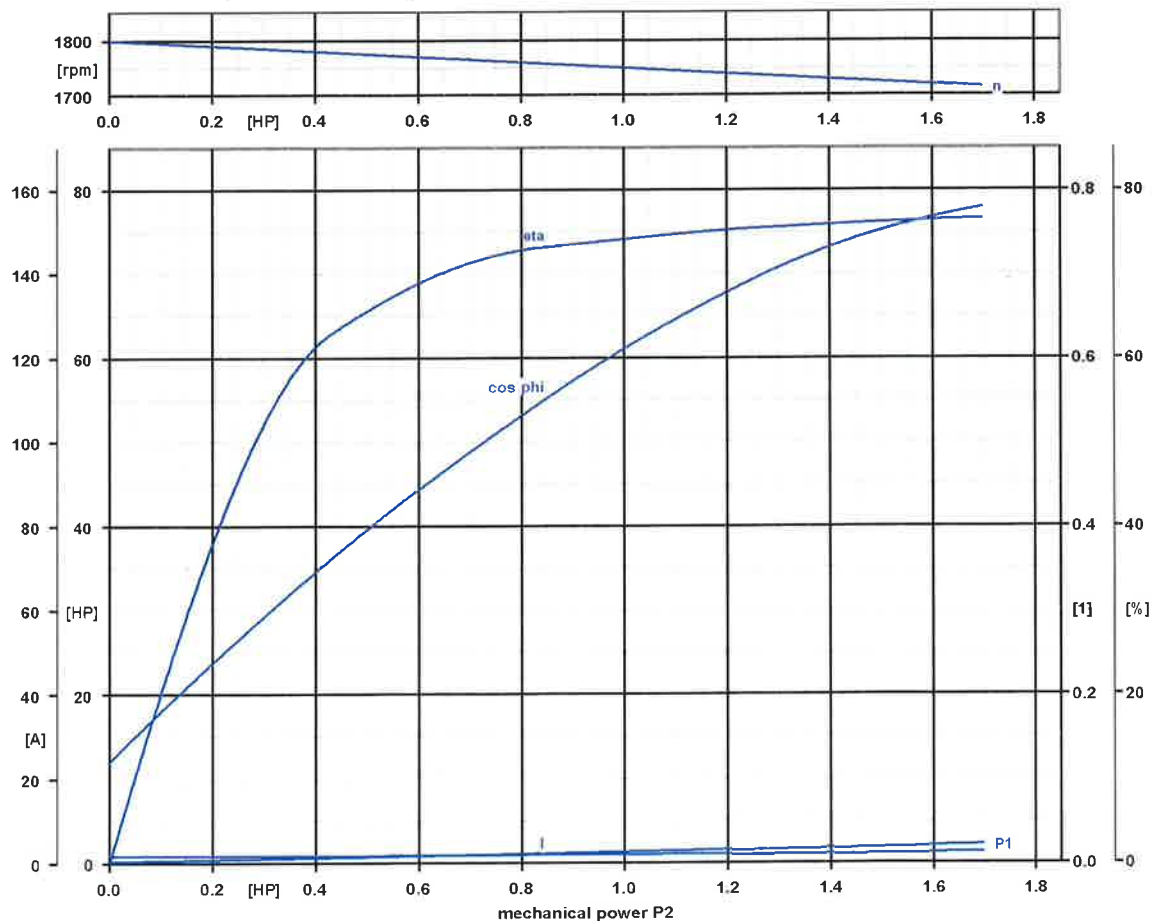
#### Motor data

Motor manufacturer	KSB	Rated speed	1715 rpm
Motor size	1D	Starting current ratio	4.9
Motor construction type	KSB Sub. motor	Starting mode	Direct-on-line starting
Motor material	Grey cast iron EN-GJL-250	Power cable	AWG 15-7
Efficiency class	not classified	Number of power cables	1
Rated voltage	460 V	Power cable Ø min.	0.52 in
Frequency	60 Hz	Power cable Ø max.	0.57 in
Motor power	1.70 HP	Cable standard	NEC
Rated current	2.7 A	Switching frequency	20.00 1/h

#### Curve data

The no-load point is not a guarantee point within the meaning of IEC 60034

Load	0.0 %	25.2 %	49.6 %	74.8 %	100.0 %
P2	0.00 HP	0.43 HP	0.84 HP	1.27 HP	1.70 HP
n	1800 rpm	1779 rpm	1758 rpm	1736 rpm	1715 rpm
P1	0.23 HP	0.68 HP	1.16 HP	1.69 HP	2.22 HP
I	1.8 A	1.8 A	2.0 A	2.3 A	2.7 A
Eta	0.0 %	62.8 %	73.2 %	75.5 %	76.6 %
cos phi	0.12	0.36	0.55	0.70	0.78





## Installation plan

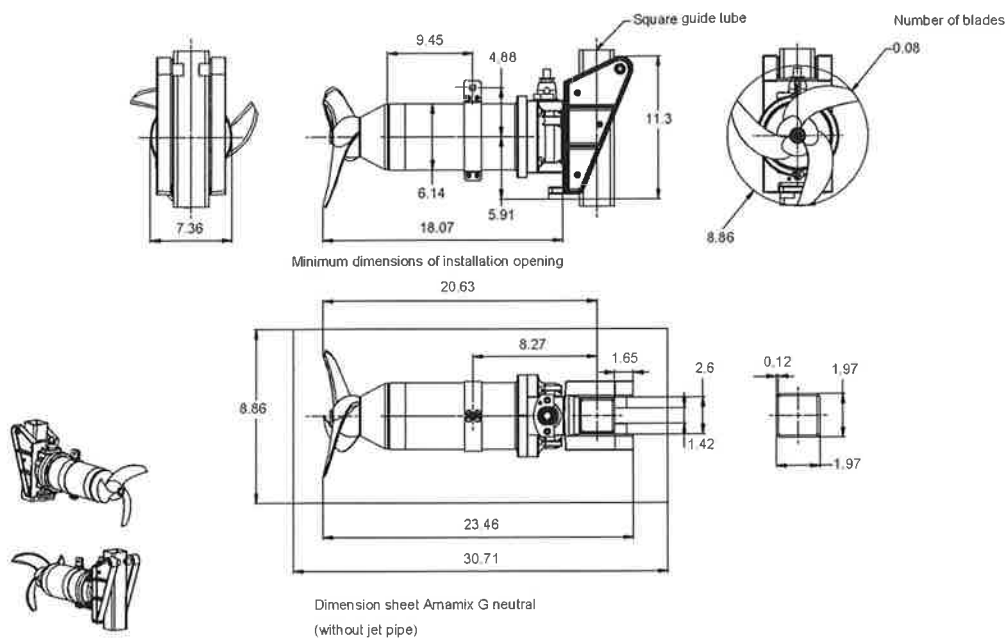


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**Amamix C 2222/14 XDG**

Version no.: 1



*Drawing is not to scale*

*Dimensions in in*

## Positioning

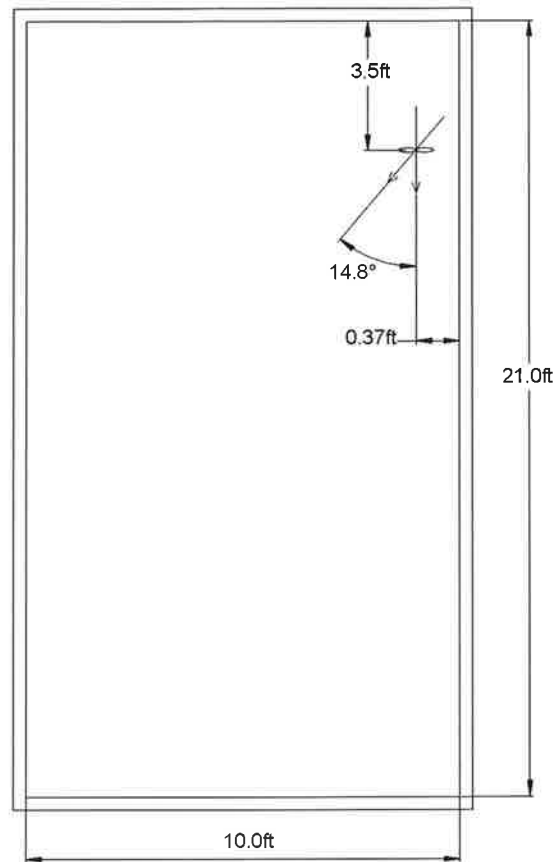


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**Amamix C 2222/14 XDG**

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*Drawing is not to scale*

*The propeller centre is the reference point.*

**Tank shape: Rectangular tank (E)**  
**Type of Installation: Wall mounting**

**RW1: Amamix C 2222/14 XDG**

### Comments

Tank installations are not shown in the positioning options. Please check whether the positioning is suitable for the local conditions.



# Approval Submittal

## **17161MA-S05R02** **Computer Allowance**

**Crosslake WWTF Improvements**  
**2017 M25-113425**  
**Crosslake, MN**



May 23, 2018

Holden Electric  
7669 College Road/PO Box 2668  
Baxter, MN 56425-2688

RE: Your Purchase Order Reference (Sub Contract Agreement 40956-B) for Crosslake WWTF  
Improvements 2017 M25-113425

Dear Jesse:

Your approval is required in order to proceed with this order. The following list of hardware and prices are for review by you and the consultant engineer.

Modifications were made to the attached list for adding a second monitor for the SCADA computer, adding an additional iPad, adding a new office computer that is standalone for operators to use w/monitor, mouse, keyboard, and UPS, and also a backup hard drive.

The backup hard drive can store an image of the computer after startup for disaster recovery and automatic backup of log files and reports. Since there is only one SCADA computer however, if something catastrophic happens to it there are a couple of options:

- 1.) Dell provides 3-year onsite support of hardware repair. If the hard drive were to crash we could load off an image on backup drive.
- 2.) Outside of 3 years if a new computer is needed it can take 3-4 weeks just to procure a new computer, plus the time to set it up. Disaster recovery of the old image may or may not work depending upon hardware chipset within the computer. We have had mixed results.
- 3.) Having a second SCADA computer would be an option but additional software costs would drive price up significantly unless the computer is setup minus the software. Only disadvantage then you have a computer sitting unused in a closet, but would provide the assurances of not having to wait for weeks to get a new one without having a dialer, reports, log files, etc.



Best Regards,

Cory Welsh  
Project Coordinator

<u>Description</u>	<u>P/N</u>	<u>Cost</u>	<u>Quantity</u>	<u>Cost</u>
Computer	Dell Precision 5820, 2.8GHz, 8GB RAM, RAID 1TB HDs	\$1,763.00	2	\$3,526.00
Monitor	Dell 24" Wide Screen P2417H	\$207.99	2	\$623.97
Sound Bar	Dell AC511	\$24.99	2	\$49.98
UPS	Powerware PW9130L-700T	\$590.63	2	\$1181.26
Ethernet Switch	Netgear GS105	\$36.99	2	\$73.98
iPad	9.7" 6th Generation, 128GB, Wi-Fi Only, Space Grey	\$449.00	2	\$898.00
iPad Case	UAG Folio Metropolis Feather-Light Rugged	\$49.99	2	\$99.98
iPad Protector	Sparin	\$11.99	2	\$23.98
Printer	HP Color LaserJet Pro M452dw	\$319.99	1	\$319.99
Firewall	Watchguard T-15W / WGT16031-WW	\$414.00	1	\$414.00
Remote Software	RealVNC 5 year contract	\$225.00	1	\$225.00
Cat 5 patch cables	Black Box EVNSL21-0006	\$5.99	4	\$23.96
Backup Hard Drive	Seagate 4TB Backup Plus	\$119.99	1	\$119.99
<b>Total</b>				<b>\$7,580.09</b>