



*Commissioning Services Proposal for:*

## **WATERVILLE-ELYSIAN-MORRISTOWN PUBLIC SCHOOLS**

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**ADDITIONS AND ALTERATIONS**

April 9, 2020





April 9, 2020

Mr. Preston Euerle  
RA Morton  
prestone@ramorton.com

**RE: Waterville Elysian Morrystown (WEM) Public Schools Additions and Alterations Commissioning Services**

Dear Mr. Euerle and Selection Team,

KFI Engineers is excited for the opportunity to provide commissioning services for Waterville-Elysian-Morrystown Public Schools Additions and Alterations project. Like you, we are passionate about what we do and are committed to making certain your updated buildings function properly. We understand the importance of effective planning, monitoring of commissioning activities, and working as part of a team to ensure systems are working as intended. Our extensive experience within educational facilities, as well as our technical skills and qualifications, will allow us to help you achieve the highest level of system performance for your buildings.

As you will see from our proposal, we are truly experts in all of the solicited areas of work. **We have the expertise, depth of staff, and ability to foster team cooperation necessary to deliver successful project results.** We understand the nature and complexities that can be associated with performing technical commissioning within K-12 facilities, and more importantly, we know how to address them.

The following is what sets KFI apart and allows us to provide exceptional performance and value:

- 1) **KFI's education experience is unmatched.** We have been providing commissioning services for over 20 years and are at the forefront of advanced system optimization and Owner representation in educational environments.
- 2) We are **National Environmental Balancing Bureau (NEBB)** certified for commissioning as well as test and balance (TAB) for air and hydronic systems. Additionally, we hold ASHRAE certification for commissioning services.
- 3) Our **full-time commissioning staff** includes licensed professional engineers, master plumbers, former controls technicians, and sheet metal workers who can interpret installation quality and practical functionality. All of our commissioning staff work in the field and operate building control systems and utilize HVAC testing instruments on a continual basis.
- 4) Our inventory of test equipment for all air, water, noise, vibration, air quality, and psychrometric conditions, allows us to **provide quick and accurate evaluation of performance problems** in systems.

KFI prides itself on technical commissioning. We believe it is imperative as the owner's Commissioning Agent that we **spend the majority of our time in the field performing inspections and physically testing equipment ourselves.**

Thank you for the opportunity to submit our proposal, we look forward to working with you on this important project. Should you have any questions regarding our qualifications or submittal, please do not hesitate to contact Robert Linder or myself at 651.771.0880 or [rjlinder@kfi-eng.com](mailto:rjlinder@kfi-eng.com) / [rpchristenson@kfi-eng.com](mailto:rpchristenson@kfi-eng.com).

Sincerely,

**KFI ENGINEERS**

A handwritten signature in black ink, appearing to read "Randy Christenson".

Randy Christenson, PE  
DIRECTOR

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## Appendix A

### Commissioning Agent Qualifications

KFI Engineers	Robert Linder, PE	Director - Performance Group	
Company Name	Contact Person	Title	
670 County Road B West	St. Paul	MN	55113-4527
Address	City	State	Zip/Postal Code
651.771.0880	651.771.0878	rjlinder@kfi-eng.com	
Telephone	Fax	E-Mail	

**Description of Business**

**Commissioning Activities**

Percentage of overall business devoted to commissioning services. 25 %

How long has the firm offered commissioning services? 21 Years

Average number of commissioning projects performed each year? 96 Projects

**Systems (technologies) for which firm has provided commissioning services (check all that apply):**

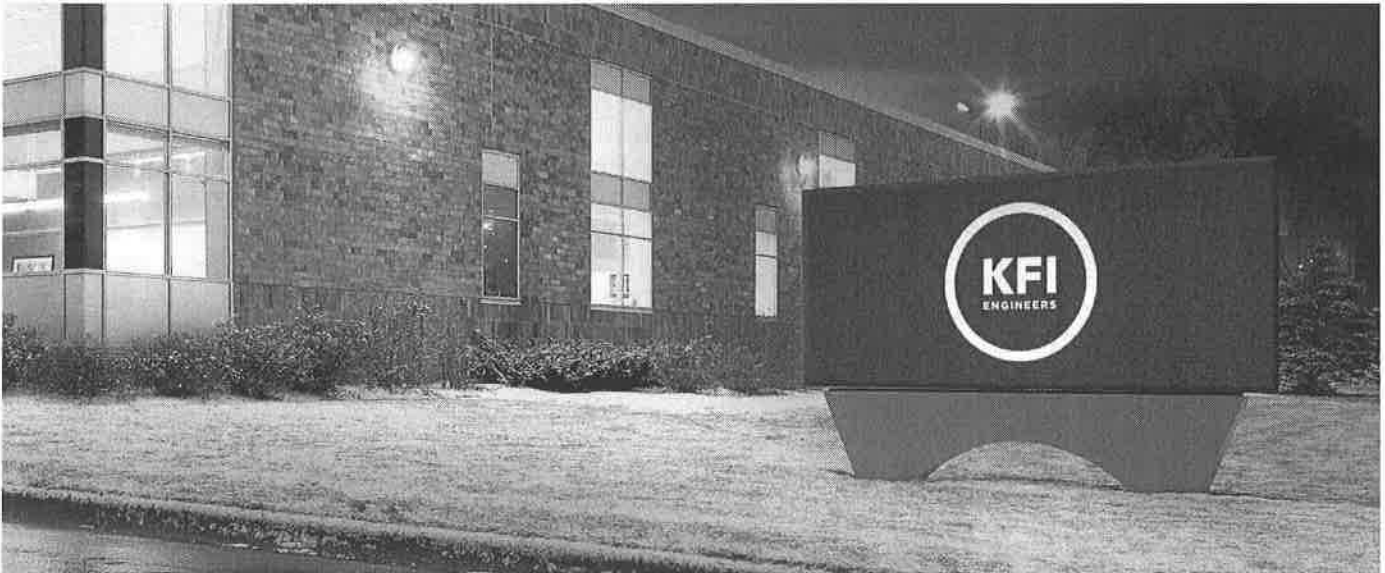
- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> Pkg or split HVAC     | <input checked="" type="checkbox"/> Day lighting             | <input checked="" type="checkbox"/> Commercial refrig      |
| <input checked="" type="checkbox"/> Chiller system        | <input checked="" type="checkbox"/> Electrical, general      | <input checked="" type="checkbox"/> Telecommunications     |
| <input checked="" type="checkbox"/> Boiler system         | <input checked="" type="checkbox"/> Electrical, emerg. Power | <input checked="" type="checkbox"/> Thermal Energy Storage |
| <input checked="" type="checkbox"/> Energy Mgmt. System   | <input type="checkbox"/> Envelope                            | <input checked="" type="checkbox"/> Labs & Clean Rooms     |
| <input checked="" type="checkbox"/> Variable Freq. Drives | <input checked="" type="checkbox"/> Fire/Life Safety         | <input type="checkbox"/> _____                             |
| <input checked="" type="checkbox"/> Lighting Controls     | <input checked="" type="checkbox"/> Plumbing                 |  |

**Number of qualified professionals on staff who have directed commissioning projects:** 6

**List Qualifications:** Professional Engineers - 5, EIT - 1, NEBB Certified Provider Cx & TAB - 4, NEBB Cx Process Professional - 1, NEBB Certified Tech TAB - 5, ASHRAE Building Cx Professional - 1, Niagara 4/AX Certified - 9, LEED AP - 2, Certified Energy Manager - 1

**Prior Projects of a similar nature**

Building Name	Location	Type of Project (new, additions or remodeling)	Contact Name	Contact Phone Number
Robbinsdale Area Schools 200+ Projects	Robbinsdal, MN	New, Additions, and Remodels	Rodger Schaeftbauer	763-504-8135
Red Wing Public Schools	Red Wing, MN	New, Additions, and Remodels	Kevin Johnson	651-385-4507
Alexandria Area Schools	Alexandria, MN	Remodels	Trevor Peterson	320-762-2141
North Branch Public Schools - 8 Buildings	North Branch, MN	Additions and Remodels	Art Tobin	651-674-1091



## FIRM OVERVIEW

**KFI Engineers (KFI)** is an engineering and commissioning firm that provides services for a wide range of customers including educational, industrial, commercial, institutional, retail, and healthcare organizations.

KFI has been providing commissioning services since 1998 and is at the forefront of commissioning work in education environments. We are proud to have successfully executed hundreds of millions of dollars in retrofits and new construction. To this day, we adhere to a diligent standard of care for our clients, getting involved during the design stage to establish the level of quality expected on our projects. We understand the difference between a proper installation and a marginal one and establish the required level of quality early in construction. There is no substitute for measurement and testing. Our NEBB certified commissioning staff utilizes KFI's fleet of trucks that contain calibrated testing equipment necessary to provide real-time information on system performance.

Our philosophy is simple and consistent, whether commissioning our own designs or the designs of others: treat contractors with respect while remaining firm, fair and timely with complex field situations. We believe in structured test protocols, point-to-point testing of control systems, the engagement of owner's operations staff and the relentless pursuit of punchlist completion.

*"I've worked with several people at KFI over the years, and everyone's been quite consistent – their goal has been to make sure the school district's desired outcome is met. It is obvious the entire firm values serving the customers' needs. They're responsive, they listen, they strive to meet our goals for system operations, budget, schedule, and consider future operational impacts."*

*Jim Gerber - Robbinsdale Area Schools (retired 2018)*

### EXPERTISE:

- Commissioning and recommissioning
- Mechanical and electrical engineering
- Central systems
- Energy audits
- Voice and data systems
- Budgets and detailed cost estimates
- Critical-path scheduling
- Control system design
- Preventative maintenance manuals
- Client training

### SERVICES WE OFFER:

- Commissioning, recommissioning and retrocommissioning
- Controls system design
- Building infrastructure
- Utility systems design
- Process and chemical engineering
- Integrated energy modeling

## Unique Qualifications

Our staff has experience in the operations of building HVAC and control systems along with ASHRAE and NEBB certifications. KFI also has extensive design experience from renovations to new construction and ***understands the level of effort required to meet project goals.***

### Dedicated Commissioning Team

At KFI, we have a ***dedicated commissioning department*** with full-time engineers and technicians who fully understand all aspects of the commissioning process. We believe this is a distinct advantage over other firms whose commissioning team members only intermittently oversee commissioning projects. KFI's commissioning staff is ***in the field on a daily basis testing and troubleshooting systems,*** which allows us to quickly look for and address issues that can be typical pitfalls for installing contractors.

### Building Start

KFI uses Building Start's AirNab Test & Balance and Building Test commissioning software platforms for documentation management. Some of the features of these platforms include:

- The Owner and project management team have the ability to see stat-tracking dashboards to identify the active percentage of tests and checklists completed, number of active open issues (and whose responsibility they are), rate of issues identified and completed, as well as other performance metrics.
- Allows contractors to utilize a web interface to execute construction checklists and pre-functional and functional test procedures. Multiple users can access their portions of checklists at once to keep pace in the field instead of handing off completed lists between parties.
- Issues are logged and tracked in real-time as test forms are executed. All parties can see and respond to the issues lists via the web interface to have constant access to the most up-to-date issues log.

### Commissioning Certification

KFI's commissioning staff is knowledgeable of the industry standards for delivering a quality, successful commissioning project to the Owner. KFI has staff members holding both ASHRAE - Building Commissioning Professional (BCxP), and NEBB - Building Systems Commissioning (BSC) and Commissioning Process Professional (CxPP) certifications. Additionally, KFI staff is active within the NEBB BSC certification program, providing technical updates and instructing at NEBB sponsored seminars. Our certifications, associated continuing education, and NEBB BSC leadership ensure that we are leading the industry, not following it.

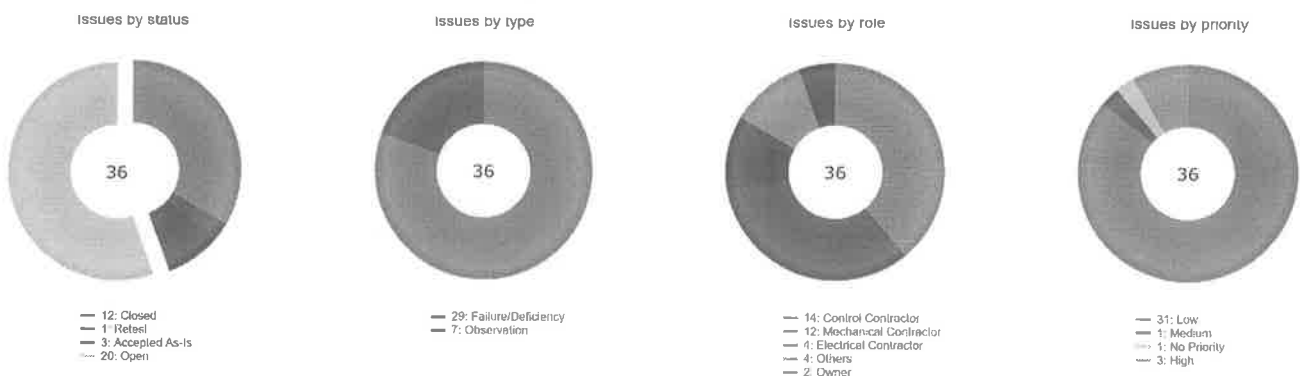
### Test & Balance Certification

KFI is a NEBB test and balance (TAB) certified firm for both air and hydronic systems. NEBB TAB certification involves both written and practical (hands-on) examinations. Our staff is proficient in industry standard TAB procedures, required reporting, and the use and applications of the TAB instrumentation. KFI has the background to identify deficiencies and, if necessary, perform independent investigation into air-side or hydronic issues to assist with identifying solutions.

### Controls Design

With experienced programmers on staff, we understand the details necessary to control a building. ***Nine of our staff members hold Niagara AX/N4 certifications.*** Our expanded control design allows us to deliver what is needed for equipment to perform in concert. Our control strategies are simulated and tested in our controls lab prior to release. We excel at creating well defined, industry standard, written sequences of operation and basic schematics. In addition, we uniquely offer documents beyond these to also include schematics, enhanced with control arcs, function block diagrams, graphical user interface layouts and installation drawings. Finally, when building control is paramount, KFI will write the actual programming code alongside the system designers to ensure that nothing is lost in translation.

**Building Start Tracking Dashboard Example**



## PROJECT TEAM

To ensure each building's equipment and systems are complete and functioning properly upon occupancy, we have brought together individuals capable of executing commissioning tasks in a thorough and timely manner. **We have assembled experts in the fields of commissioning, recommissioning, energy efficiency, BAS infrastructure, and system optimization.** Each proposed team member has extensive experience and knowledge of operations and maintenance requirements and contributes a specialized skill to the group.

For project management consistency, **Matt Swanson, PE** will serve as the commissioning authority and main point-of-contact for both of the District's projects. He will provide oversight throughout each project and assist other KFI staff, listed below, in the performance of specific commissioning tasks. Matt is a licensed mechanical engineer with 15 years of operations, maintenance, and building automation system programming experience. Matt has exceptional knowledge of the commissioning process and will utilize his expertise to provide substantial improvements to the overall function and maintainability of your buildings.

**Gary Trudeau** and **Tim Markoe** will provide construction, acceptance, and post acceptance phase commissioning services for the project. Gary has over 20 years of experience operating buildings and is intimately familiar with utility management, energy saving strategies, HVAC operation, and building automation systems. Tim is an experienced field technician within KFI's commissioning department focusing on K-12 education projects.

KFI recognizes the need to meet the project's scheduling requirements. In addition to the dedicated staff above, we are able to call upon our deep bench of commissioning professionals for additional testing manpower if needed.

A representative sampling of team members' similar project experience is reflected on their resumes included on the following pages. All team members are available, ready to start work immediately, and will be active on the project throughout its duration.





## **Matthew V. Swanson, PE**

### **Commissioning Engineer**

Matthew is a licensed mechanical engineer with over 15 years of industry experience. Matt has extensive knowledge of Class A high rise and low rise building systems design and infrastructure and has managed a variety of system types including full chiller plants, district fed systems, and heat pump operated buildings. With this experience, Matt has become proficient in several building automation system platforms including Trane Tracer Summit, Trane ES, and Niagara AX.

### **Relevant Experience**

#### **K-12 EDUCATION**

Bloomington Public Schools - Bloomington, MN

- Jefferson High School Air Conditioning Systems
- John F. Kennedy High School
- Poplar Bridge Elementary School Remodel
- Ridgeview Elementary School Renovation

Cambridge-Isanti High School and Intermediate HVAC Upgrades - Cambridge, MN

Hudson High School - Middle School Additions/Renovations - Hudson, WI

Lewiston-Altura Public Schools Lewiston Elementary School - Lewiston, MN

Minneapolis Public Schools - Minneapolis, MN

- Armatage Elementary School Renovation and Addition
- Elizabeth Hall International Elementary School Renovation
- Washburn High School Science Classroom

North Branch Area Public Schools Sunrise Elementary School Commissioning and Test Adjust and Balance Services - North Branch, MN

Orono Public Schools High School Activity Center Addition - Long Lake, MN

Red Wing Public Schools District Commissioning - Red Wing, MN

Roseville Area Schools

- LTFM Projects - Multiple Locations, MN
  - Little Canada Elementary School
- Referendum Bond Projects - Multiple Locations, MN
  - Roseville Area Middle School
  - Roseville High School
  - Falcon Heights Elementary School

St. Paul Public Schools

- Highland Park Elementary School Commissioning and Test and Balance Services - Lewiston, MN
- RiverEast Elementary and Secondary School Commissioning and Test and Balance Services - St. Paul, MN

Wayzata Public Schools

- Birchview Elementary School Mechanical Improvements
- Greenwood Elementary School Upgrades

Westonka Public Schools Mound Westonka High School Auditorium and Field House Additions - Minnetrista, MN

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#### **EDUCATION**

B.S. Mechanical Engineering  
North Dakota State University

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#### **LICENSURE**

Minnesota #57119

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#### **AFFILIATIONS/CREDENTIALS**

FE Certification

Niagara AX

Universal Refrigeration License

Minnesota State Special Boilers License

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## Gary G. Trudeau

### Field Technician

Gary is a field technician within KFI's building performance group. He has over 20 years of experience operating buildings. Prior to joining KFI, Gary was responsible for operating, maintaining, and troubleshooting issues for multiple buildings exceeding 1 million square feet. He is intimately familiar with utility management, energy saving strategies, HVAC operation, and building automation systems. This experience gives Gary a unique perspective of looking at issues from the owner's point of view when performing commissioning tasks.

### Relevant Experience

#### K-12 EDUCATION

Eastern Carver County East and West Middle Schools Boiler Replacement - Chaska, MN

Mounds View Public Schools District - Arden Hills, MN

Minnesota State Academy for the Deaf Noyes Hall Chiller Replacement - Faribault, MN

Robbinsdale Area Schools

- Cooper High School Renovation - New Hope, MN
- Noble Elementary School Renovation - Golden Valley, MN

Roseville Area Schools

- LTFM Projects - Multiple Locations, MN
  - Little Canada Elementary School
- Referendum Bond Projects - Multiple Locations, MN
  - Roseville High School

St. Paul Public Schools American-Auto Matrix (AAM) Building Automation System Integrations - St. Paul, MN

#### HIGHER EDUCATION

University of Iowa College of Pharmacy - Iowa City, IA

#### COMMERCIAL

American Dream - East Rutherford, NJ

#### GOVERNMENT

City of Victoria City Hall and Library HVAC Assessment - Victoria, MN

Dakota County Safety and Mental Health Alternative Response Training (SMART) Center - Inver Grove Heights, MN

Minnesota Security Hospital Phase 2 - St. Peter, MN

#### HEALTHCARE

Mayo Clinic - Rochester, MN

- Immunology Lab Phase 2
- USP Pharmacy Renovations

#### EDUCATION

B.A. Sociology  
Minnesota State University Moorhead

#### LICENSURE

State of Minnesota

- Power Limited Technician License (PLO08139)
- Special Engineer, Boilers License (SP005058)

#### AFFILIATIONS/CREDENTIALS

BOMA Minneapolis - Member



## Timothy D. Markoe

### Technician

Timothy is a technician within KFI's building performance group where he performs commissioning and controls services for building owners. With a masters degree in architecture with an emphasis on sustainable design, Tim brings a unique perspective to our team. Tim's experience encompasses a variety of facility types from education buildings to government and commercial facilities.

### Relevant Experience

#### K-12 EDUCATION

Bloomington Public Schools - Bloomington, MN

- John F. Kennedy High School
- Jefferson High School Air Conditioning Systems
- Poplar Bridge Elementary School Remodel
- Washburn Elementary School

Buffalo-Hanover-Montrose Public Schools - Buffalo, MN

- High School Additions
- Tatanka Elementary School Addition
- Buffalo Community Middle School Additions and Remodeling
- High School Additions

Cambridge-Isanti High School and Intermediate HVAC Upgrades -  
Cambridge, MN

Eastern Carver County Schools - Chaska, MN

- Carver Elementary School
- Classroom Pod Additions

Hudson School District High School and Middle School Additions/  
Renovations - Hudson, WI

Lewiston-Altura Public Schools Lewiston Elementary School - Lewiston, MN

Minneapolis Public Schools - Minneapolis, MN

- Bancroft Elementary School
- Jordan Park Elementary School Desiccant System Replacement
- Armatage Elementary School Renovation and Addition

New London-Spicer Public Schools Additions - New London, MN

North Branch Area Public Schools - North Branch, MN

- High School Commissioning and TAB Services
- Middle School Commissioning and TAB Services
- Sunrise Elementary School Commissioning and TAB Services

Red Wing Public Schools District Commissioning - Red Wing, MN

Robbinsdale Area Schools, 6 Schools - Robbinsdale, MN

St. Paul Public Schools - St. Paul, MN

- RiverEast Elementary School and Secondary Commissioning and Test and Balance Services
- Highland Park Elementary School Commissioning and Test and Balance Services
- Horace Mann Elementary School Commissioning and Test and Balance Services

#### EDUCATION

M.S. Architecture - Sustainable Design  
University of Minnesota

B.A. Environmental Studies  
St. John's University

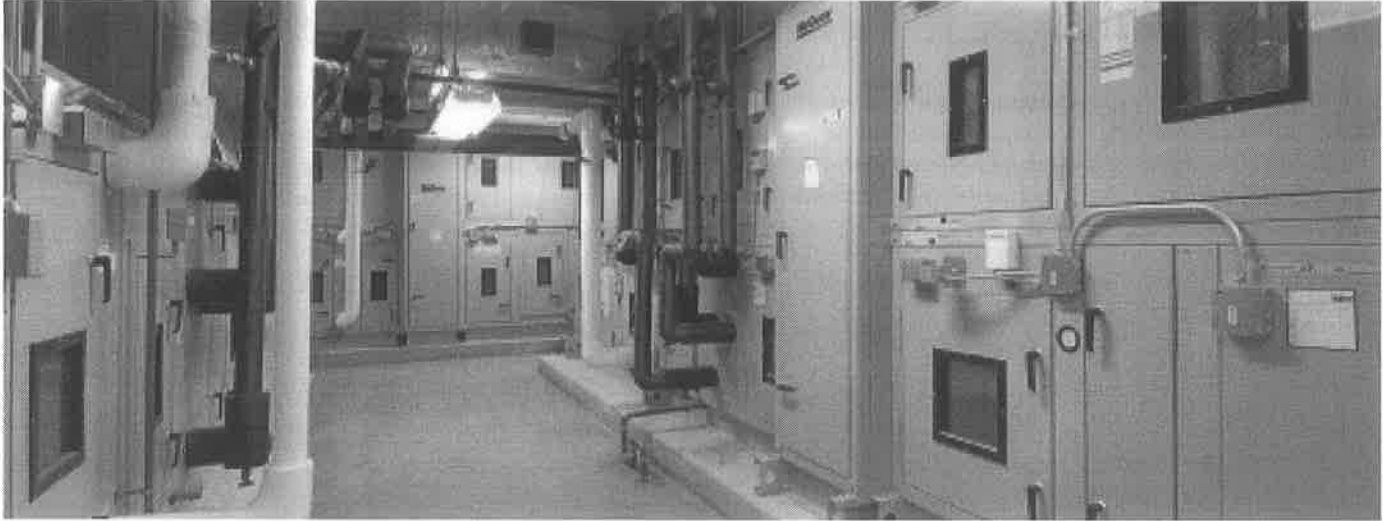
## RELEVANT EXPERIENCE AND REFERENCES

KFI provides **top quality commissioning and controls design services**, and has, for over 20 years. We have an extensive list of commissioning experience, having provided commissioning services for over 1,300 buildings, totaling more than 30,000,000 square feet. We strive to **provide our clients with the highest possible value**. Our clients' best interests are at the forefront of everything we do. KFI has many clients who will attest to our owner advocacy and performance. **We invite you to reach out to our references** included in the project summaries provided on the following pages.

A sample of our K-12 client's includes:

- Alexandria Public Schools - Alexandria, MN - Multiple Buildings (5)
- Austin Public Schools - Austin, MN - Multiple Buildings (3)
- Bloomington Public Schools - Bloomington, MN - Multiple Buildings (8)
- Buffalo - Montrose Hanover Public Schools - Buffalo, MN - Multiple Buildings (3)
- Cambridge-Isanti Public Schools - Cambridge, MN - Multiple Buildings (5)
- Centennial School District - Centerville, MN - Multiple Buildings (6)
- Crosby-Ironton Independent School District - Crosby, MN
- Dassel-Cokato Public Schools - Dassel, MN - Multiple Buildings
- Eden Valley Watkins Public Schools - Eden Valley, MN - Multiple Buildings (2)
- Edina Public Schools - Edina, MN
- Minneapolis Public Schools - Minneapolis, MN - Multiple Buildings (4)
- Minnetonka Public Schools - Minnetonka, MN - Multiple Buildings (5)
- New Ulm Public Schools - New Ulm, MN - Multiple Buildings (3)
- North St. Paul Public Schools - North St. Paul, MN - Multiple Buildings (8)
- Northeast Metro Intermediate School District 916 - Multiple Buildings
- Northfield Public Schools - Northfield, MN - Multiple Buildings (3)
- Osseo Area Schools - Osseo, MN - Multiple Buildings (29)
- Orono Public Schools - Orono, MN
- Red Wing Public School District - Red Wing, MN - Multiple Buildings
- Robbinsdale School District - Robbinsdale, MN - Multiple Buildings (3,000,000 ft<sup>2</sup>) (26)
- Sauk Rapids High School - Sauk Rapids, MN
- Spring Lake Park Public Schools - Spring Lake Park, MN - Multiple Buildings
- St. Anthony - New Brighton Public Schools - St. Anthony, MN - Multiple Buildings
- St. Louis Park School District - Spring Lake Park, MN - Multiple Buildings (1,000,000 ft<sup>2</sup>) (10)
- Waseca Area Schools - Waseca, MN - Multiple Buildings
- Watertown Mayer Area Schools - Watertown, MN - Multiple Buildings - LEED
- Wayzata Public Schools - Wayzata, MN - Multiple Buildings (1,600,000 ft<sup>2</sup>) (14)
- Westonka Public Schools - Minnetrista, MN - Multiple Buildings (4)





## Robbinsdale Independent School District Commissioning

KFI continues to work with the District commissioning construction infrastructure improvements and upgrades involving all twenty-six of the district's schools and learning centers. KFI provides, design, commissioning and recommissioning services. The ten-year construction plan covered the entire 2.6 million square-foot district, at a cost of over \$200 million.

Commissioning project types include full summer renovations, partial additions, and new buildings. The commissioning scope for Robbinsdale projects is implemented during the construction phase and lasts throughout the one year warranty walkthrough. In 2010, the district also initiated a program to start re-commissioning schools that have gone over five years since the last upgrade at the facility. Thus far, KFI has recommissioned 14 district buildings. In addition, KFI provides continual troubleshooting, feasibility studies/investigations and training services for all facilities as required by the district. A sampling of relevant Cx/Recx projects include:

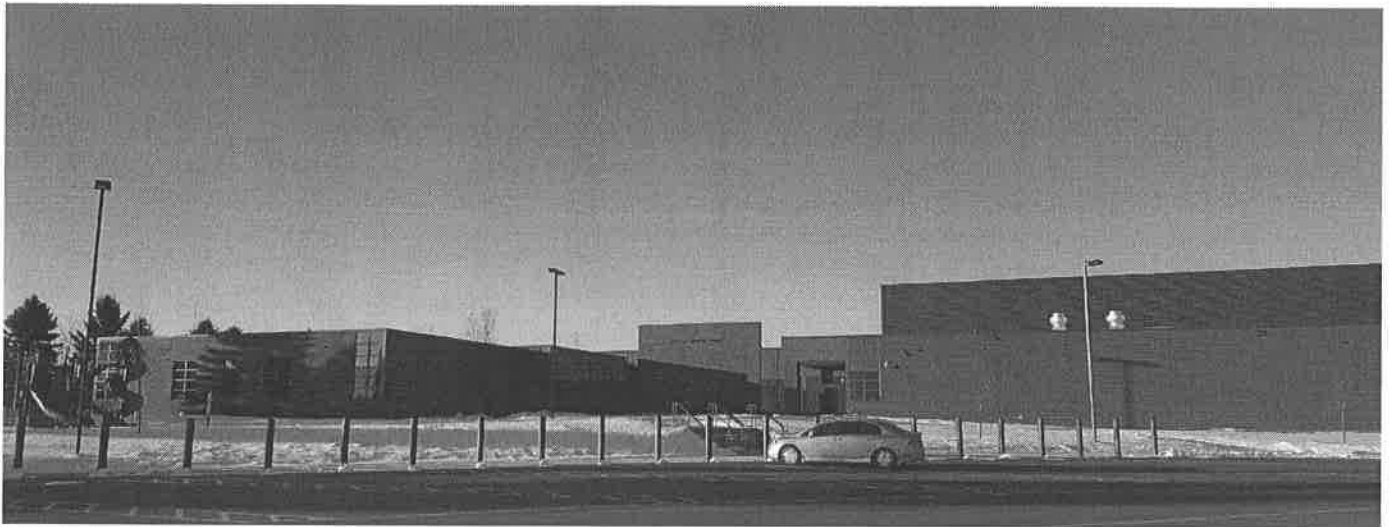
**LOCATION:**  
Robbinsdale, MN

**OWNER:**  
Robbinsdale Independent School District

**COMPLETION DATE:**  
1999 - Ongoing

**CLIENT CONTACT:**  
Rodger Schaeffbauer, Program Director ESC  
p: 763-504-8135  
e: rodger\_schaeffbauer@rdale.org

SCHOOL	YEAR(S) CX WAS PERFORMED	YEAR(S) RECX WAS PERFORMED
Armstrong High School	1999-2000; 2007-2008; 2016	2010
Cooper High School	1999-2001; 2019	2013
Educational Service Center	2003	2014
Fair School	2008; 2009	
Forest Elementary School	2003; 2016	2014
Lakeview Elementary School	2012	
Meadow Lake Elementary School	2000; 2016	2011
Neill Elementary School	2000; 2003; 2007; 2016	2011
New Hope Learning Center	2003	2013
Noble Elementary School	2000; 2019	2015; 2016
Northport Elementary School	2011-2013; 2016	
Olson School	2000; 2017	2013



## Red Wing Public Schools District Commissioning

KFI has been commissioning projects for Red Wing School District since 2015 beginning with River Bluff Education Center which included the construction of a new 66,000 square-foot education facility that combined all of the District’s special need services into one building. The building consists of general administration offices, cafeteria, classrooms, gymnasium, science lab, and shop spaces. Special features included energy recovery air handling units with advanced engineered occupancy based ventilation resets, pressure independent energy control valves for 100% of HVAC valves, condensing boiler systems, LED lighting, and occupancy based lighting controls.

Following the success of the River Bluff project in 2016, KFI was contracted, during the design phase, to review the Twin Bluff pool construction documents for the HVAC equipment replacements. KFI then participated in construction inspections and executed functional testing of systems.

Over the course of 2017 and 2018, KFI also commissioned five HVAC retrofits at schools within the District. Similar to our involvement on the Twin Bluff pool project, KFI performed design reviews for the retrofit projects. During construction KFI conducted construction inspections and once systems were turned over; performed functional performance testing to ensure functionality.

**LOCATION:**  
Red Wing, MN

**OWNER:**  
Red Wing Public Schools

**COMPLETION DATE:**  
2019

**CLIENT CONTACT:**  
Kevin Johnson, Director of Buildings  
and Grounds/Technology  
p: 651-385-4507  
e: kdjohnson@redwing.k12.mn.us

SCHOOL	YEAR CX WAS PERFORMED
River Bluff Education Center (new building)	2016
Twin Bluffs Middle School Pool AHU Replacement	2016
Burnside Elementary School HVAC Upgrade	2017
Twin Bluffs Middle School HVAC Controls Upgrades	2017
Red Wing High School HVAC Upgrade	2018
ColMill Family Center HVAC Upgrades	2018
Sunnyside Elementary School	2018



## Alexandria Public Schools Commissioning

KFI's relationship with Alexandria Public Schools dates back to 2010 when significant issues were plaguing Woodland Elementary's geothermal system. KFI's commissioning team was brought in to retro-commission, troubleshoot, and optimize the heat pump and air handling energy recovery systems.

In 2015, KFI's commissioning team was retained to provide technical commissioning for four schools within the Alexandria Public School District. Carlos, Milona, and Voyager Elementary Schools, and Discovery Middle School underwent renovations to improve energy efficiency throughout the buildings.

KFI's involvement in the projects began with design reviews during the design phase. KFI attended construction meetings and performed observation reviews while on-site.

Following the completion of construction KFI conducted functional performance testing, as well as a review of the test and balance values and report. Systems involved in the renovations included air handling units, with variable air volume boxes, induction units, pumps, boilers, as well as geothermal water to water heat pumps and air handling unit energy recovery systems.

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**LOCATION:**  
Alexandria, MN

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**OWNER:**  
Alexandria Public Schools

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**SQUARE FOOTAGE:**  
Varied

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**COMPLETION DATE:**  
2016

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**CLIENT CONTACT:**  
Trevor Peterson, Director of  
Business Services  
p: 320-762-2141  
e: [tpeterson@alexandria.k12.mn.us](mailto:tpeterson@alexandria.k12.mn.us)

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## Wayzata Public Schools District Commissioning

KFI has been providing ongoing commissioning and recommissioning services for Wayzata Public Schools' construction projects since 2004, including projects at 12 of the district's elementary schools, middle schools, the high school, and an administrative building. Thousands of pieces of equipment have been successfully commissioned by KFI.

KFI's projects included the commissioning of infrastructure upgrades and summer remodels as well as recommissioning energy studies. In addition, we have performed feasibility studies in several other facilities. KFI's projects within the district include:

**LOCATION:**  
Plymouth, MN

**OWNER:**  
Wayzata Public Schools

**SQUARE FOOTAGE:**  
1.6 Million

**COMPLETION DATE:**  
2004 - Ongoing

**CLIENT CONTACT:**  
Jon Deutsch, Director of Facilities  
and Transportation  
p: 763-745-5000  
e: jon.deutsch@wayzataschools.org

SCHOOL	YEAR(S) CX WAS PERFORMED	YEAR(S) RECX WAS PERFORMED
Plymouth Creek Elementary	2004	2015
Kimberly Lane Elementary	2004	2015
Sunset Hill Elementary	2005; 2015	
Gleason Lake	2006; 2018	2018
Birchview Elementary	2006; 2016; 2018	
Administration Building	2004	2009
East Middle School	2010; 2015	
West Middle School	2011; 2015; 2016	
High School		2012
Oakwood Elementary	2004; 2010	2014
Central Middle School	2007; 2008; 2009; 2014; 2016	
Greenwood Elementary	2010; 2014	

## PROJECT APPROACH

KFI practices the **technical commissioning** methodology, and has done so since our company's inception. Technical commissioning places an emphasis on the commissioning authority and the commissioning technicians actively performing and witnessing the construction, installation, and operational tests in the field, in lieu of simply creating checklists for contractors to fill out themselves. This style of commissioning provides an unbiased, independent review of the commissioned systems, **delivering true value to the District** and the project. Included below are several key aspects to our commissioning approach.

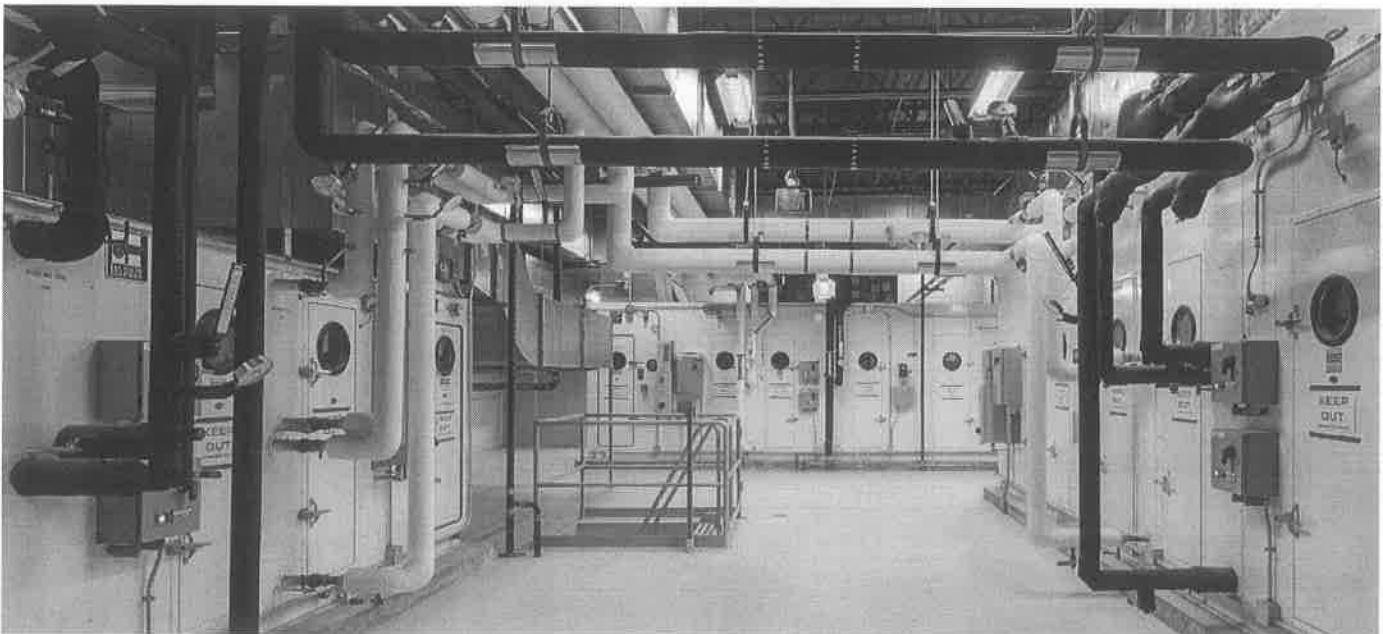
KFI's biggest benefit to the project comes from **proactively identifying issues as early** as possible. To implement this practice, a commissioning team needs expertise in all areas of design and construction. **Our team has unique industry diversity and experience** that other firms cannot match:

- Our commissioning department contains a unique blend of commissioning engineers, controls technicians, former design engineers, facility engineers, as well as tradesmen experienced in sheet-metal and pipe-fitting.
- We have multiple commissioning personnel who are TAB certified, and routinely execute TAB work.
- KFI's commissioning team routinely performs retrocommissioning and system troubleshooting projects in existing facilities. These projects require our team to **diagnose the root cause of issues**, and either correct them ourselves, or design the solution to the issue.

**Our team leverages its field experience immediately on the project.** A thorough construction phase installation review is paramount to preventing turnover delays during testing. KFI's commissioning agents' responsibilities go beyond creating construction checklists and attending construction meetings. **Our personnel actively inspect systems** to identify installation deficiencies while they are still easy to correct. In addition to ensuring construction details and specifications are met, we also:

- **Ensure manufacturer requirements are maintained.** The ever-evolving technology in building systems requires continued research by our commissioning personnel to ensure that equipment is installed properly to allow optimal performance.
- **Verify equipment access is maintained.** This is critical not only for future owner maintenance needs, but to ensure all equipment can be thoroughly accessed during TAB and start-up processes.
- Use our experience as installation professionals to **ensure quality workmanship is maintained.**

A poorly executed TAB process can be as devastating to facility operations as a bad controls installation. KFI will review the final TAB report for both completeness and accuracy to the project documents, as well as conformance to the plan, process, and demonstration results. We will also ensure that critical data such as calibration factors, and system differential setpoints are documented in the report for future owner





reference. This has proven critical in the past if a controls system suffers a critical component failure and loses all existing setpoints.

**The heart of the commissioning process is functional performance testing.** KFI implements a robust testing process that goes far beyond simple setpoint adjustment to test sequences and reviewing automation trend logs. KFI believes that real commissioning is a technical, comprehensive process that involves hands-on physical inspection, technical knowledge of the controlled systems, devices, and their appropriate applications. We utilize our troubleshooting proficiency in order to identify the issues that were not identified by the contractors themselves. KFI has the ability to identify the root cause of an issue, instead of simply documenting a failure.

Our multi-step testing process includes:

Requiring the contractor to perform preliminary self-checkout prior to functional performance testing with our team. This step shakes out minor issues by the contractor, so **our personnel can focus on optimizing the system.**

Physical verification of the controlled devices and sensors to confirm their installations comply with manufacturer requirements for optimal performance.

**Review of Building Automation System (BAS) graphics** to ensure the animated graphical displays match the actual locations of sensors and devices in the systems or equipment.

**Alarm verification:** Alarm devices will be tripped to verify alarms are properly displayed, and the appropriate shutdown sequences are followed.

**Sequence verification:** This includes initial setpoint adjustments and overrides to prove immediate functions. A critical follow-up step is to review trends of the sequences after the facility is occupied to ensure the automation system properly controls the functions under load, without significant overshoot or hunting problems. Sequence testing includes normal mode, alarm sequences, and applicable emergency modes of operation.

After all of the above tests are conducted, and issues corrected, integrated systems testing is conducted to **ensure the facility functions properly as a whole.**

We will utilize key trend review and point verifications at the terminal level to provide best value to the District while identifying issues prior to turnover.

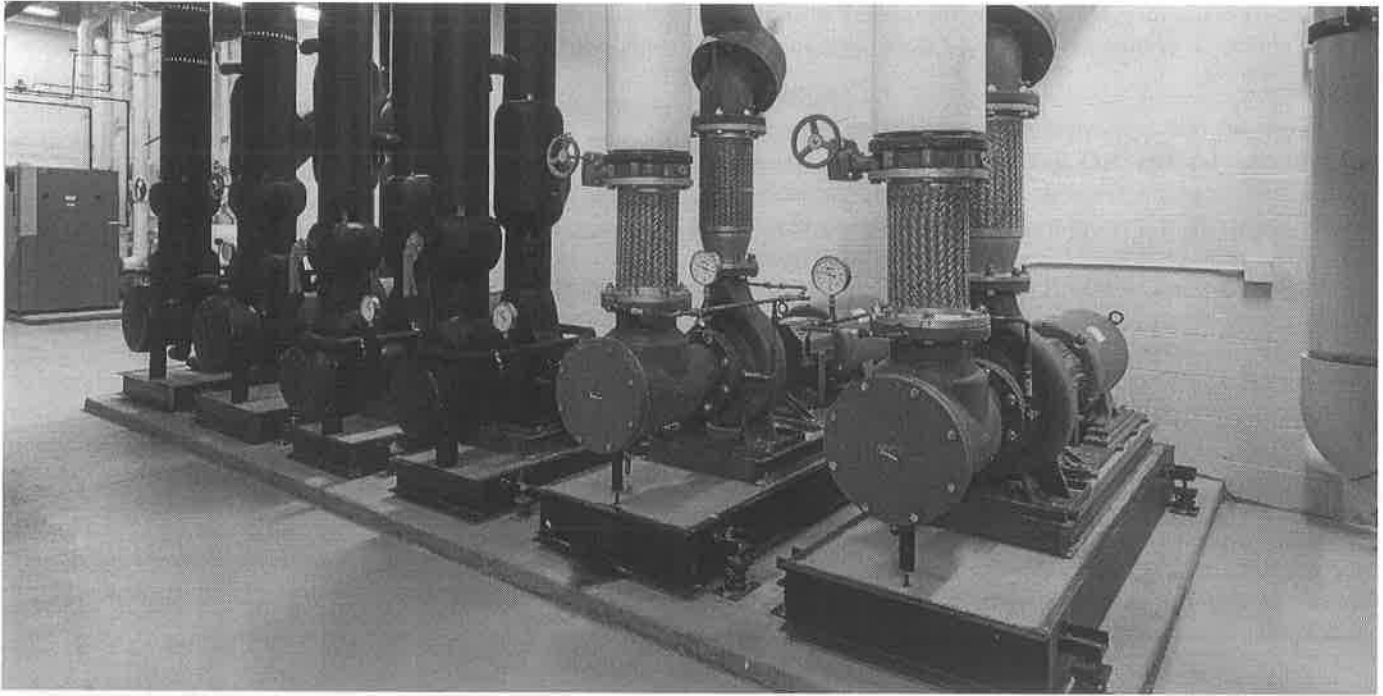
All issues are tracked on KFI's standard forms, and issued at the end of each testing session. **KFI does not accept corrections until they are verified by our team.**

Our commissioning personnel are experts in collaborating with engineers and contractors on issues that may arise. This is of the utmost importance because a unified project team, who works together to resolve issues in a timely manner, better provides the desired results the owner is seeking. We encourage contractors to be present and assist with the functional performance testing. This leads to the understanding, and acceptance, of issues discovered.

KFI understands that we are not the engineer of record, nor do we try to be. There may be instances in which we find solutions that differ from the project documents. In these cases, we will provide suggestions to the design architect or engineer for consideration. In the end, we ensure all direction related to our issues logs come from the architect, engineer, or the owner, not the commissioning authority.

In summary, KFI's technical commissioning approach works. **Our commissioning services result in the delivery of a quality project.** Our thorough post-construction efforts ensure these results continue to be achieved.





## Project Understanding

The project consists of building additions, remodeling, and HVAC improvements at two (2) separate facilities in the District:

- Middle School facility which is approximately 26,660 square feet, single story type building located in Morristown, MN.
- Elementary and High School Facility which is approximately 198,515 square feet, multiple stories and level type building which is located in Waterville, MN

The Morristown project consists of completely replacing the steam heating system and piping with a new hot water heating and piping system throughout the facility. This also includes a complete replacement of the boiler plant with hot water condensing type boilers. The pneumatic control system is to be completely removed and replaced with a new electric/DDC system (system will be a new Alerton as installed by NAC Controls). Included with the work will be utilizing existing indoor air handling equipment and replacing the heating coils with new hot water coils and adding new DX cooling coils. New remote air-cooled condensing unit equipment will be added for cooling throughout the building. New air handling equipment will be added to serve the remodeled area. New and existing systems are to be re-balanced throughout the building. Existing ductwork and HVAC equipment cleaning is part of the project. This site does not receive a fire protection system.

The Waterville project consists of completely replacing the steam heating system and piping with a new hot water

heating and piping system throughout the facility. This also includes a complete replacement of the boiler plant with hot water condensing type boilers. The pneumatic control system is to be completely removed and replaced with a new electric/DDC system (system will be a new Alerton as installed by NAC Controls). Included with the work will be utilizing existing indoor air handling equipment and replacing the heating coils with new hot water coils and adding new DX cooling coils. New remote air-cooled condensing unit equipment will be added for cooling throughout the building. New air handling equipment will be added to serve the addition and remodeled areas. New and existing systems are to be re-balanced throughout the building. Existing ductwork and HVAC equipment cleaning is part of the project. A new fire protection system is to be installed throughout the building under this project.

The Waterville site construction schedule is to be completed in two (2) phases, the first phase is to be complete by Fall 2020 with new construction and remodeling continuing through the year. The first phase includes installing and utilizing a steam to water heat exchanger that is to be used for the 2020/2021 heating season. The second phase, includes the replacement of the boiler plant. The second phase also calls for removing the heat exchanger entirely and relocating the heating pumps (installed in Phase 1) from adjacent to the boiler room to the mechanical space located adjacent to the varsity gymnasium. The second phase and all work throughout the facility is to be completed by the Fall of 2021.

## Scope of Work

Systems to be commissioned are:

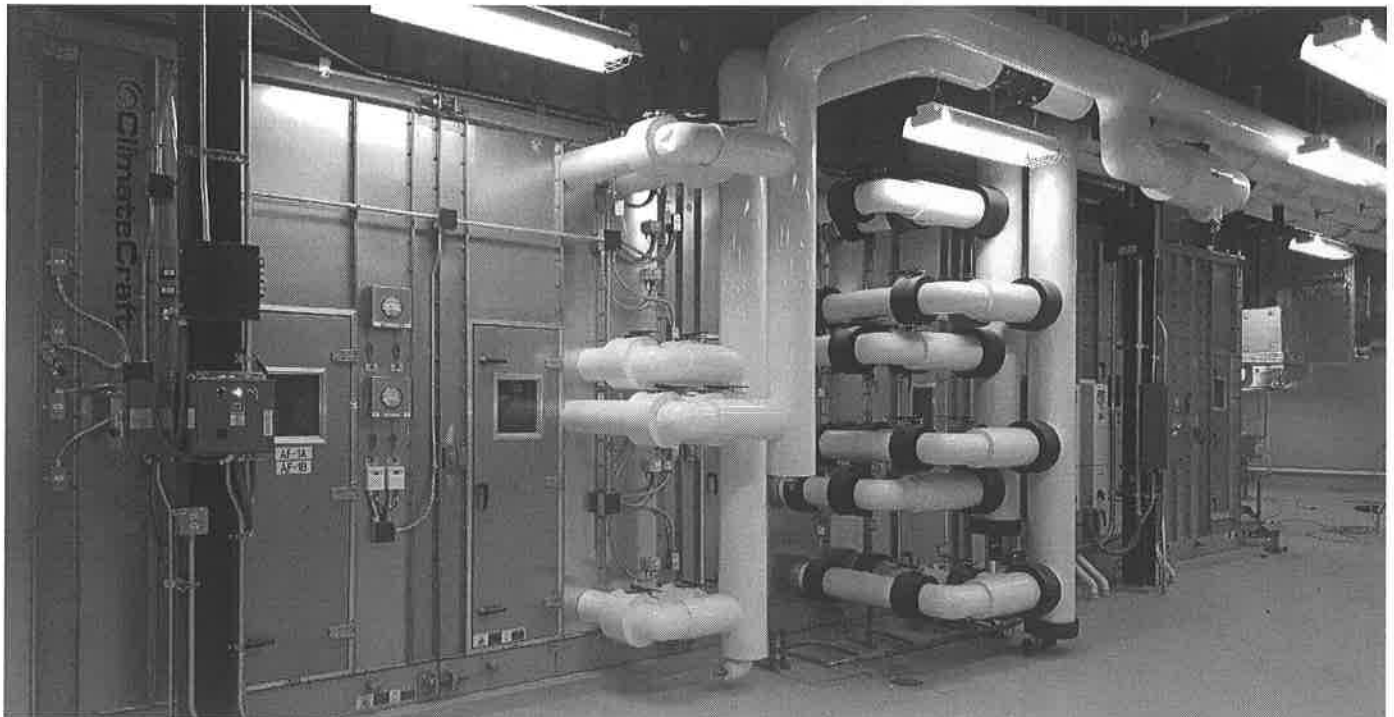
### Morristown Site:

- New front-end central building automation system (Alerton), including remote monitoring and control sites (this excludes any security-related control systems or interlocks)
- Six (6) indoor air handling units (AHUs)
  - Three (3) existing AHUs, three (3) new AHUs
- Six (6) new remote air-cooled condensing units
- Three (3) relief fans
- 18 New VAV boxes – test 18 of the 18 boxes
- Three (3) hot water boilers
- Two (2) stand-by fuel oil pumps – serve dual-fuel burners
- Three (3) power roof ventilators
- Six (6) destratification fans – all serve the gymnasium
- Three (3) primary hot water pumps
- Two (2) secondary hot water heating pumps
- One (1) existing kitchen exhaust hood
- Two (2) gas fired domestic water heaters
- One (1) domestic water mixing station with associated circulation pump
- One (1) domestic 120° circulation pump
- Review balancing of domestic recirculating loops and return back to water heaters
- 12 New unit heaters
- New baseboard radiation – located in the remodeled office area

- Miscellaneous BAS monitoring points
- Observe and validate hydronic system flushing, cleaning, filling of system, testing of water chemistry and glycol solution
- Demolition work

### Waterville Site:

- New front-end central building automation system (Alerton), including remote monitoring and control sites (this excludes any security-related control systems or interlocks)
- 12 Indoor AHUs
  - Eight (8) existing AHUs, four (4) new AHUs
- Nine (9) new remote air-cooled condensing units
- Two (2) new rooftop units with packaged DX cooling and heat recovery
- 23 New floor-set, vertical-type unit ventilators – future DX cooling provisions
- Nine (9) relief fans
- 23 New VAV boxes – test 23 of the 23 boxes
- 36 New dual duct boxes – test 36 of the 36 boxes
- Four (4) duct heating coils
- Three (3) hot water boilers
- Two (2) stand-by fuel oil pumps – serve dual-fuel burners
- Five (5) power roof ventilators
- One (1) utility set-type fan and science fume hood
- 10 Destratification fans – all serve the gymnasium
- Three (3) primary hot water pumps
- Two (2) secondary hot water heating pumps – Phase 2



- One (1) steam to water heat exchanger – installed under Phase 1, removed under Phase 2
- Two (2) hot water heating pumps – Phase 1 location near boiler room
- Two (2) tertiary heating pumps – relocated from heat exchanger under Phase 2
- One (1) existing kitchen exhaust hood
- Two (2) gas fired domestic water heaters
- One (1) domestic water mixing station with associated circulation pump
- One (1) domestic 120° circulation pump
- Review balancing of domestic recirculating loops and return back to water heaters
- 16 New unit heaters
- Existing unit heaters with new electric controls
- New and existing baseboard radiation
- Miscellaneous BAS monitoring points
- Observe and validate hydronic system flushing, cleaning, filling of system, testing of water chemistry and glycol solution
- Under Phase 1, observe and validate existing pneumatic systems and tubing are removed and tubing capped to allow systems that are remaining under this phase to remain functioning until Phase 2 work begins. Also,

under Phase 1, observe and validate newly installed HVAC equipment is functioning and controlled utilizing the new DDC front-end

- Demolition work

## Commissioning Tasks

The following tasks will be performed at each of the project sites:

### Construction & Acceptance Phases

1. Develop a Commissioning Plan (CxP). Update the CxP throughout the project. The CxP will identify members of the commissioning team, roles and responsibilities of each team member, the commissioning schedule, and provide a narrative of commissioning tasks. Review project schedule, and provide the construction team commissioning milestones and task durations for inclusion in the official project schedule.
2. Review all additional project information.
3. Review initial equipment submittals for the commissioned systems concurrent with the design team. Submittal review comments will be forwarded to the design team for consideration and official inclusion in their submittal review comments.
4. Perform construction site visits during each project. Two (2) will be performed at Morristown and four (4) at Waterville. During the site visits we anticipate the following tasks:
  - Review contractor progress on the construction checklists.
  - Review equipment and system installations for conformance to the construction documents, industry standards, manufacturer recommendations, and KFI experience. Document deficiencies on observation reports, and forward to the project team for review and action.
  - Conduct commissioning meetings to review progress on commissioning tasks (and provide agendas, minutes, etc.). We will coordinate site visits to coincide with regular construction meetings whenever possible to make best use of everyone's time. When we cannot attend construction meetings, we will review meeting minutes and provide comments where necessary.
5. Observe and validate hydronic system flushing, cleaning, filling of system, testing of water chemistry and glycol solution.
6. Collect and review all information needed to write detailed functional test procedures.
7. Review start-up plan from contractors (and provide comments), review start-up documentation for completeness and accuracy (and provide comments).



8. Execute an air side TAB review. KFI's review includes the following tasks:
  - Witness contractor procedures in the field.
  - Randomly sample up to 10% of TAB values in the field at the conclusion of TAB work.
  - Review the completed TAB report.
9. Develop detailed functional test procedures.
10. Validate Outside Air (OA) TAB Report information. KFI's review includes the following tasks:
  - Witness contractor procedures in the field.
  - Confirm minimum 100% OA flow rates.
  - Review the completed TAB report.
11. After reviewing and accepting the controls contractor self-testing (pre-functional testing) documents, KFI will witness contractor demonstration of the functional performance testing. Testing includes the following tasks:
  - Point-to-point verification (including sensor calibrations, input/output verification).
  - Review graphics for accuracy to systems, menu operability, links, and schematic accuracy.
  - Perform sequence testing through a combination of setpoint adjustments, trend reviews, and manual overrides.
  - Perform integrated systems testing.
12. Document functional test deficiencies on the Master Issue Tracking List and work with project team to ensure corrective actions are performed.
13. After written notification of correction, KFI will retest deficiencies. KFI considers one retest part of the normal scope of work. However, additional retests will be at the contractor's expense.
14. Execute a hydronic TAB review. KFI's review includes the following tasks:
  - Witness contractor procedures in the field.
  - Confirm minimum 100% OA flow rates.
  - Randomly sample up to 10% of TAB values in the field at the conclusion of TAB work.
15. Review the completed TAB report.
16. Review O&M manuals and provide comments to the project team. Review equipment warranty information provided in O&Ms.
17. Provide a final commissioning report in PDF format at the conclusion of the project:
  - Provide a summary of the commissioning process (including a summary of any open issues & associated documentation), a building/system description, review of the tasks executed, and a brief summary of the testing methods executed for future reference by the owner.
  - Include all commissioning documentation from the tasks identified above.

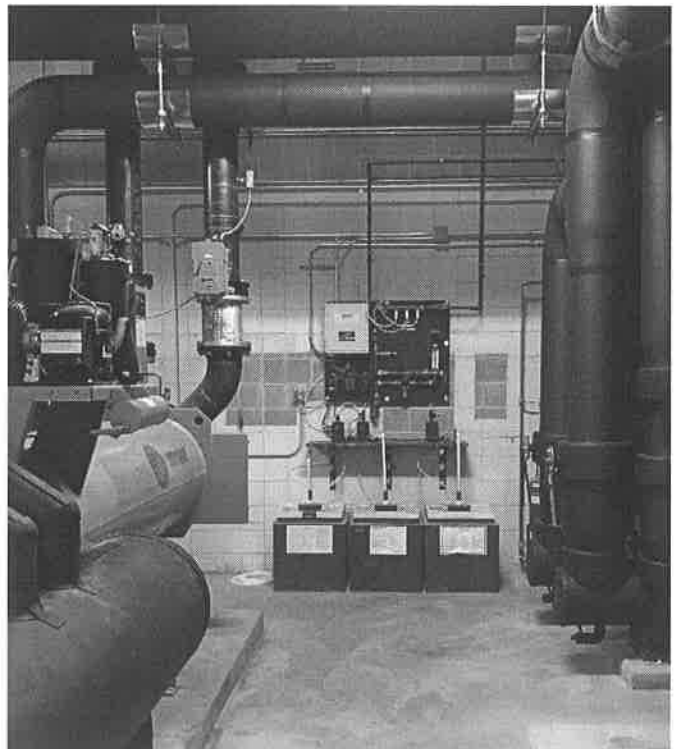
- Provide a summary of equipment deficiencies with regards to: performance/efficiency, executed documentation, and training.
- Provide recommendations for any of the systems.

**One Year Correction Period**

18. Supervise seasonal testing of HVAC systems to review sequence testing of equipment under appropriate loads in all seasons.
19. Conduct a warranty review walk-through with the design team and owner's staff during the one-year correction period.

**Clarifications**

1. KFI reserves the right to copy the Owner on all commissioning correspondence.
2. We have included one (1) review of equipment and controls submittals in our base fee. Review of resubmittals will be considered an additional service.
3. Distribution of commissioning related review comments, issues logs, and checklists will be through KFI's forms or web-tools. We have not included time for reformatting our documents into other software platforms.
4. KFI has included budget for one retesting trip to the site. Additional site visits for retesting due to contractor failure to contractor identified issues will be at the responsible contractor's expense.



## PROPOSED FEE

KFI will provide commissioning services described in the scope of work section for the base fee provided below. Direct and reimbursable costs are included in our base fee.

SCHOOL	PROPOSED FEE
Morristown Building	\$28,035
Waterville Building	\$65,415
<b>Total</b>	<b>\$93,450</b>