



# **SCHOOL BOARD ACTION REPORT**

**DATE:** March 6, 2019  
**FROM:** Denise Juneau, Superintendent  
**LEAD STAFF:** Fred Podesta, Chief Operations Officer  
206-252-0636, [fhpodesta@seattleschools.org](mailto:fhpodesta@seattleschools.org)

**For Introduction:** May 1, 2019  
**For Action:** May 15, 2019

## **1. TITLE**

BTA IV: Resolution 2018/19-23: Acceptance of the Building Commissioning Report for the Roxhill Elementary at E.C. Hughes School Modernization project

## **2. PURPOSE**

The purpose of this action is to accept the building commissioning report for the Roxhill Elementary at E.C. Hughes School Modernization project, in accordance with [WAC 392-344-165](#), as required to complete the Office of Superintendent of Public Instruction (OSPI) Form D-11 Application to Release Retainage. Approval of the resolution meets identified requirements.

## **3. RECOMMENDED MOTION**

I move that the School Board adopt Resolution 2018/19-23, accepting the building commissioning report for the Roxhill Elementary at E.C. Hughes School Modernization project.

## **4. BACKGROUND INFORMATION**

### **a. Background**

Commissioning is a systematic process of documentation and verification to demonstrate that the building mechanical and electrical systems have been installed and function properly and efficiently and can be maintained to operate and satisfy the engineer's design intent and the district's operational requirements. The commissioning consultant, Engineering Economics, Inc., has satisfactorily completed the commissioning process.

The district's Capital Projects Mechanical/Electrical Coordinator, Mike Kennedy, has been involved throughout the commissioning process concerning the Roxhill Elementary at E.C. Hughes School Modernization project located at 7740 34<sup>th</sup> Ave SW Seattle WA. Mr. Kennedy recommends the acceptance of this effort.

The Office of Superintendent of Public Instruction (OSPI), through the School Construction Assistance Program (SCAP), provides funding assistance to school districts that are undertaking a major new construction or modernization project. The primary documents that form the basis of any agreement between OSPI and the district are the "D-form" documents. These documents, when properly completed and signed by all

parties, form the official notices of agreement and intent on behalf of the district and OSPI.

As noted above, the acceptance of the commissioning report is required for Form D-11 for the release of construction retainage. Approval of this motion meets the requirements of OSPI to receive state funding assistance.

**b. Alternatives**

Not accepting this motion could put the district in a position subject to litigation and if state funding requirements are not met, the district will not receive state funding assistance that is available for this project. Therefore, this alternative is not recommended.

**c. Research**

- Office of Superintendent of Public Instruction, Form D-11 Application to Release Retainage
- Roxhill Elementary at E.C. Hughes School Modernization Commissioning Report, Engineering Economics, Inc.

**5. FISCAL IMPACT/REVENUE SOURCE**

Action helps to secure approximately \$2,000,000 million dollars in state funding assistance. This motion does not represent a specific expenditure.

Expenditure:  One-time  Annual  Multi-Year  N/A

Revenue:  One-time  Annual  Multi-Year  N/A

**6. COMMUNITY ENGAGEMENT**

With guidance from the District's Community Engagement tool, this action was determined to the following tier of community engagement:

Not applicable

Tier 1: Inform

Tier 2: Consult/Involve

Tier 3: Collaborate

The selection of projects in the BTA IV program went through an extensive community vetting process and ultimately received more than 72% approval from voters in February 2016.

**7. EQUITY ANALYSIS**

This motion was not put through the process of an equity analysis. The selection of projects in the BTA IV program was designed to provide equitable access to safe school facilities across the city.

**8. STUDENT BENEFIT**

This project helps ensure a safe, secure learning environment for every student.

**9. WHY BOARD ACTION IS NECESSARY**

- Amount of contract initial value or contract amendment exceeds \$250,000 (Policy No. 6220)
- Amount of grant exceeds \$250,000 in a single fiscal year (Policy No. 6114)
- Adopting, amending, or repealing a Board policy
- Formally accepting the completion of a public works project and closing out the contract
- Legal requirement for the School Board to take action on this matter
- Board Policy No. \_\_\_\_\_, [TITLE], provides the Board shall approve this item
- Other: OSPI requires Board acceptance of this report.

**10. POLICY IMPLICATION**

School Board approval of the commissioning report is consistent with Board Policy No. 6100, Revenues from Local, State and Federal Sources, which states “It is the policy of the Seattle School Board to pursue systematically those funding opportunities that are consistent with district priorities from federal, state and other governmental units, as well as from private and foundation sources,” and “The Board agrees to comply with all federal and state requirements that may be a condition for the receipt of federal or state funds...”.

**11. BOARD COMMITTEE RECOMMENDATION**

This motion was discussed at the Operations Committee meeting on April 18, 2019. The Committee reviewed the item and moved it forward to the full Board with a recommendation for approval.

**12. TIMELINE FOR IMPLEMENTATION**

Upon approval of this motion, the D-11 Application to Release Retainage will be completed and submitted to OSPI

**13. ATTACHMENTS**

- Commissioning Completion Letter dated, December 31, 2018, Engineering Economics, Inc. (for reference)
- Commissioning Report dated October 4, 2018 (Executive Summary attached, the full report is available in the Capital Projects and Planning Office)
- Resolution 2018/19-23 (for approval)



Engineering Economics, Inc.

1201 Western Avenue, Suite 325  
Seattle, Washington 98101

Telephone: 206.622.1001

## Memorandum

Date:	December 31, 2018	Project Name:	EC Hughes Elementary School
To:	Paul Wight, Seattle Public Schools 2445 Third Avenue South Seattle, WA 98134	Project #:	03-16305
From:	James Sommer, CCT	Subject:	Commissioning Completion

Dear Paul,

The purpose of this letter is to document the completion of the building commissioning process for the EC Hughes Elementary School project. EEI developed and executed a commissioning plan, including system functional testing that began in the Spring of 2018. Testing, issue troubleshooting, tracking and resolution continued into the winter of 2018.

The entire process was documented in a Commissioning Record document transmitted to SPS and dated 12/31/2018. Final resolution status for issues discovered, and details of test findings, are included in the report appendices.

With the exception of open EEI issues resolution log items, EEI recommends that Seattle Public Schools accept the commissioned building systems, including HVAC, lighting controls, and modifications to the building automation system.

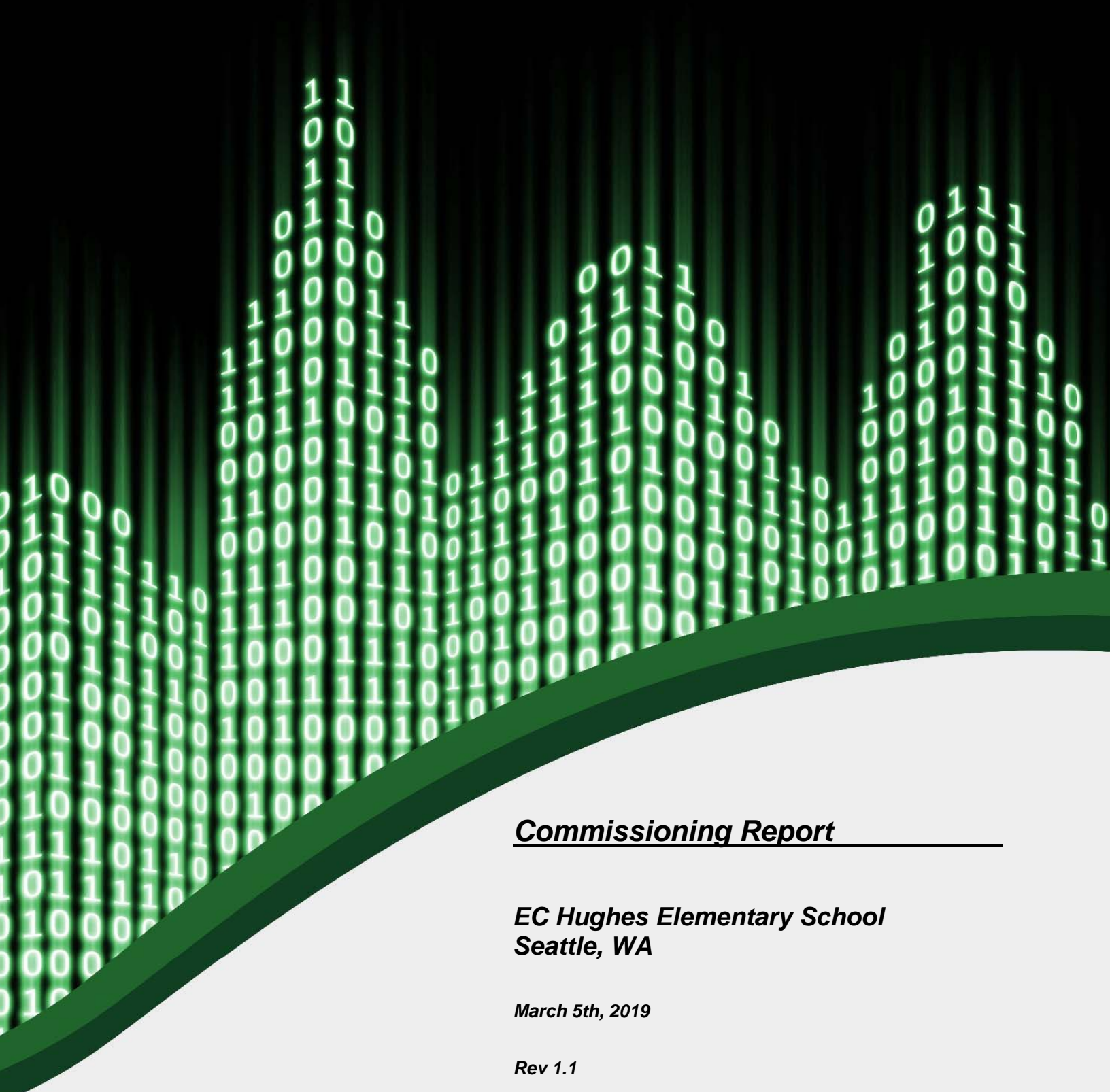
If there are any further questions or concern please let me know.

Sincerely,

**Engineering Economics, Inc.**

A handwritten signature in blue ink, appearing to read 'James Sommer', is written over a light blue horizontal line.

James Sommer, CCT



## **Commissioning Report**

### ***EC Hughes Elementary School Seattle, WA***

***March 5th, 2019***

***Rev 1.1***

***EEL Project #03-16305***



**Engineering Economics, Inc.**

1201 Western Avenue, Suite 325  
Seattle, Washington 98101  
206.622.1001

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**Requests for reproduction shall be addressed to:**

**Engineering Economics, Inc.  
780 Simms Street, Suite 210  
Golden, Colorado 80401  
(303) 239-8700**

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## LIST OF ABBREVIATIONS

A/E	Architect/Engineer
AFMS	Air Flow Measuring Station
AHU	Air Handling Unit
B	Boiler
BAS	Building Automation System
BMS	Building Management System
BoD	Basis of Design
Cx	Commissioning
CH	Chiller
CHW	Chilled Water
CW	Condenser Water
CFM	Cubic Feet Per Minute
CT	Cooling Tower
CUH	Cabinet Unit Heater
DAT	Discharge Air Temperature
°F or Deg. F	Degrees Fahrenheit
DHW	Domestic Hot Water
dP	Differential Pressure
EEI	Engineering Economics
EF	Exhaust Fan
ES	Elementary School
FCU	Fan Coil Unit
GPM	Gallons Per Minute
HEX	Heat Exchanger
HVAC	Heating, ventilating and air conditioning
HW	Hot Water
HHW	Heating Hot Water
In.W.C.or "w.c.	Inches of Water Column
LEED	Leadership in Energy and Environmental Design
MAT	Mixed Air Temperature
MUA or MAU	Make-up Air Unit
MEP	Mechanical, Electrical and Plumbing
MS	Middle School
O&M	Operations and Maintenance
OA	Outside Air
OAT	Outside Air Temperature
OPR	Owner's Project Requirements
PSI	Pounds per Square Inch
RAT	Return Air Temperature
RHC	Reheat Coil
RH	Relative Humidity
RF	Return Fan
SF	Supply Fan
SPS	Seattle Public School
TAB	Test, Adjust and Balance
UH	Unit Heater
UV	Unit Ventilator
VAV	Variable Air Volume
VFD	Variable Frequency Drive

## I. PROJECT DESCRIPTION

Engineering Economics (EEI) was hired to provide commissioning (Cx) services for the remodel of the EC Hughes Elementary School.

This project is modernizing the three-story 47,307 square-foot main building and adjacent portable classrooms to bring the building back into service for use as an Seattle Public School (SPS) elementary school. The upgrades, which consists of a complete remodel of the mechanical, electrical and plumbing systems are designed to accommodate the program needs of Roxhill Elementary School or similar populations. There are also some architectural changes.

The mechanical scope includes replacement of the central plant, all air handling units and all duct work. The plumbing scope includes complete replacement of all existing plumbing lines within the building and installing new fixtures throughout. The fire protection scope includes reconfiguring the existing system to put sprinkler lines above ceiling height. The electrical scope includes all new wiring, new lighting throughout, and new data and power to meet district technical standards and current codes. The architectural alterations include new windows on the south wall of the 1949 building, new exterior insulation in the 1949 and 1926 buildings, new finishes throughout, a teaching wall in each classroom, remodel of the 1926 building's first floor to include a new student restroom, and reconfigured administration space and specialists' offices.

## II. EXECUTIVE SUMMARY

This Final Commissioning Report contains an overview of the Cx process and results of the Cx program for EC Hughes Elementary School. Prominent among the Cx services provided was the witnessing of functional testing for all heating/cooling/ventilation equipment, domestic hot water and lighting control.

### A. Conclusions

Installation and operation of commissioned equipment is consistent with applicable contract documents and meets the intent of the Basis of Design. EEI did not validate equipment or items described in the BoD for non-commissioned equipment.

### B. Commissioning (Cx) Timeline

Design Development Review	11/2016
Construction Document Review	01/2017
Cx Specifications Submitted to Architect/Engineer (A/E)	01/2017
Mechanical, Electrical, Plumbing (MEP) Systems Start-up	03/2018 thru 06/2018
Testing, Adjusting and Balancing (TAB)	06/2018 thru 7/2018
Functional Testing	07/2018 thru 8/2018
100% Outside Air Flush	08/2018 to 08/2018
O&M Manual Review	08/2018 to 08/2018
Operator Training – Contractor Provided	08/2018 to 09/2018
10-Month Warranty Review Meeting	Tentatively Scheduled 05/2019

### C. Outstanding Issues & Recommendations

There are no outstanding commissioning issues for the EC Hughes project. Please see Appendix E for the completed issues resolution log.

### D. Observations & Summary of Major Issues

The commissioning of EC Hughes Elementary School was delayed from the original schedule which had commissioning completing in May of 2018. Mechanical/Electrical systems were slow to be installed/started-up and programmed which pushed the start of functional testing until late July 2018 impacting timely commissioning of the school.

Identified by EEI and resolved by the team include:

1. Installation: The installation of heating hot water system included a boiler management panel which controlled the boiler isolation valves. This caused an issue when the boilers cycles off because it also closed the isolation valves which dead headed the circulation pumps. The resolution was to have JCI control the isolation valves and let the circulation pumps even when the boilers were not enabled.
2. Programming: The BAS programming was found to have minor errors that were discovered during functional testing and required correction. Most of the errors discovered were conditions that would possibly not been seen for several months before being identified had it not been for commissioning. An example of this would be the morning warm-up modes for the air handling units.
3. Lighting Control/Controlled Receptacles: There were issues integrating the lighting controllers into the BAS. This took several visits from the lighting vendor and JCI to correct.

### E. Commissioning (Cx) Process Benefits

The Cx process for EC Hughes Elementary School has been beneficial for Seattle Public Schools. The Cx process identified numerous issues and concerns regarding the commissioned equipment. These concerns, identified in Section 4 of this report, were brought to the attention of the design and construction team through written reports. For each item, an observation and recommendation was prepared. The design and construction teams worked together to address issues when they were identified and few outstanding items remain.

Benefits delivered to the Seattle School District by EEI include increased occupant comfort, a higher level of confidence that building equipment and controls are operating correctly, and increased energy savings compared to a similar project without successful commissioning.

### III. DESIGN PHASE ACTIVITIES

#### A. Construction Document Review

1. Plans and specifications dated: Construction Document Permit Set 09.28.16.
2. Representative Comments:
  - a. Stair S5 – Delete return air grills in the stairwell and use supply grills for pressurization.
  - b. Recommend moving supply duct in Office 123 to a side wall diffuser.
  - c. Heating Hot Water System Sequence – Recommend resetting heating hot water supply temperature set point based on building conditions rather than outside air temperature.
  - d. Fin Tube Radiator Schedule – Minimum a circuit setter can do is approximately 0.5 gpm. Pump will need to be sized accordingly.
  - e. Fin Tube Radiator Schedule – Recommend using 1/2" branch connection instead of 3/4" for low flow radiators.
  - f. Solenoid valve (SV-1) appears to shut off gas for the boilers in boiler room 030 and the water heaters in mechanical 031. Where will the EPO switch be located? Recommend adding signage to let operator know that EPO effects equipment in an additional zone other than boiler rooms.

#### **IV. CONSTRUCTION PHASE ACTIVITIES**

A. Submittal Review Process:

EEl was involved with the submittal review process of the following:

1. Div 22 & 23 Submittal Package Review
2. Lighting Controls
3. Various Div 26, 27 & 28 Sections

B. Job Site Observation

EEl performed site walks and general site observations over the duration of the project. Some of these visits were documented in PCRs while others were verbally discussed with the team.

C. History of Deficiencies and Resolution

See the Cx Issue Resolution Log found in Appendix E for complete information regarding the history and resolution of issues discovered during field testing.

## **V. ACCEPTANCE PHASE ACTIVITIES**

### **A. Pre-functional Tests**

As part of the field commissioning process, prior to executing functional tests for any given commissioned system, EEI reviewed for completeness all relevant pre-functional and startup documentation completed by subcontractors, vendors, and manufacturers.

### **B. Functional Performance Tests**

EEI developed and observed execution of functional tests for all commissioned systems. See Appendix G for detailed results of testing.

### **C. Building Systems Performance**

Extensive discussion of building system performance test results and evaluation are included in the notes for functional performance test reports (see Appendix G), as well as in the descriptions, recommendations, and notes for items included on the Cx Issue Resolution Log (see Appendix E).

## VI. CLOSE-OUT ACTIVITIES

### A. O&M Manual Documentation Review

EEl reviewed the O&M manual documentation for systems that were commissioned. EEl did not take any exception to the documents that were submitted.

### B. Training Program Evaluation

EEl reviewed and discussed the general contractor's detailed training schedule for various building systems, and EEl has verified that training for commissioned systems was completed to the satisfaction of the Owner.

### C. Systems Manual

EEl has created a Systems Manual. The Systems Manual is intended to be used by maintenance personnel as a supplement to the information contained in the O&M data. It includes the following information:

1. System Description
2. Operating Set Points
3. BAS Screen Shots
4. Recommended schedule for retesting of commissioned system
5. Recommended schedule for recalibration of sensors and actuators.

### D. 10-Month Warranty Review Meeting

EEl is tentatively scheduled to meet with SPS and the controls contractor in May of 2019 to discuss EC Hughes Elementary School project.

## **VII. CONCLUSION**

While the commissioning of EC Hughes Elementary School got a late start due to the GC construction schedule slippage, the end result is a beautiful school with functioning mechanical and electrical systems. EEI enjoys working with the School District's facilities department and appreciate all of the effort they put into the construction projects we work on with them. They are knowledgeable in the District's standards and their ability to make decisions and give direction for issues that are identified allows the contractor to proceed with construction and makes the commissioning program work smoothly.

We enjoy working with SPS and having an impact on the final buildings that the district will utilize. EEI looks forward to working with the School District on future projects.

## **VIII. POST OCCUPANCY REPORT AMENDMENT**

Following the pending post-occupancy (10 month review) review meeting, EEI will issue a project final status report that should be inserted here.



**Seattle School District #1  
Board Resolution**

**Resolution No. 2018/19-23**



**A RESOLUTION** of the Board of Directors of Seattle School District No. 1, King County, Seattle, Washington accepting the Building Commissioning Report by Engineering Economics Incorporated for the BTA IV Program, Roxhill Elementary at E.C. Hughes School Modernization Project as part of OSPI D-11 Application to Release Retainage.

**WHEREAS**, The Seattle School District Board of Directors has received the building commissioning report from Engineering Economics, Inc. regarding the Roxhill Elementary at E.C. Hughes School Modernization project; and

**WHEREAS**, it has been determined that the commissioning report is complete and the building is operating as the commissioning report states; and

**NOW THEREFORE, BE IT**

**RESOLVED**, that the Seattle School Board of Directors, in accordance with the provisions in WAC 392-344-165, accepts the commissioning report by Engineering Economics Incorporated for the BTA IV Program, Roxhill Elementary at E.C. Hughes School Modernization Project as part of the OSPI D-11 Application to Release Retainage; and

**RESOLVED**, that duly certified copies of this resolution shall be presented to the Office of Superintendent of Public Instruction.

ADOPTED this 15<sup>th</sup> day of May, 2019

\_\_\_\_\_  
Leslie Harris, President

\_\_\_\_\_  
Rick Burke, Vice-President

\_\_\_\_\_  
Zachary DeWolf, Member-at-Large

\_\_\_\_\_  
Jill Geary, Member

\_\_\_\_\_  
Eden Mack, Member

\_\_\_\_\_  
Betty Patu, Member

\_\_\_\_\_  
Scott Pinkham, Member

ATTEST: \_\_\_\_\_  
Ms. Denise Juneau, Superintendent  
Secretary, Board of Directors  
Seattle School District No. 1  
King County, WA