

Reinforced Autoclaved Aerated Concrete Assessment (Siporex) Report

Pineview Public School



Report Prepared for:
Upper District School Board
Request for Quotation #24-014

Report Prepared by:
Shoalts and Zaback Architects Ltd.
SZA Project #: 24028

Report Date: 2024-08-28



Reinforced Autoclaved Aerated Concrete Assessment (Siporex) Report

	Table of Contents	... 1
1.0	Introduction	... 2
2.0	Summary of Findings	... 3
3.0	Assumptions and Limitations of Report	... 4
	Appendix 1 – Reinforced Autoclaved Aerated Concrete Structural Assessment Report	
	Appendix 2 – Estimate Scope	
	Appendix 3 – Cost Management Report – Class D Estimate	
	Appendix 4 – Representative Images	

1.0 Introduction

In February 2024 The Upper Canada District School Board (UCDSB) issued Request for Quotation #24-014 for Architectural Services for the completion of Siporex Reports at multiple locations. The scope of the report was to include a visual inspection and recommendations by a Structural Engineer for a number of existing School Board Buildings that were known to contain Siporex elements.

Shoalts and Zaback Architects Ltd. (SZA) was hired by UCDSB in February 2024 to complete the reports. Their team of consultants included Eastern Engineering Group Inc. (Structural Engineers) and BTY Group (Quantity Surveyors) for this project.

To complete the assessment of the RAAC, the team reviewed existing documents that were provided by the UCDSB for the building and then visited the site and performed a visual inspection of exposed roof and floor area as well as a visual review of bearing walls and building facades.

Additional locations were also strategically selected to assess the floor or roof construction in areas that were concealed. This was typically completed by removing the acoustical ceiling tiles or viewing through access panels (installed by the UCDSB for this purpose) to visually review the in-situ construction.

The findings of the documents and on-site review have been summarized in the Reinforced Autoclaved Aerated Concrete Assessment Report in Appendix A.

The report includes a summary of recommendations for repair. These recommendations jointly with a summary of ancillary scope were used as the basis for preparing a Class D estimate of the cost to correct the deficiencies. The Class D Estimate is included in Appendix C.

The following report summarizes the findings and recommendations for **Pineview Public School**.

2.0 Summary of Findings

Upon completion of the assessment, it is noted that the damage observed in RAAC elements for Pineview Public School is found to be in poor condition and needs repair or replacement soon. Localized or total replacement of the roof slabs with a steel structure should be considered.

Repairs or partial replacement is likely not feasible due to the deterioration throughout the school. Structural replacement should be considered within 2 to 5 years.

In six locations of severe damage temporary shoring / hoarding should be installed immediately to protect against slab failure.

Immediate intervention is recommended.

Based on the repairs required and the associated work required to access and reinstate the areas of repair the estimated costs are as follows:

Estimate:	\$3,657,300
Permit Costs:	\$73,146
Professional Fees:	\$365,730
Total	\$4,096,176
Contingency (+/- 10%)	
Total Estimated Costs	\$4,506,000

Notes:

- 1) For detailed notes on the evaluation and the cost estimates see the reports included in the appendices.
- 2) Building Permit costs are estimated at 2% of the construction cost (to be confirmed for each municipality).
- 3) Professional Fees are estimated at 10% of the construction cost.
- 4) A 10% Contingency has been included for additional scope, UCDSB project management costs and adjustments to permits and fees.
- 5) Smaller projects are assumed to be grouped with other similar work for efficiency.

3.0 Assumptions and Limitations of Report

This report has been prepared based on the information that has been made available to Shoalts and Zaback Architects Ltd. (SZA) by The Upper Canada District School Board (UCDSB) and the conditions that were visible at the time of the assessments relating to this project and the additional resources that have been referenced as noted in the report.

This report focuses on the primary RAAC structural elements and the major elements of the buildings structural system. Although the building was visited and all identified areas of RAAC were viewed in the preparation of this report, a completely exhaustive survey of all elements of the building, has not been completed. Areas that were concealed or beyond the visible range from access panels have not been viewed. Additionally, the top surfaces of the RAAC that are concealed by flooring or roofing materials have not been viewed.

This report assumes that all other portions of the building structure are sound, unless noted otherwise. Other structural, architectural, mechanical or electrical systems have not been reviewed unless noted specifically.

The estimate has been prepared assuming that multiple repair projects will be tendered together in packages; that all construction work will be carried out during business hours and that all costs are prepared based on work being completed in August 2024. Escalation beyond this date has not been included.

**Appendix 1 – Reinforced Autoclaved Aerated Concrete
Structural Assessment Report**

REINFORCED AUTOCLAVED AERATED CONCRETE **ASSESSMENT REPORT**

Prepared by:

SZa Shoalts and Zaback Architects Ltd.
& Eastern Engineering Group Inc.

for:



PINEVIEW PUBLIC SCHOOL
8 GEORGE STREET
ATHENS, ON

Prepared by:
Eastern Engineering Group Inc.
Consulting Engineers

Final: August 22, 2024

TABLE OF CONTENTS

Executive Summary	Pg. 2
1.0 Background	Pg. 3-4
2.0 Methodology	Pg. 5
3.0 Observations	Pg. 6-7
4.0 Recommendations	Pg. 8
Assumptions and Limitations	Pg. 9

Appendix “A” – DAMAGE IDENTIFICATION PLAN

Appendix “B” – PHOTOGRAPHS

Appendix “C” – SAMPLE REPAIR DIAGRAMS

EXECUTIVE SUMMARY

In partnership with Shoalts and Zaback Architects; Eastern Engineering Group Inc. has completed detailed site investigations of reinforced autoclaved aerated concrete (RAAC) products at the Upper Canada District School Board property.

RAAC has been identified to be a problematic building material which can be at risk of structural defects and possible failure. The Ministry of Education has mandated that this product be identified and assessed in schools throughout the province of Ontario. Upper Canada District School Board (UCDSB) staff monthly inspects/monitors/observes for issues such as delamination, slab deflection, leaks, and cracks. If there are localized concerns or issues, the Board commissions a Structural Engineer to review and author a report. UCDSB staff monitor snow loads during winter months and removes snow if required. Within a 5-year interval UCDSB commissions a comprehensive Structural Engineer's review of all sites.

Eastern Engineering Group Inc. structural engineering consultants completed on site reviews to assess the RAAC products visually. Expertise with the product allowed us to provide findings and recommendations for repairs as required.

During the assessment, we were able to identify the intensity of physical damage to the RAAC as well as the type and likely causation of the damage. These findings were considered to develop recommendations

Pineview public school was found to have a limited quantity of RAAC products composing the roof slabs on the northern end of the building and main office. The damage was noted to these products to be severe in nature with replacement being recommended within 2 to 5 years with provisions for an extension of this timeframe through use of a continued monitoring program.

1.0 BACKGROUND

Reinforced autoclaved aerated concrete (RAAC) is a precast lightweight concrete building material generally used as slabs for roof and floor systems, and occasionally used in wall assemblies. The material has densities between 25 and 37 lbs per cubic foot (410kg/m^3 to 610kg/m^3). This is compared to 145pcf (2400kg/m^3) for normal density concrete. The material is manufactured in 24" (600mm) wide modules and has various thickness and span lengths. There is longitudinal steel reinforcement and cages present in the slabs. As a precast unit the slabs are placed on beams, joists and walls and the top key is filled with grout. These are typically anchored and installed during placement to fasten to beams and other supports using steel retainer clips. The product is manufactured by imparting gas bubbles into the material during mixing and then moulding the element. RAAC has good fire rating capabilities, is fire proof and has good insulating and sound transmissions projected.

Literature on RAAC provides limitations as follows:

- Do not use in areas of temperature over 150°F.
- In acidic atmosphere.
- In refrigeration or cooler building.
- In areas where excessive vibrations may occur.
- Area of high relative humidity.

Other printed limitations are that the cellular concrete body of the slab must be kept dry, and away from heavy concentrated moving or impact production loads. Purpose made hangers should be supplied to support items from the slabs or for openings. Various construction details are also provided by the applicable manufacturer. RAAC is presently not used in our area. The use of RAAC in schools and other buildings in Ontario has proven to have presented challenges over time. RAAC is no longer regularly used in construction and is not commonly available.

Historical issues with RAAC include:

1. Degradation from freeze/thaw when the material becomes wet.
2. Damage from impact.
3. Deflection of slabs on long unsupported span slabs.
4. Deflection or creep can be destructive when one slab is able to move, and the adjacent slab cannot. This can result in grout being dislodged from between the joints.
5. Fasteners in RAAC can become loose and dislodged resulting in sagging or falling fixtures. New ceilings, fixtures and services must be supported independent of the RAAC slabs.
6. During re-roofing operations, large chunks of RAAC may come off with roofing materials because the asphalt base coat adhered to the RAAC slab.
7. Chipping or spalling of the RAAC slab is likely when impact is experienced.

Generally, if RAAC is kept dry and is supported at short span distances with OWSJ or other methods, it will continue to perform in an acceptable manner. Many institutions have implemented projects to install supports to reduce the span of the RAAC slabs.

The useful life of RAAC is considered to be shorter than other materials including steel, concrete and engineered wood. Although it is difficult to quantify the exact loss of useful life in RAAC slabs, it can be assumed that RAAC would require replacement sooner than other building materials.

2.0 METHODOLOGY

To complete our assessment, we performed a visual inspection of exposed roof and floor area as well as a visual review of bearing walls and building facades. Previous assessments and maps of identified known locations of RAAC throughout the schools under review were provided to complete this report.

To complete our review, we identified parts of the building that would represent different periods of construction and additions. We then strategically selected locations to assess the floor or roof construction in these areas. This was typically completed by removing the acoustical ceiling tiles to visually review the in-situ construction. Inspection port locations were determined based on multiple factors as listed below:

- Interference of visual review by mechanical systems and utilities
- Multiple layers of ceiling structures or no suspended ceilings being present.
- Brightness of the space
- Similar construction methods and periods of construction.
- General professional experience with RAAC products

The structure was assessed on average in intervals ranging from 15'-0" (4.5m) to 15'-0" (4.5m), with identified damages and congested areas being more frequently exposed for assessment. It is our opinion that this represented a reasonable sample size to accurately describe the construction type of the buildings. In locations that were concealed, access hatches were installed to visually access the condition of the RAAC.

During the review, any assessed damage would be visually assessed for parameters, photographed, and noted on the identification chart. Where typical damage was encountered, these parameters were identified, and the approximate limits noted on the identification plan.

We did not assess the RAAC from the top due to flooring or roofing being in place.

3.0 OBSERVATIONS

Findings have been categorized based on risk factors. Severe damage at risk of structural failure is noted as high risk with minor damage noted as low risk. RAAC building elements in good condition have not been categorized.

HIGH:

There is an inanimate risk or existing structural failure of an RAAC building element. Failure has or can result in a reduction in structural performance of the building element. Repair or replacement is of high priority. Damage identified in this category should be remediated within 1 year and assessed more directly by a qualified professional engineer practicing in the field of structural engineering. If repairs cannot be completed in a timely fashion, additional measures such as restricting access to areas or temporary shoring may be feasible if advised by the structural engineer.

MID:

There is a low to moderate risk of structural failure of an RAAC building element. The damage is likely to lead to future reduction in structural performance of the building element. The damage has propagated resulting in repair or replacement as a moderate priority. Damage identified in this category should be remediated within 2 to 5 years and assessed by a qualified professional engineer practicing in the field of structural engineering as part of the recommended monitoring program for further recommendations.

LOW:

There is low risk that the damage will result in structural failure of an RAAC building element. The damage has not resulted in a reduction in structural performance of the building element. The damage is unlikely to propagate resulting in repair or replacement being a lower priority. Damage identified in this category should be remediated within 5 to 10 years and assessed by a qualified professional engineer practicing in the field of structural engineering as part of the recommended monitoring program for further recommendations. Repairs are more likely able to be deferred if the monitoring program identifies the deterioration rates have not progressed.

The below table is a summary of our findings and description:

PINEVIEW PUBLIC SCHOOL			
RAAC DAMAGE DESCRIPTION	PROBABLE SOURCE	OBSERVATION FREQUENCY	RISK IDENTIFIER
LONGITUDINAL CRACKS	Deflection, Overloading	Localized	HIGH
SHEAR CRACKS	Overloading, inadequate bearing	Localized	HIGH
CHIPS/GOUGES	Direct Fasteners, Exposure	Common	HIGH
SPALLING	Vibration, aging	Common	HIGH
TRANSLATION/SHIFTING	Lateral Loading, Missing/Failed Retainer clips	Sporadic	MID
MOISTURE DAMAGE	Roof leak, Mechanical service leak	Localized	LOW
GROUT LOSS	Vibration, aging	Sporadic	MID
MISUSE	Improper hardware use. Careless construction practices	Localized	MID

This chart identifies severity of damage noted on the identification map in Appendix A.

4.0 RECOMMENDATIONS

Upon completion of our assessment, it is our opinion that the damage observed in RAAC elements for the location identified in this report is found to be in poor condition and needs repair or replacement soon. Localized replacement or total replacement of the floor and or roof slab should be considered. Due to the nature of the RACC being a lightweight product replacement with steel structure or a combination of composite steel and concrete is recommended. Repairs and or replacement shall be designed to ensure that the supporting structure is not negatively impacted by the proposed construction. Connections and laterally shear flow and stability need be considered when completing large scale replacements. Repairs of this magnitude would include removal of most or all finishes such as ceiling, roofing, and flooring as applicable. Intervention should be considered in a timely manner.

The most severe damage observed included delamination of approximately 30% of the slab, transverse and longitudinal cracking in the slabs pose a risk for structural failure. We would advise for the installation of temporary hoarding to protect against slab failure at these locations (6 areas identified). We recommend immediate intervention to ensure the safety of building occupants.

Due to the extensive limits of damage and the evidence that slab replacement has been necessary in the past, it is our opinion that the roof slabs should be replaced with structural steel framework and metal deck with the RAAC slabs removed from the building.

Localized repair is not a feasible solution as the damage is extensive throughout the limit of the RAAC elements.

ASSUMPTIONS AND LIMITATIONS

This report includes the following assumptions and limitations:

- .1 The major structural construction elements of the buildings structural systems have been included in this report in locations where RAAC is present. Primarily to identify their interactions with the RAAC structural building elements.
- .2 Minor components and building services, such as partition framing, ceilings and similar secondary elements are assumed to be part of the building fabric and have not been included in this report. They are expected to have a normal life, which is not concurrent with the life of the building.
- .3 Excavations were not completed to assess foundations. Similarly non-destructive visual inspections were completed, no removal of fixed finishes was performed to complete the assessment.
- .4 The nature of the investigation was limited to strategically located inspection points under the opinion of the structural engineer. It was not feasible to investigate the entire area of the building in detail to obtain our opinion of the condition of the roof structure and its components.

This report has been authored by:

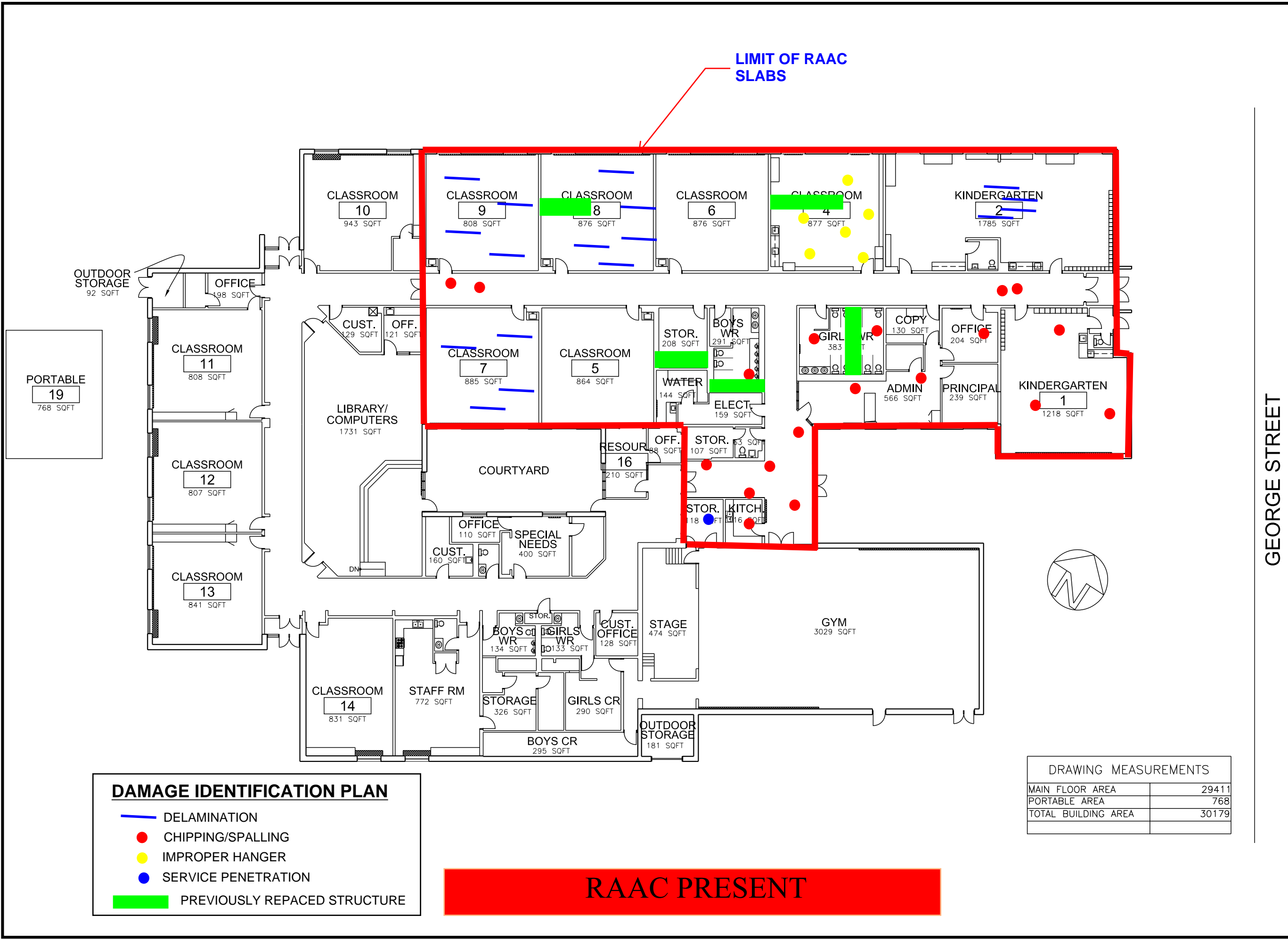


A handwritten signature in blue ink, appearing to read "B. Campbell", written over a horizontal line.

Brandon Campbell, P.Eng.
Eastern Engineering Group Inc.
Consulting Engineers
August 22, 2024

APPENDIX “A”

DAMAGE IDENTIFICATION PLAN



GEORGE STREET

DATE	No.	REVISION

THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK. THIS DRAWING IS NOT TO BE SCALED.

designed by	XX	scale	N.T.S.
drawn by	XX	job no.	XXXXX
checked by		drawing no.	
approved by			
dole	SEP 29 2015		

OWNER
UPPER CANADA DISTRICT SCHOOL BOARD

PROJECT
PINEVIEW PUBLIC SCHOOL

ATHENS ONTARIO

TITLE

FLOOR PLAN

1



APPENDIX “B”
PHOTOGRAPHS



Improper Fixture Installation



Spalling Edges



Spalling Edges



Surface Mount Services



Chipping and Spalling



Delamination at Edges



Improper Hangers/Chipping



Improper Hangers/Chipping



Previous Repair with Grouting



Chipping of Slab



Delamination of Slab



Chipping around Hanger



Chipping around Hanger



Delamination of Slab



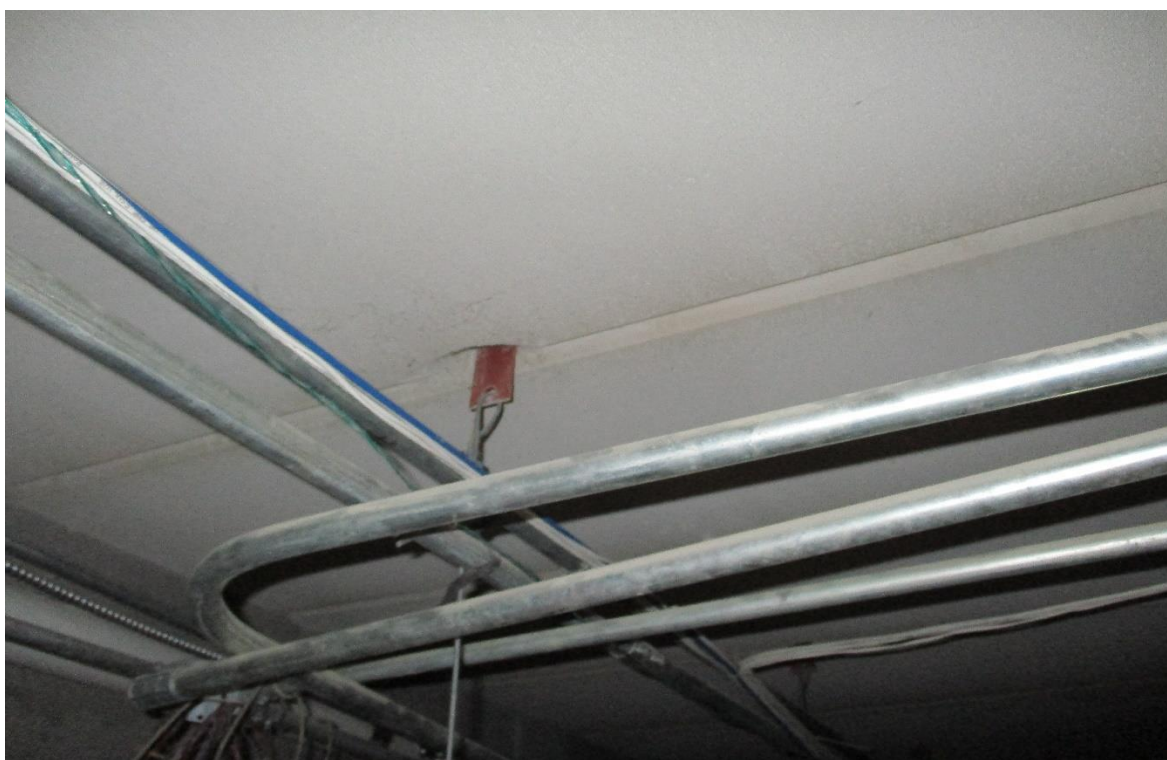
Improper Hanger



Large Gouge around Hanger



Chipping around Hanger



Chipping around Hanger



Gouging of Surface



Delamination/Missing Grout



Chipping around Replacement



Chipping around Replacement



Replaced Slabs



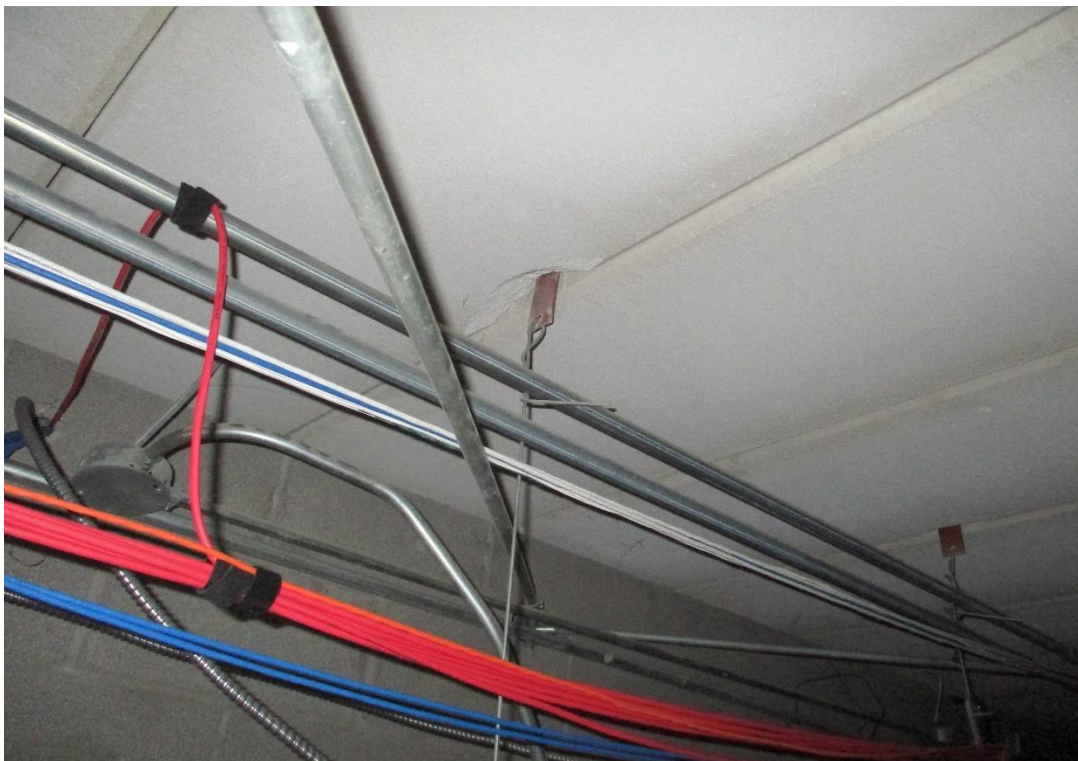
Improper Drain Penetration



Large Surface Delamination



Large Surface Delamination



Large Surface Chipping



Large Surface Chipping



Large Surface Delamination



Large Surface Chipping



Chipping around Hanger



Chipping around Hanger



Delamination of Slabs



Delamination of Slabs



Chipping of Slabs



Missing Grout



Delamination of Slabs



Delamination of Slabs



Delamination of Slabs



Delamination of Slabs



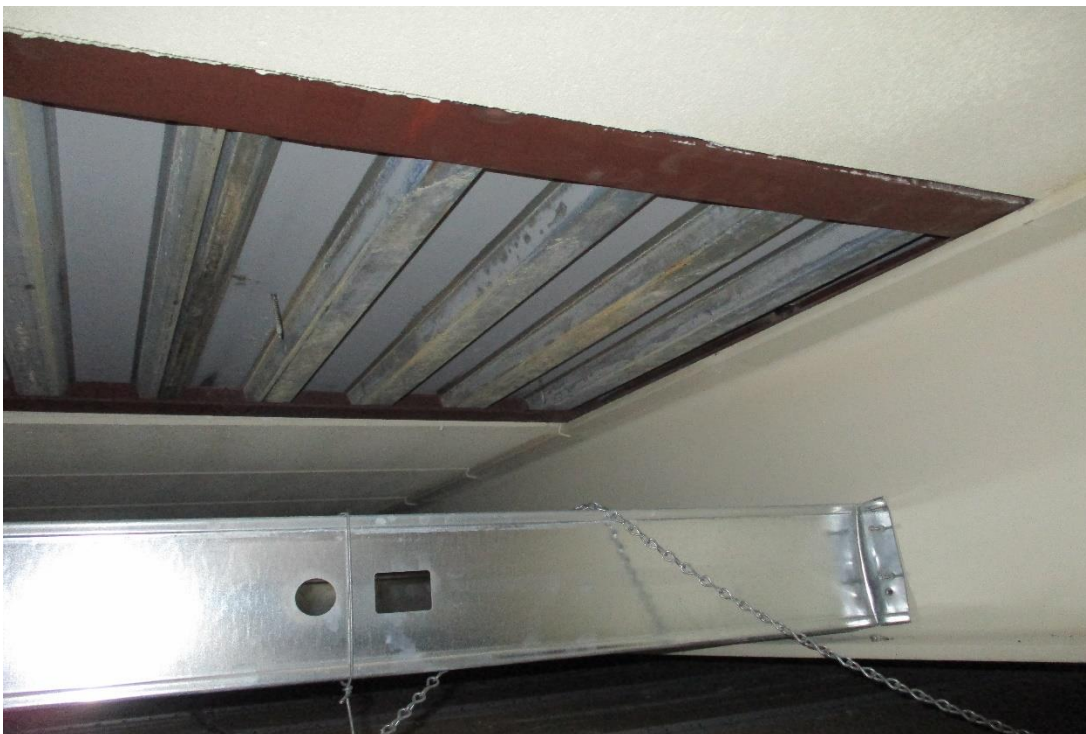
Delamination of Slabs



Delamination of Slabs



Missing Grout



Sample of Replaced Slab



Chipping and Spalling



Missing Grout



Delamination



Delamination/Missing Grout



Delamination



Delamination



Chipping and Gouging



Chipping and Gouging



Chipping and Gouging



Chipping and Gouging



Improper Hanger



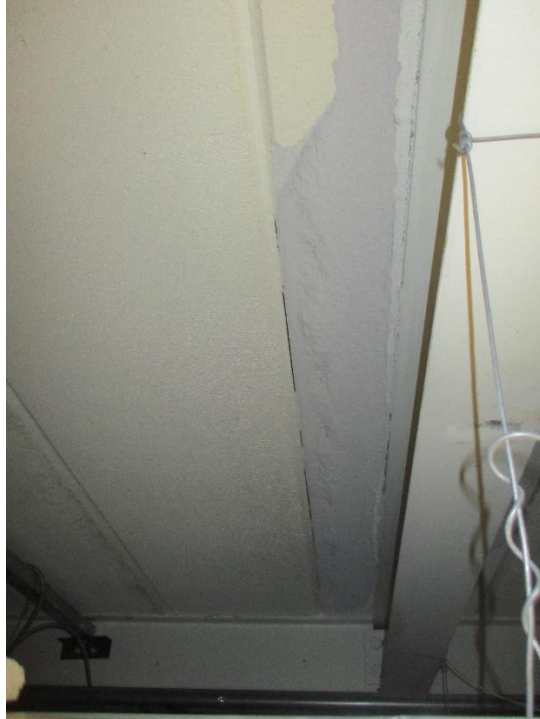
Improper Hanger



Missing Grout



Chipping around Replacement



Large Surface Delamination



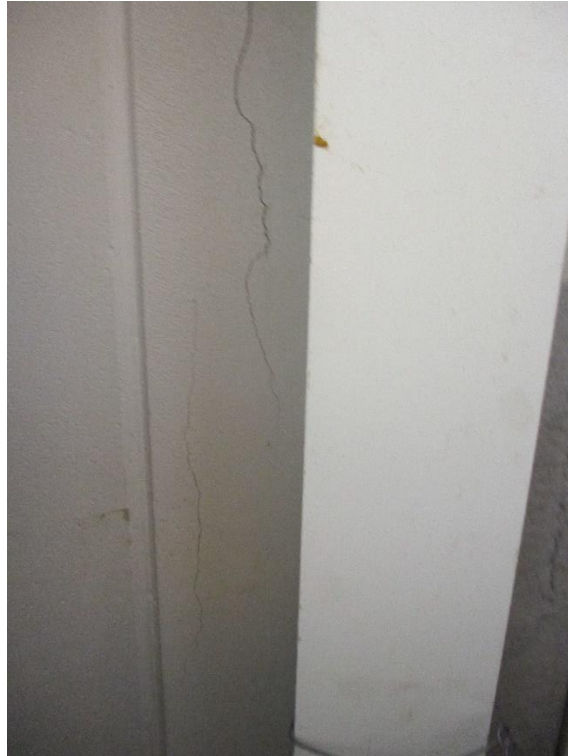
Large Surface Delamination



Severe Longitudinal Crack



Severe Delamination and Cracking



Severe Longitudinal Cracking



Chipping and Gouging



Improper Hanger



Improper Service Penetration



Improper Hanger



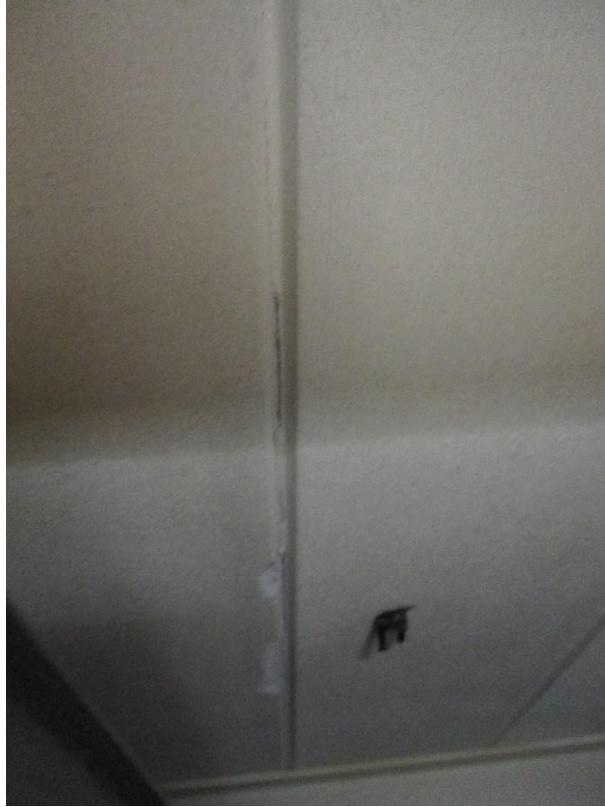
Slab Replaced



Chipping around Replaced Slab



Delamination



Delaminated Edges



Delamination at Edges



Previous Repaired Grout



Chipping and Spalling



Chipped at Hanger



Spalled Edges



Spalled Edges



Roof Drain Penetration Not Framed

APPENDIX “C”
SAMPLE REPAIR DIAGRAMS

N/A

Appendix 2 – Estimate Scope

In the provision of an assessment of the condition of existing Siporex panels in various schools for the UCDSB a cost estimate of the work required to repair areas of concern has been prepared. Below is a summary of work required because of items identified in the structural report.

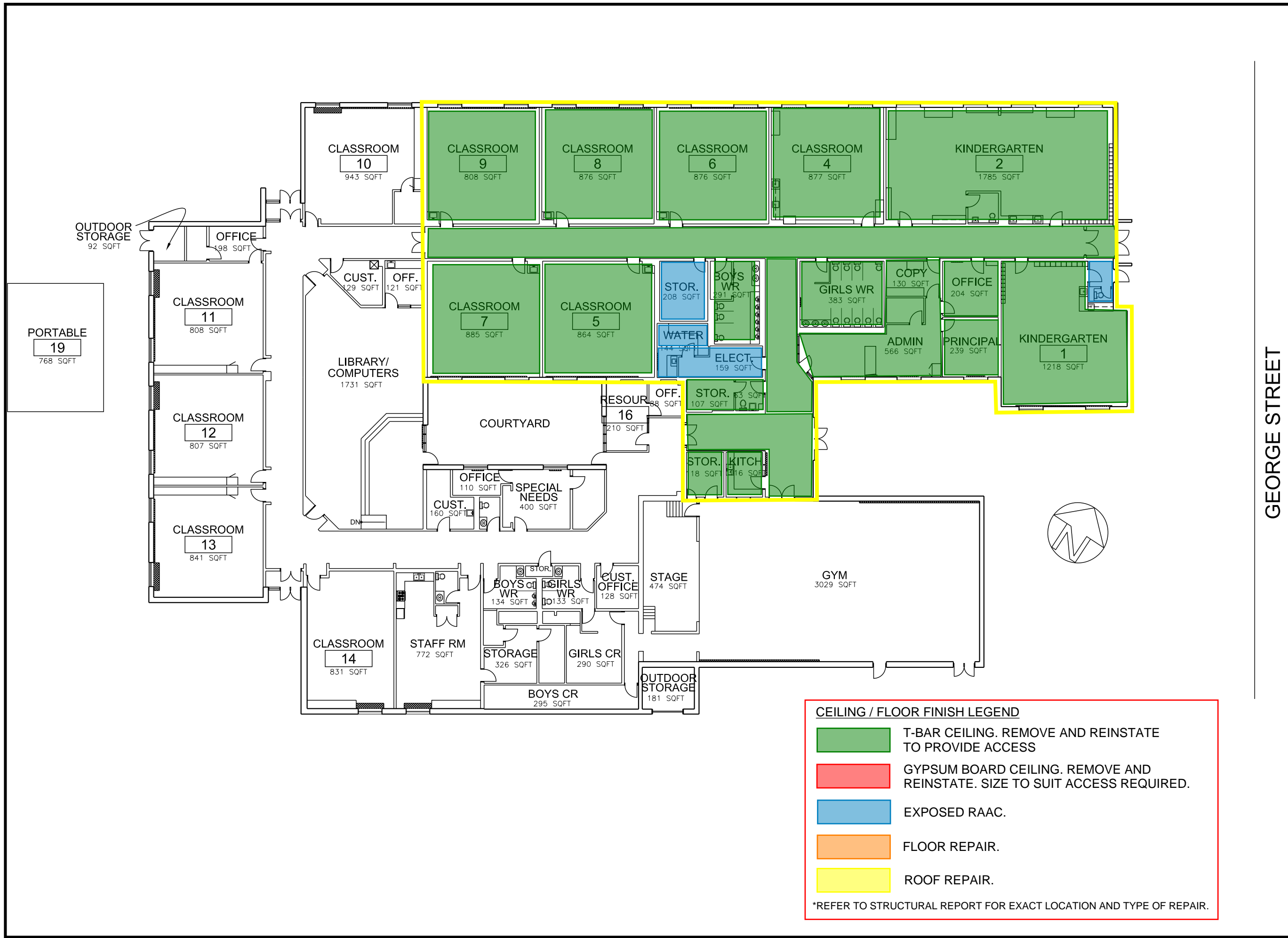
Division 0 - Procurement and Contracting Requirements	The project will be tendered to a list of prequalified Contractors. The work will be completed during the summer months when the school is closed. The contract will be a CCDC 2 – Fixed Sum.
Division 1 - General Conditions	The Contractor will be required for cleaning at all stages of the work. The Contractor will be required to engineer and supply any required temporary shoring. The Contractor will be required to remove all debris from the site. The Contractor will provide shipping containers for the temporary storage of all materials in rooms where slabs are to be replaced. All materials are to be relocated to the shipping containers. Small items will be boxed by the school ready for storage.
Division 2 - Existing Conditions	The Contractor will be required to remove all materials as outlined below and in the structural report.
Division 3 - Concrete	Install bearing plates in existing concrete block walls to support new structural steel members.
Division 4 - Masonry	Modifications to existing concrete block walls to support new steel members.
Division 5 - Metals	Install new structural steel roofing members and metal deck.

Upper Canada District School Board
Siporex Report
Pineview Public School

Division 6 - Woods, Plastics and Composites	Supply and install new wood blocking for parapets and roof curbs etc.
Division 7 - Thermal and Moisture Protection	Remove and replace 2-ply modified bitumen roofing over area of slab replacement.
Division 9 - Finishes	Remove exiting T-bar ceilings. Install new at completion of work. Paint sections of exposed new structure and repaint existing walls.
Division 10 – Specialties	Remove and replace ceiling hung toilet partitions. Replace washroom accessories from partitions.
Division 22 - Plumbing	Remove and replace services (water supply lines, roof drains, etc.) as required at the location of slab replacement.
Division 23 - Heating, Ventilating and Air Conditioning	Remove and replace services (duct work, HVAC units, controls, etc.) as required at the location of slab replacement.
Division 26 - Electrical	Remove and replace services (power, lighting, etc.) as required at the location of slab replacement.
Division 27 – Communication	Remove and replace services (data, communications, controls, etc.) as required at the location of slab replacement.

The following Divisions have not been included as there is no work anticipated:

Division 8 – Openings; **Division 10 –** Specialties; **Division 11 –** Equipment; **Division 12 –** Furnishings; **Division 14 –** Conveying Systems; **Division 21 –** Fire Suppression; **Division 25 –** Integrated Automation; **Division 31 –** Earthwork;



GEORGE STREET

DATE	No.	REVISION

THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK. THIS DRAWING IS NOT TO BE SCALED.

designed by	XX	scale	N.T.S.
drawn by	XX	job no.	XXXXX
checked by		drawing no.	
approved by			
dole	SEP 29 2015		

OWNER
UPPER CANADA DISTRICT SCHOOL BOARD

PROJECT
PINEVIEW PUBLIC SCHOOL

ATHENS ONTARIO

TITLE

FLOOR PLAN

1



Appendix 3 – Cost Management Report – Class D Estimate

The following Cost Management Report – Class D Estimate has been prepared for this project by BTW Group.



COST MANAGEMENT REPORT

Pineview PS Class D Estimate

REPORT NUMBER 1.1
AUGUST 23, 2024

PREPARED FOR:
Shoalts and Zaback Architects Ltd

127 John St, Toronto, ON M5V 2E2
T 416-596-9339



Contents

1.0	Introduction	1
2.0	Executive Summary	2
3.0	Development Cost Summary	3
4.0	Basis & Assumptions	3
5.0	Exclusions	4
6.0	Construction Cost Summary	5
7.0	Areas	6
8.0	Taxes	6
9.0	Project Schedule & Escalation	6
10.0	Pricing	7
11.0	Risk Mitigation	7
12.0	Contingencies	7
13.0	Documents Reviewed	8

APPENDICES:

APPENDIX I	Elemental Summary	2 pages
APPENDIX II	Limit of Work Area	1 page

Prepared By	Reviewed By	Date
Chido Madamombe	David Twiddy	8/23/2024



1.0 Introduction

1.1 Instructions Received

This report has been prepared by BTY Group (“BTY”) at the request of Shoalts and Zaback Architects Ltd (the “Client”).

Shoalts and Zaback Architects Ltd has appointed BTY to provide a Class D estimate developed for the project at Pineview PS, 8 George Street, Athens, Ontario (the “Project”). The Project will be delivered using a Stipulated Price Contract construction model and, therefore, BTY strongly recommends that estimates are prepared at each of the key design milestones. This report has been prepared in accordance with the scope of our Fee Proposal, dated February 13, 2024, which was prepared in response to the email request dated February 7, 2024, and is subject to the terms of that appointment.

Information related to the Project for the purposes of this report was received by BTY on July 03, 2024, and July 09, 2024. Please refer to Section 13.0 for a list of information received in producing this report.

1.2 Report Reliance

This Report is owned by BTY Group, and it is provided for the benefit and sole reliance of the Client. BTY Group, its directors, staff, or agents do not make any express or implied representation or warranty whatsoever as to the factual accuracy of the information provided to us on behalf the Client, its subcontractors or agents, upon which this Report is based. This Report contains confidential, proprietary information and related intellectual property rights of BTY Group which is licensed on a non-exclusive and limited basis to the Client and the Report may not be reproduced, transferred, copied, shared, or distributed, in whole or in part, to any party, without the express prior written permission of BTY Group.

1.3 Reporting Qualifications

This Report has been prepared based on information provided to us by the Client up to the date of issue of this Report. BTY Group does not accept any liability or accountability for information that has not been provided, or made available to us, at the time of preparing this Report. Any advice, opinions, or recommendations within this Report should be read and relied upon only in the context of the report as a whole. The contents do not provide legal, insurance or tax advice or opinion. Opinions in this report do not an advocate for any party and if called upon to give oral or written testimony it will be given on the same assumption.

1.4 Contacts

Should you have any queries regarding the content of this report, please do not hesitate to contact either of the following:

Chido Madamombe
Senior Cost Consultant
Tel: 613-769-0615
Email: chidomadamombe@bty.com

David Twiddy
Associate Director
Tel: 647-497-6620
Email: davidtwiddy@bty.com



2.0 Executive Summary

2.1 Report Purpose

The purpose of this report is to provide a realistic estimate of the Project cost based on the information available at the time of writing.

The opinion expressed in this report has been prepared without the benefit of detailed architectural, structural, civil, landscaping, mechanical, electrical, or processing system drawings and should, therefore, be considered a Concept Design (Class D) estimate. Based on the documents reviewed, our estimate should be correct within a range of approximately +/- 15% to 20%.

In order to provide an accurate cost estimate for the Project, BTY Group strongly recommends that a professional Quantity Surveying organization, such as BTY Group, be retained to provide a detailed analysis of any design information produced on behalf of the Client during the remaining stages of design.

2.2 Project Background and Description

The proposed project consists of a restoration to an existing roofing system known as Reinforced Autoclaved Aerated Concrete (RAAC), that is being used as a roof structure to a school.

Additional associated scope regarding ceiling finishes and existing mechanical and electrical systems will need to be considered as information is developed and becomes available.

2.3 Project Overview

Construction Budget Status		Details	
Current Estimate		\$3,657,300	
Current Cost		\$2,774.89 /m ²	\$258 /ft ²
Project Specifics			
Limit of Work		1,318 m ²	14,187 ft ²
Construction Start		September-2024	
Construction Completion		February-2025	
Duration		6 months	
Escalation		2.22%	
Design Contingency		15.00%	
Construction Contingency		20.00%	

3.0 Development Cost Summary

The current estimated cost of the project may be summarized as follows:

	Item	Estimated Costs (\$)
A	Land Cost (Excluded)	0
B	Construction	2,592,800
C	Contingencies	985,200
D	Professional Fees (Excluded)	0
E	Municipal & Connection Fees (Excluded)	0
F	Management & Overhead (Excluded)	0
G	Project Contingency (Excluded)	0
H	Furnishing, Fittings & Equipment (Excluded)	0
I	Financing Costs (Excluded)	0
J	Harmonized Sales Tax (Excluded)	0
Total Project Cost (August, 2024 Dollars)		\$3,578,000
K	Escalation (2.22%)	79,300
Escalated Project Cost (February, 2025 Dollars)		\$3,657,300

Please note that, where zero-dollar values are stated, BTY has excluded these costs and the values should be carried in a separate budget (if applicable).

4.0 Basis & Assumptions

The construction estimate is based on the following list of assumptions:

1. Foundations are sound and do not require repair or modification
2. No dewatering is required
3. RAAC Slab will be replaced
4. Existing ceiling finishes will be replaced
5. Existing supporting walls can sustain additional loading from new framing
6. Existing supporting walls will require new structural bracing
7. Existing roof framing will require structural modifications
8. To facilitate replacement, removal and replacement of services is required
9. Removal of RAAC panel requires access from exterior roof side
10. New roofing is required to complete panel replacement
11. Multiple school repair projects will be tendered as packages

Please note that BTY is not qualified to act as design consultant. The assumptions in our estimate should be reviewed and corrected by the design team.

127 John St, Toronto, ON M5V 2E2 | 416-596-9339

This report has been prepared at the request of Shoalts and Zaback Architects Ltd and is the exclusive property of BTY Group. The information must be treated as confidential and not to be disclosed, reproduced or permitted to be disclosed to any party without the prior consent of BTY Group.

5.0 Exclusions

The construction estimate includes all direct and indirect construction costs derived from the drawings and other information provided by the Consultants, with the exception of the following:

1. Land costs
2. Professional fees and disbursements
3. Planning, administrative and financing costs
4. Legal fees and agreement costs / conditions
5. Building permits and development cost charges
6. Temporary facilities for user groups during construction
7. Removal of hazardous materials from existing site and building
8. Loose furnishings and equipment
9. Unforeseen ground conditions and associated extras
10. Special winter Conditions
11. Environmental remediation outside building footprint
12. Servicing outside the project site boundary (Main hydro service)
13. Phasing of the works and accelerated schedule
14. Decanting & moving
15. Costs associated with "LEED" certification
16. New roofing assemblies or repair
17. Structural steel framing to existing openings
18. Project commissioning (Third Party)
19. Erratic market conditions, such as lack of bidders, proprietary specifications
20. Cost escalation past February 2025.

6.0 Construction Cost Summary

The estimated construction cost of the project may be summarized as follows:

Description	Estimated Cost \$	Cost/GFA \$/m ²	Cost/GFA \$/ft ²	%
Structural	472,500	358	33	18%
Architectural	899,600	683	63	35%
Mechanical	320,300	243	23	12%
Electrical	226,600	172	16	9%
General Requirements & Fees	326,300	248	23	13%
Net Building Cost	\$2,245,300	\$1,704 /m²	\$158 /ft²	87%
Site Work	0	0	0	0%
Ancillary Work (Demolition)	297,000	225	21	11%
General Requirements & Fees	50,500	38	4	2%
Net Construction Cost	\$2,592,800	\$1,967 /m²	\$183 /ft²	100%
Design Contingency (15%)	388,900	295	27	
Construction Contingency (20%)	596,300	452	42	
Total Construction Cost	\$3,578,000	\$2,715 /m²	\$252 /ft²	
Escalation Allowance (2.22%)	79,300	60	6	
Escalated Construction Cost	\$3,657,300	\$2,775 /m²	\$258 /ft²	
Limit of Work (GFA)	1,318 m ²		14,187 ft ²	
Net Building Cost /GFA	\$1,704 /m ²		\$158 /ft ²	
Net Construction Cost /GFA	\$1,967 /m ²		\$183 /ft ²	
Total Construction Cost /GFA	\$2,715 /m ²		\$252 /ft ²	
Escalated Construction Cost /GFA	\$2,775 /m ²		\$258 /ft ²	



7.0 Areas

The limit of work area of the project, measured in accordance with the guidelines established by the Canadian Institute of Quantity Surveyors, is:

Location	Limit of Work (m²)	Total (m²)
Main Floor	1,318	1,318
Total:	1,318	1,318

8.0 Taxes

The Estimate excludes the Harmonized Sales Tax (H.S.T.).

9.0 Project Schedule & Escalation

For the purpose of identifying and quantifying the escalation allowance for this project, BTY has assumed the following schedule:

Activity	Start	Finish	Duration
Construction	Sep-01-2024	Feb-28-2025	6 months

Based on the above schedule, the mid-point of construction for the project is projected to be November 30th, 2024, which is 1 month from the date of this estimate. On this basis, BTY has calculated the escalation for this project to be 2.22%.

Our current projected escalation rates are shown below. In the event that there is slippage in the schedule, further escalation based on the projected escalation rate per annum should be included in the estimate.

Current BTY Group Forecast	2024	2025	2026
	5% - 7%	4% - 6%	3% - 5%

10.0 Pricing

The estimate has been priced at current rates considering the size, location, and nature of the project. The unit rates utilized are considered competitive for a project of this type, bid under a stipulated lump-sum form of tender in an open market, with a minimum of five (5) bids, supported by the requisite number of sub-contractors.

The estimate allows for labour, material, equipment and other input costs at current rates and levels of productivity. It does not consider extraordinary market conditions, where bidders may be few and may include in their tenders' disproportionate contingencies and profit margins.

11.0 Risk Mitigation

BTY Group recommends that the Owner, Project Manager and Design Team carefully review this document, including exclusions, inclusions and assumptions, contingencies, escalation and mark-ups. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding into the next design phase.

Requests for modifications of any apparent errors or omissions to this document must be made to BTY Group within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.

It is recommended that BTY Group design and propose a cost management framework for implementation. This framework would require that a series of further estimates be undertaken at key design stage milestones and a final update estimate be produced which is representative of the completed tender documents, project delivery model and schedule. The final updated estimate will address changes and additions to the documents, as well as addenda issued during the bidding process. BTY Group is unable to reconcile bid results to any estimate not produced from bid documents including all addenda.

12.0 Contingencies

12.1 Design Contingency

A design contingency of Fifteen Percent (15%) has been included in the estimate to cover modifications to the program, drawings and specifications during the design.

12.2 Construction Contingency

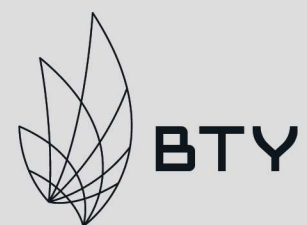
An allowance of Twenty Percent (20%) has been included in the estimate for changes occurring during the construction period of the project. This amount may be expended due to site conditions or if there are modifications to the drawings and specifications.



13.0 Documents Reviewed

The list below confirms the information that we have reviewed in order to prepare our opinion contained within this report:

Description	Revised Date
Drawings & Specifications	
Pineview Public School - Final Report.pdf (53 pages)	June 6, 2024
UCDSB Siporex Reports_Pineview.pdf (11 pages)	July 9, 2024*



COST MANAGEMENT REPORT

Pineview PS

APPENDICES

APPENDIX I	Elemental Summary	2 pages
APPENDIX II	Limit of Work Area	1 page

127 John St, Toronto, ON M5V 2E2
T 416-596-9339



APPENDIX I

Elemental Summary

2 PAGES

Element	Ratio G.F.A.	Element		Average Unit Cost	Amount \$	Total Cost \$	Cost/Floor Area \$/ m ²	%
		Quantity	Unit					
A1 SUBSTRUCTURE						0	0.00	0.0%
A11.1 Standard Foundations	0.00	0	m ²	0.00	0		0.00	
A11.2 Special Foundations	0.00	0	m ²	0.00	0		0.00	
A12 Basement Excavation	0.00	0	m ³	0.00	0		0.00	
A2 STRUCTURE						472,500	358.50	21.0%
A21 Lowest Floor Construction	0.00	0	m ²	0.00	0		0.00	
A22.1 Upper Floor Construction	0.00	0	m ²	0.00	0		0.00	
A22.2 Stair Construction	0.00	0	riser	0.00	0		0.00	
A23 Roof Construction	1.00	1,318	m ²	358.50	472,500		358.50	
A3 EXTERIOR ENCLOSURE						681,500	517.07	30.4%
A31 Structural Walls Below Grade	0.00	0	m ²	0.00	0		0.00	
A32.1 Walls Above Grade	0.00	0	m ²	0.00	0		0.00	
A32.2 Structural Walls Above Grade	0.00	1	m ²	10,500.00	10,500		7.97	
A32.3 Curtain Walls	0.00	0	m ²	0.00	0		0.00	
A33.1 Windows & Louvres	0.00	0	m ²	0.00	0		0.00	
A33.2 Glazed Screens	0.00	0	m ²	0.00	0		0.00	
A33.3 Doors	0.00	0	lvs.	0.00	0		0.00	
A34.1 Roof Covering	1.00	1,318	m ²	494.08	651,200		494.08	
A34.2 Skylights	0.00	0	m ²	0.00	0		0.00	
A35 Projections	0.00	1	sum	19,800.00	19,800		15.02	
B1 PARTITIONS & DOORS						46,100	34.98	2.1%
B11.1 Fixed Partitions	0.00	0	m ²	0.00	0		0.00	
B11.2 Moveable Partitions	0.00	0	m ²	0.00	0		0.00	
B11.3 Structural Partitions	1.00	1,318	m ²	34.98	46,100		34.98	
B12 Doors	0.00	0	lvs.	0.00	0		0.00	
B2 FINISHES						152,300	115.55	6.8%
B21 Floor Finishes	1.00	1,318	m ²	25.95	34,200		25.95	
B22 Ceiling Finishes	1.00	1,318	m ²	62.06	81,800		62.06	
B23 Wall Finishes	2.38	3,131	m ²	11.60	36,300		27.54	
B3 FITTINGS & EQUIPMENT						19,700	14.95	0.9%
B31.1 Metals	0.00	0	m ²	0.00	0		0.00	
B31.2 Millwork	0.00	0	m ²	0.00	0		0.00	
B31.3 Specialties	1.00	1,318	m ²	14.95	19,700		14.95	
B32 Equipment	0.00	0	m ²	0.00	0		0.00	
B33.1 Elevators	0.00	0	stop	0.00	0		0.00	
B33.2 Escalators & Moving Walkways	0.00	0	m ²	0.00	0		0.00	
B33.3 Material Handling Systems	0.00	0	m ²	0.00	0		0.00	
C1 MECHANICAL						320,300	243.02	14.3%
C11 Plumbing and Drainage	1.00	1,318	m ²	15.02	19,800		15.02	
C12 Fire Protection	1.00	1,318	m ²	20.03	26,400		20.03	
C13 HVAC	1.00	1,318	m ²	200.00	263,600		200.00	
C14 Controls	1.00	1,318	m ²	7.97	10,500		7.97	
C2 ELECTRICAL						226,600	171.93	10.1%
C21 Service & Distribution	1.00	1,318	m ²	25.04	33,000		25.04	
C22 Lighting, Devices & Heating	1.00	1,318	m ²	106.90	140,900		106.90	
C23 Systems & Ancillaries	1.00	1,318	m ²	39.98	52,700		39.98	
Z1 GENERAL REQUIREMENTS & FEES						326,300	247.57	14.5%
Z11 General Requirements	12.00%				230,300		174.73	
Z12 Fee	5.00%				96,000		72.84	
NET BUILDING COST						2,245,300	1,703.57	100.0%
COST CONSULTANTS								A1-1



Element			Ratio G.F.A.	Element		Average Unit Cost	Amount \$	Total Cost \$	Cost/Floor Area \$/ m²	%
				Quantity	Unit					
NET BUILDING COST							2,245,300	1,703.57		
D1 SITE WORK							0	0.00		
D11.1	Site Preparation	0.00	0	m²	0.00	0		0.00		
D11.2	Hard Surfaces	0.00	0	m²	0.00	0		0.00		
D11.3	Site Improvements	0.00	0	m²	0.00	0		0.00		
D11.4	Landscaping	0.00	0	m²	0.00	0		0.00		
D12	Mechanical Site Services	0.00	0	m²	0.00	0		0.00		
D13	Electrical Site Services	0.00	0	m²	0.00	0		0.00		
D2 ANCILLARY WORK							297,000	225.34		
D21.1	Demolition	1.00	1,318	m²	225.34	297,000		225.34		
D21.2	Hazardous Materials	0.00	0	m²	0.00	0		0.00		
D22	Alteration	0.00	0	m²	0.00	0		0.00		
Z1 GENERAL REQUIREMENTS & FEES							50,500	38.32		
Z11	General Requirements	12.00%				35,600		27.01		
Z12	Fee	5.00%				14,900		11.31		
NET CONSTRUCTION COST							2,592,800	1,967.22		
Z2 ALLOWANCES							985,200	747.50		
Z21	Design Allowance	15.00%				388,900		295.07		
Z23	Construction Allowance	20.00%				596,300		452.43		
SUBTOTAL CONSTRUCTION COST							3,578,000	2,714.72		
Harmonized Sales Tax (H.S.T.)		0.00%					0	0.00		
TOTAL CONSTRUCTION COST							3,578,000	2,714.72		
Z22	Escalation Allowance	2.22%					79,300	60.17		
ESCALATED CONSTRUCTION COST							3,657,300	2,774.89		



APPENDIX II

Limit of Work Area

1 PAGE



BTY.COM

NORTH AMERICA | EUROPE

BUILDING INTELLIGENCE

Appendix 4 – Representative Images

The following images are representative of the existing conditions in the building.



View of RAAC panels in Service Room



View of former RAAC replacement in Classroom

Upper Canada District School Board
Siporex Report
Pineview Public School



View of secondary framing below RAAC panels to support ceiling



View of improper hanger in RAAC panels

Upper Canada District School Board
Siporex Report
Pineview Public School



View of major area of spalling RAAC panels



View of improper opening and hanger in RAAC panels