The Hunt For Red Sandstone

Rosanne Howes, Project Manager, DND

The Hunt For Red Sandstone

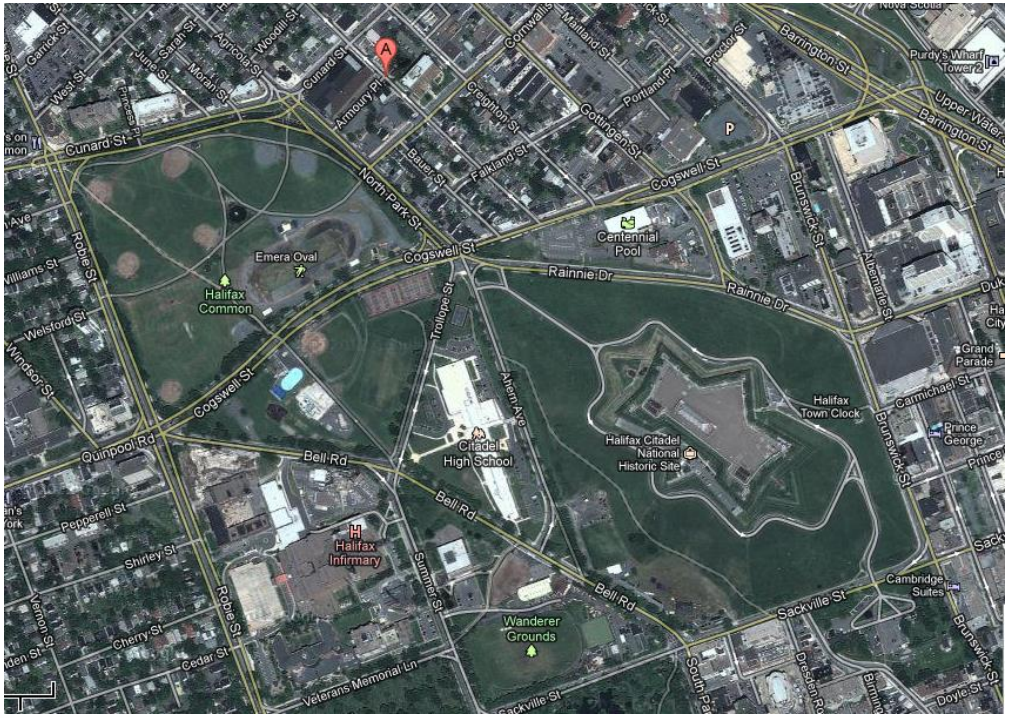
This is a story about a heritage building called the North Park Armoury and the intercurrence of history and built form.

The hunt for red sandstone, and the research required to find replacement stone for masonry rehabilitation lead to a sequence of events that influenced this magnificent building's story.

- Background, Armoury as "Landmark"
- Heritage Character
- Condition assessment
- Halifax explosion
- Looking for stone replacement options
- Pilot project
- Current and future works

The Hunt For Red Sandstone

The Armoury as "**Landmark**"



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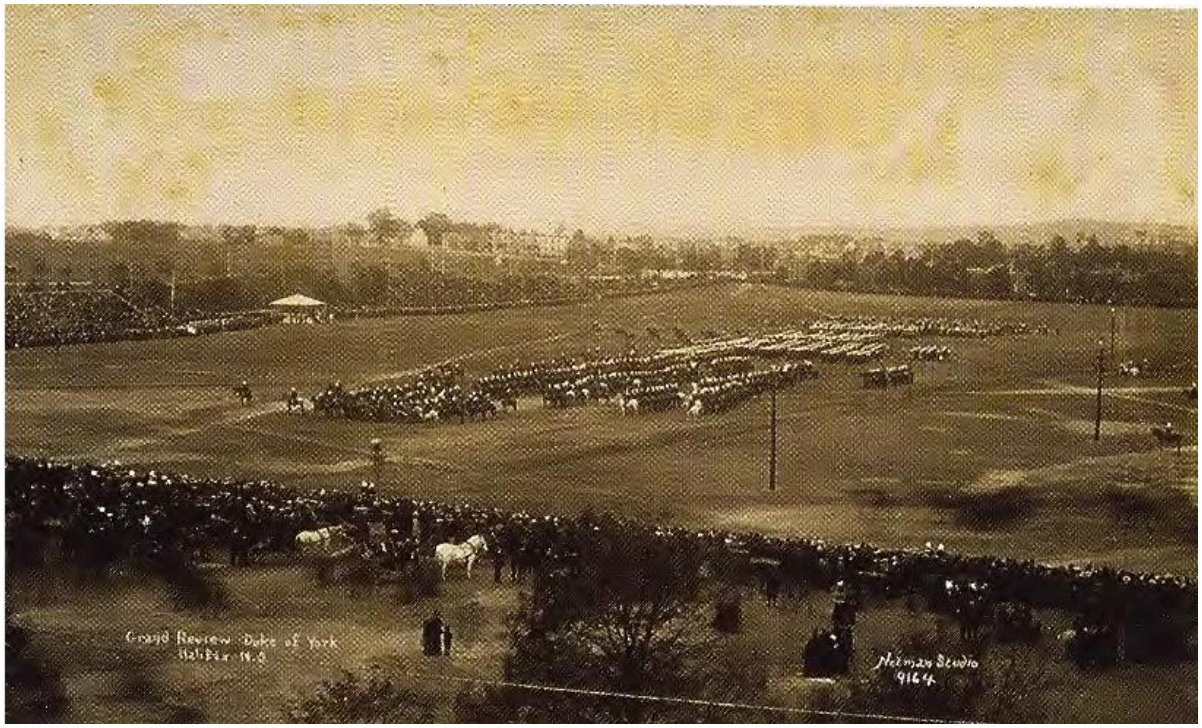
the Armoury as "**Landmark**"

Soldiers would amalgamate at the Armoury before departing by ship for the Boer War and both World Wars.

After the Halifax Explosion the Armoury provided shelter for many who had lost their homes.

The Hunt For Red Sandstone

the Armoury as "**Landmark**"



WW I

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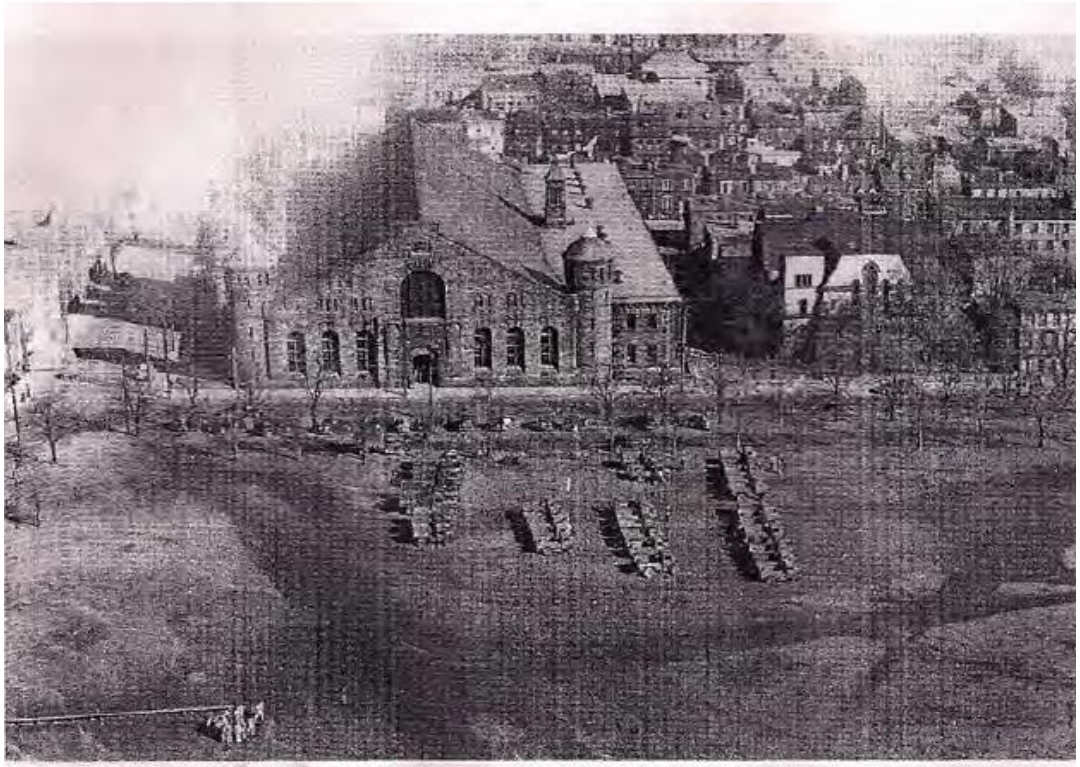
the Armoury as "**Landmark**"



THE ARMOURIES IN WARTIME, OCTOBER 30, 1941

WW II

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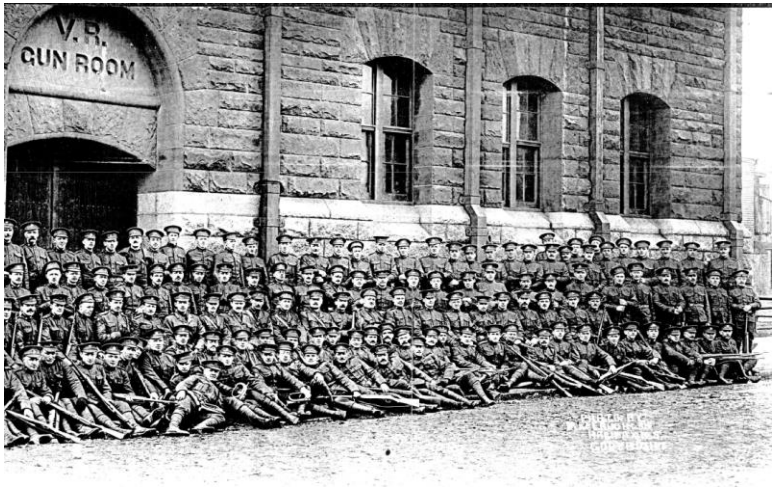
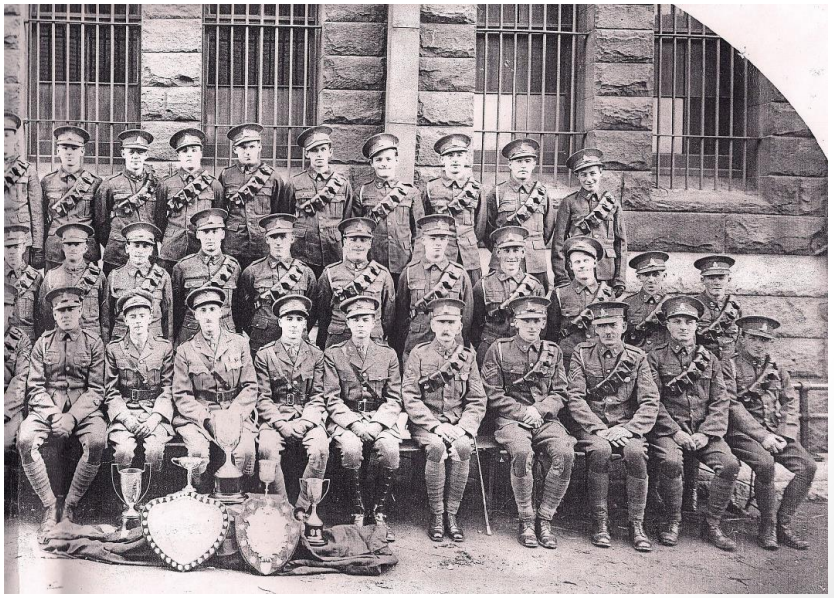
the Armoury as "**Landmark**"





Home to the Halifax Rifles and the PLF

The Hunt For Red Sandstone

the Armoury as "**Landmark**"

Events held at the Halifax Common

Date	Event Name	Performers	Event Attendance
1983	Royal Visit	Prince Charles and Diana, Princess of Wales	est. 30,000–40,000
1984	Papal Visit	Pope John Paul II	80,000
September 23, 2006	A Bigger Bang Tour	Rolling Stones, Kanye West, Alice Cooper, Sloan	55,000[*citation needed*]
August 30, 2008	Country Rocks 2008	Keith Urban, Charlie Major, Johnny Reid, Aaron Pritchett, Gretchen Wilson, Jimmy Rankin, Great Big Sea	paid attendance 11,853
July 11, 2009	Paul McCartney Live on the Common	Paul McCartney, Joel Plaskett, Wintersleep,[6] Sierra Noble[7]	paid attendance of 26,504 [8]
July 18, 2009	Halifax Rocks 2009	KISS, Thornley, The Trews, Econoline Crush, The Novaks, Children of Eve, Frankie Whyte	paid attendance of 21,402))
June 24–28, 2010	Grand Chief Membertou 400 (Mawiomi Pow-wow) & Royal Visit	Royal Visit by Queen Elizabeth II, Buffy Sainte-Marie, Schedule of events	Unknown
July 24, 2010	Halifax Rocks 2010	The Black Eyed Peas, Weezer, Classified, Hot Hot Heat, Rich Aucoin, The Jimmy Swift Band, The Stanfields, Chad Hatcher	paid attendance of 8,362 [9]
August 6 & 7 2010	Country Rocks 2010	**Aug 6:** Johnny Reid, George Canyon, One More Girl **Aug 7:** Alan Jackson, Billy Currington, Kevin Costner and Modern West, Lonestar	-
January 15, 16 2011	Canadian Masters Championships	Canada Games Oval	-
February 11 - 27, 2011	2011 Canada Games.	Canada Games Oval- long track speed skating competitions .	- Future-

The North Common on September 22, 2006. This performance stage was being prepared for a Rolling Stones concert.

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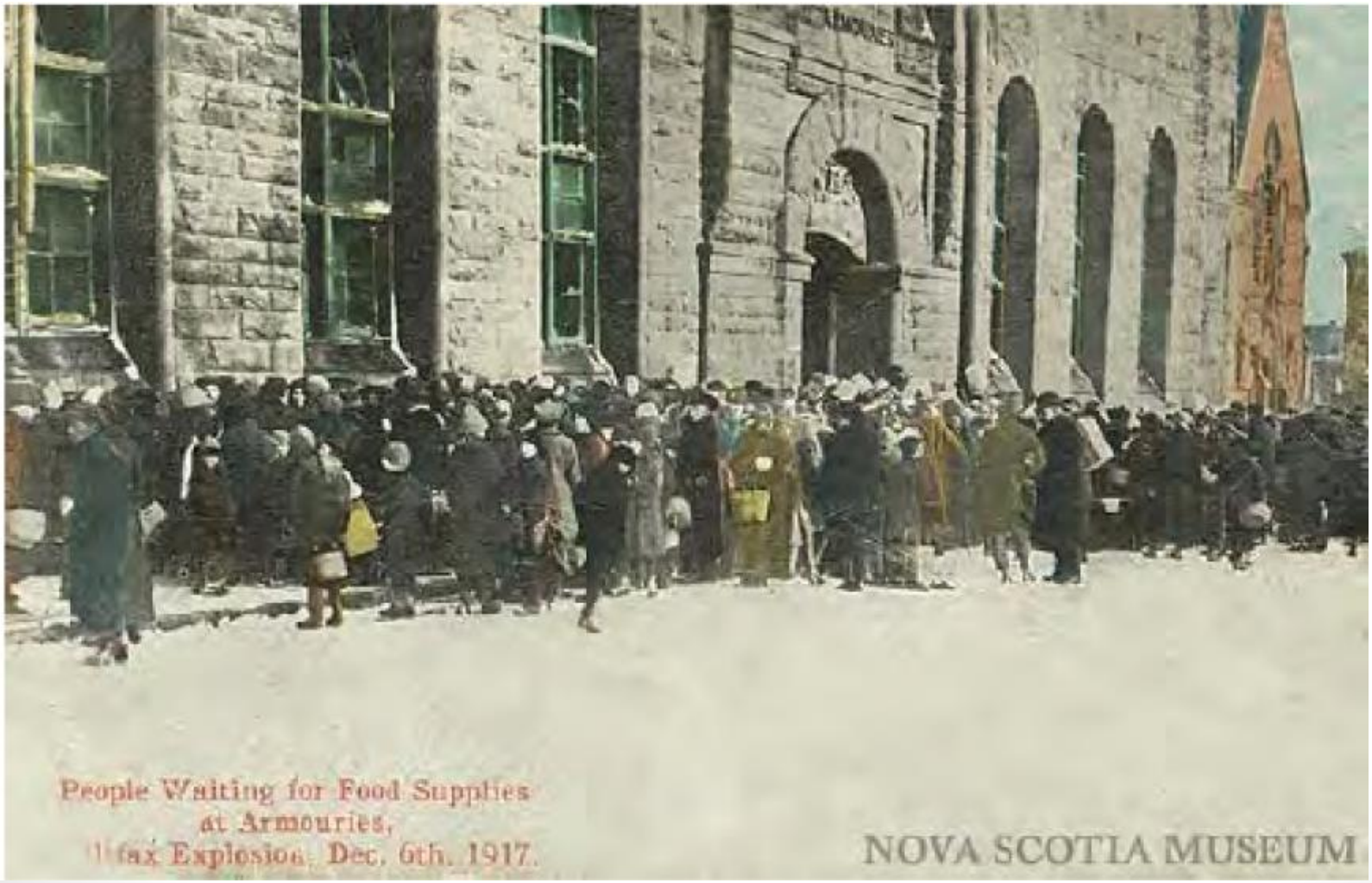
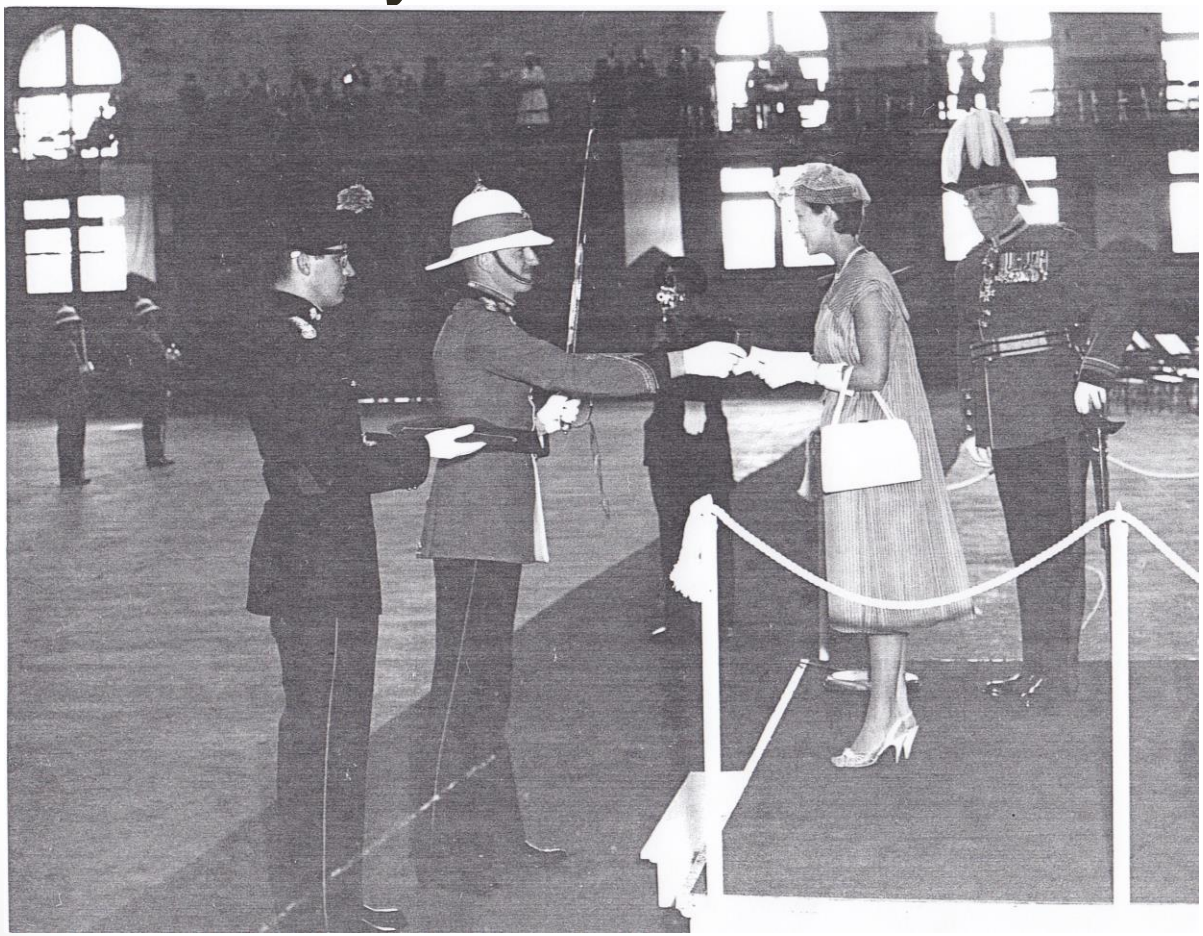
the Armoury as "**Landmark**"



The Hunt For Red Sandstone

the Armoury as "**Landmark**"



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Armoury as Landmark

- Haunted by ghost
- WW I soldier in uniform

The Hunt For Red Sandstone

Heritage Character:

PA-135543

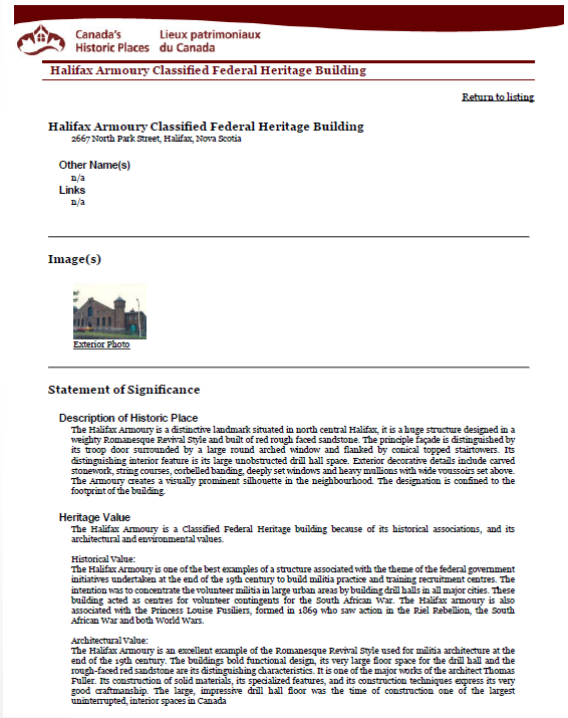
The Hunt For Red Sandstone

Heritage Character:

- The Halifax Armoury was built from 1895-99 to designs by Thomas Fuller, the chief Architect of the Department of Public Works.
- He was also the architect for the Centre block and Library of Parliament

The Hunt For Red Sandstone:

Heritage Character



Canada's Historic Places / Lieux patrimoniaux du Canada

Halifax Armoury Classified Federal Heritage Building

Return to listing

Halifax Armoury Classified Federal Heritage Building
2667 North Park Street, Halifax, Nova Scotia

Other Name(s)
n/a
Links
n/a

Image(s)

Exterior Photo

Statement of Significance

Description of Historic Place
The Halifax Armoury is a distinctive landmark situated in north central Halifax, it is a huge structure designed in a weighty Romanesque Revival Style and built of red rough faced sandstone. The principle façade is distinguished by its troop door surrounded by a large round arched window and flanked by conical topped staittowers. Its distinguishing interior feature is its large unobstructed drill hall space. Exterior decorative details include carved stonework, string courses, corbelled banding, deeply set windows and heavy mullions with wide voussoirs set above. The Armoury creates a visually prominent silhouette in the neighbourhood. The designation is confined to the footprint of the building.

Heritage Value
The Halifax Armoury is a Classified Federal Heritage building because of its historical associations, and its architectural and environmental values.

Historical Value:
The Halifax Armoury is one of the best examples of a structure associated with the theme of the federal government initiatives undertaken at the end of the 19th century to build militia practice and training recruitment centres. The intention was to concentrate the volunteer militia in large urban areas by building drill halls in all major cities. These building acted as centres for volunteer contingents for the South African War. The Halifax armoury is also associated with the Princess Louise Fusiliers, formed in 1869 who saw action in the Riel Rebellion, the South African War and both World Wars.

Architectural Value:
The Halifax Armoury is an excellent example of the Romanesque Revival Style used for militia architecture at the end of the 19th century. The buildings bold functional design, its very large floor space for the drill hall and the rough-faced red sandstone are its distinguishing characteristics. It is one of the major works of the architect Thomas Fuller. Its construction of solid materials, its specialized features, and its construction techniques express its very good craftmanship. The large, impressive drill hall floor was the time of construction one of the largest uninterrupted, interior spaces in Canada

Reasons for Designation

The Halifax Armoury was designated Classified, in recognition of its **historical and architectural significance, and its environmental and landmark value.**

The building is one of the best examples of government initiatives undertaken at the end of the 19th century to build militia practice, training and recruitment centres. **It is one of five extant regimental drill halls** built in major cities in Canada in the last quarter of the 19th century, and the most fully developed. Regionally important, it houses an infantry battalion, the Princess Louise Fusiliers.

Architecturally, it is an excellent example of a bold Romanesque Revival style. The design, functional plan, and novel facilities make the Halifax Armoury an outstanding example of the type. The architectural design and amenities of the drill hall set the standard for subsequent designs across Canada.

The Halifax Armoury was the last major project of Thomas Fuller as chief architect and is one of the best example of his talents.

The Armoury is a distinctive landmark situated in north central Halifax. It has maintained an unchanged relationship to its site and is **close to the citadel which reinforces its military identity.**

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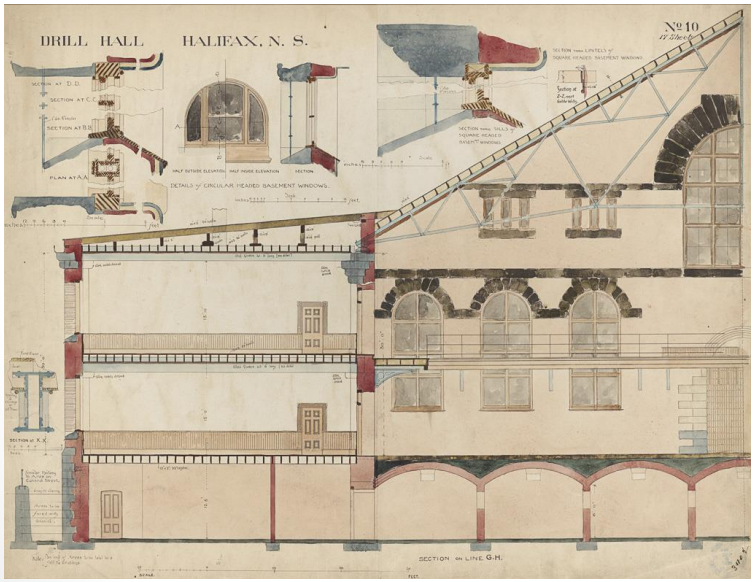
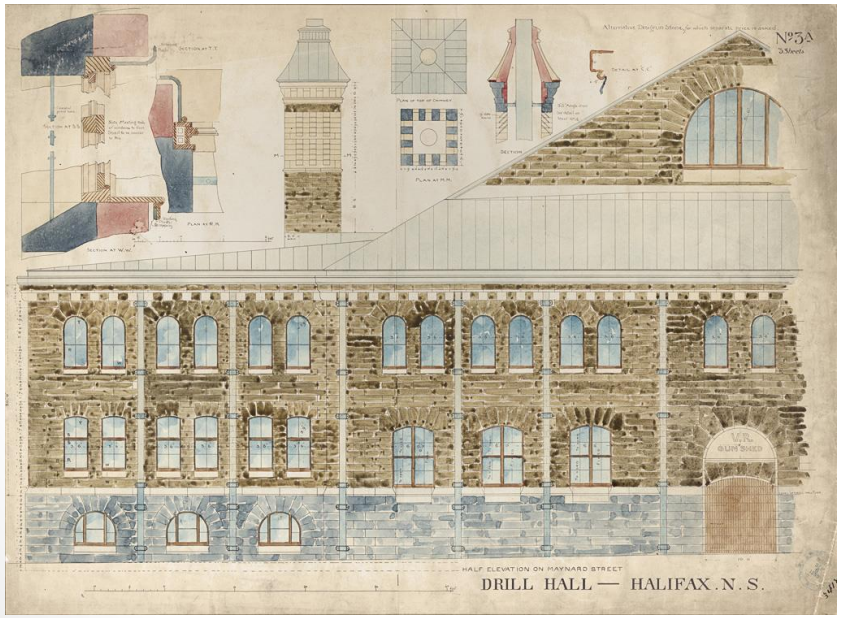
Heritage Character



- The decorative details, which include carved stonework, string courses, corbelled banding, deeply set windows with the multi-panes and heavy mullions, and wide voussoirs above
- The interior of the Armoury incorporated a clear span drill hall, one of the largest of the time, which was accomplished by the use of triangular steel Fink trusses.
- Constructed of red rough-faced Pugwash sandstone surmounting a rough-faced granite foundation, the massive walls are enlivened by bold decorative details.
- The site is largely unchanged, and the building reinforces present military character of the area and plays an important role as landmark in the neighbourhood.

The Hunt For Red Sandstone

Heritage Character



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The Hunt For Red Sandstone

Condition assessment

FARO User's manual FARO Laser Scanner LS 5

1 Introduction

Fig.1 FARO Laser Scanner LS

The FARO Laser Scanner LS is a precise measuring instrument producing photorealistic three dimensional images. The main features are

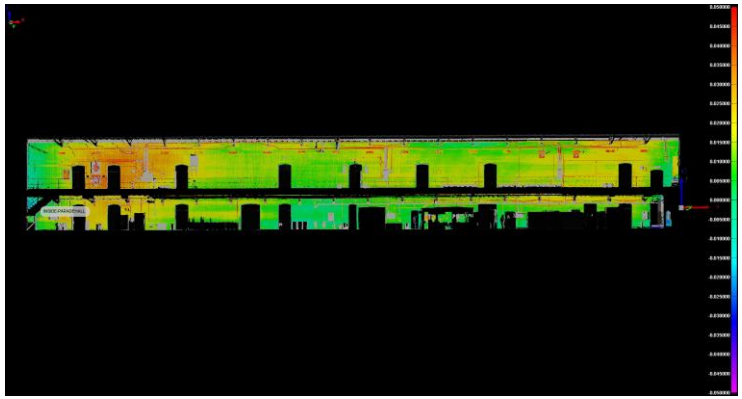
- high accuracy
- high resolution
- high speed
- modularity

A list of possible applications can be found on the FARO webpage http://www.faro.com.

This manual provides an introduction to the FARO Laser Scanner LS.
As a minimum requirement, read at least the safety information and the step-by-step guide before using the scanner!

Faro Scanner Production GmbH
Lingwiesenstraße 11/2
D-70825 Korntal-Münchingen
Tel.: +49 (0)7150 9797400
Fax: +49 (0)7150 97979400
Mail: support@faroeurope.com
Web: www.faro.com

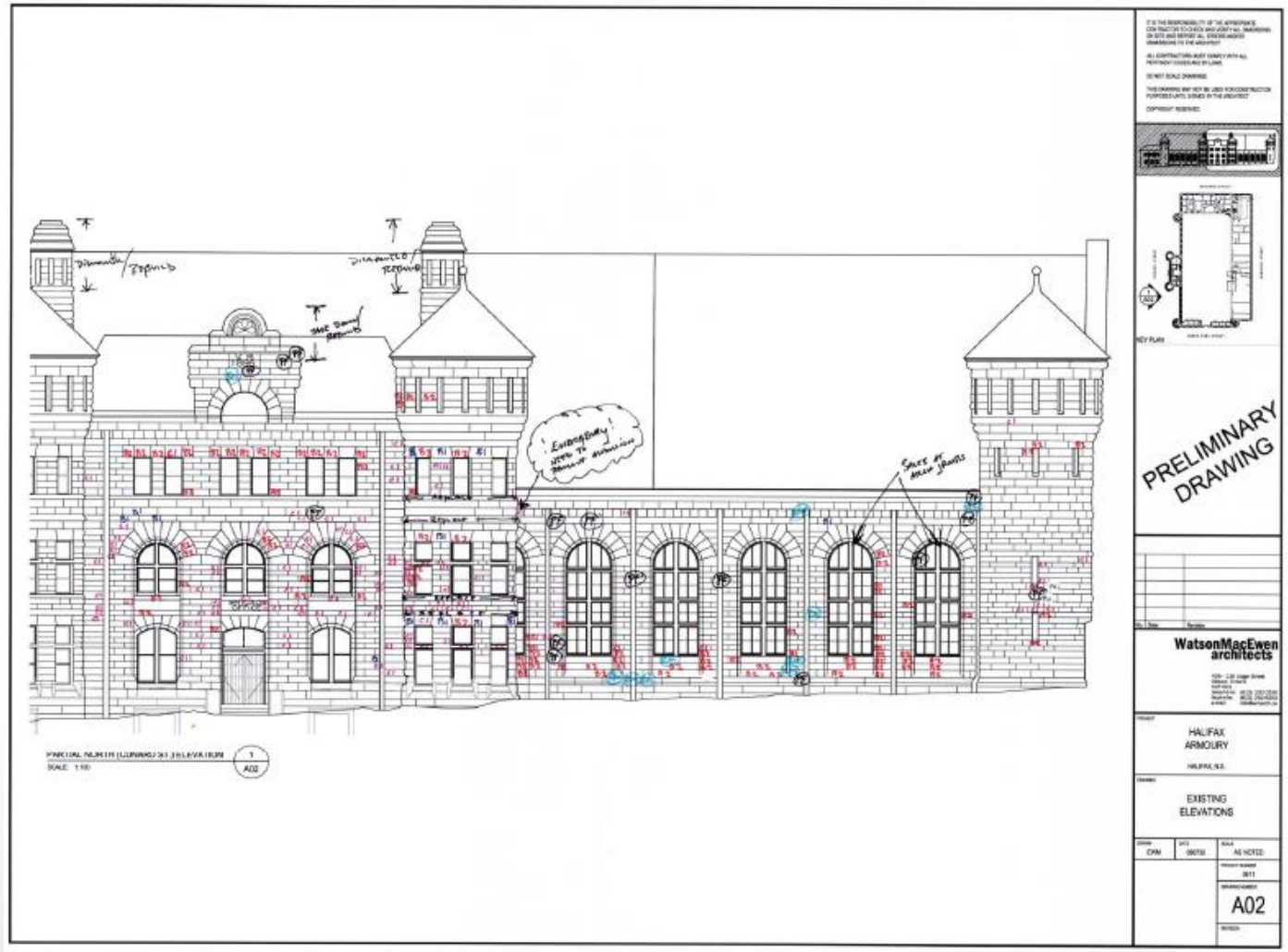
© 2007 FARO Scanner Production



LYDAR scans

The Hunt For Red Sandstone

Condition assessment



The Hunt For Red Sandstone

Condition assessment

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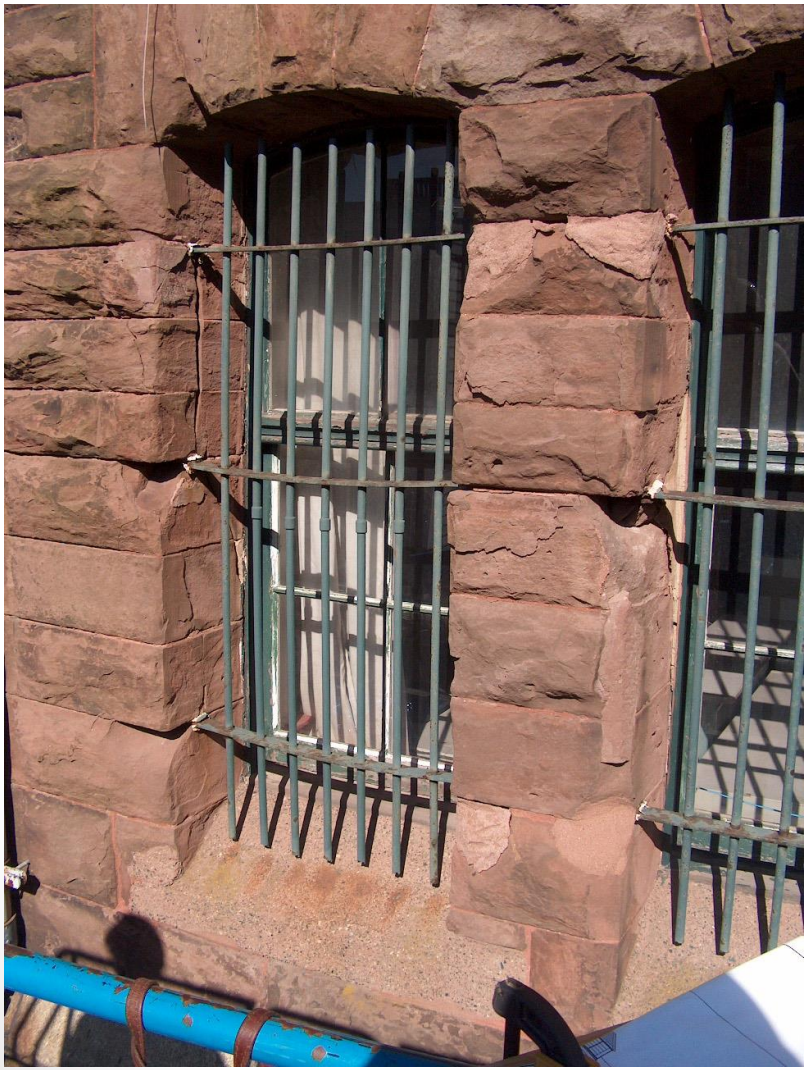
Condition assessment



Oxide jacking or “rust” jacking.

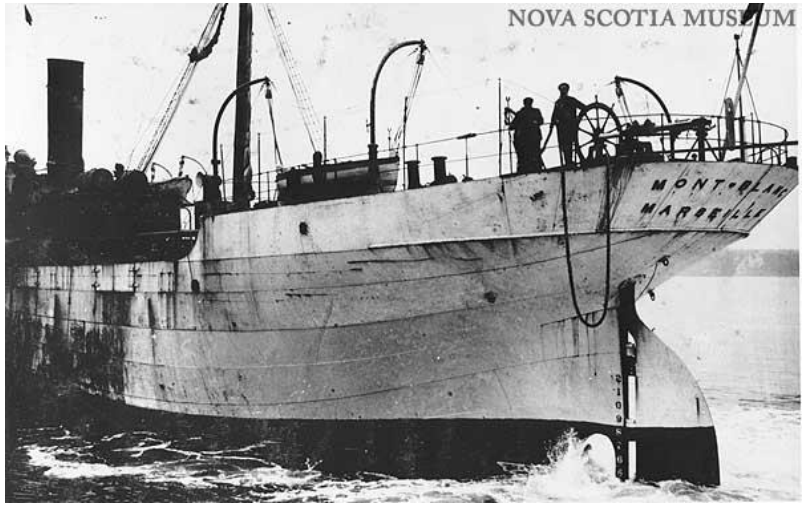
The Hunt For Red Sandstone

Condition assessment

Deteriorated carvings and spalling of stone due to water infiltration.

The Hunt For Red Sandstone

Halifax explosion



The **Halifax Explosion** was a maritime disaster, on the morning of 6 December 1917. SS *Mont-Blanc*, a French cargo ship laden with high explosives, collided with the Norwegian vessel SS *Imo* in the Narrows, a strait connecting the upper Halifax Harbour to Bedford Basin. A fire on board the French ship ignited her cargo, causing a large explosion that devastated the Richmond district of Halifax. Approximately 2,000 people were killed by blast, debris, fires and collapsed buildings, and an estimated 9,000 others were injured.

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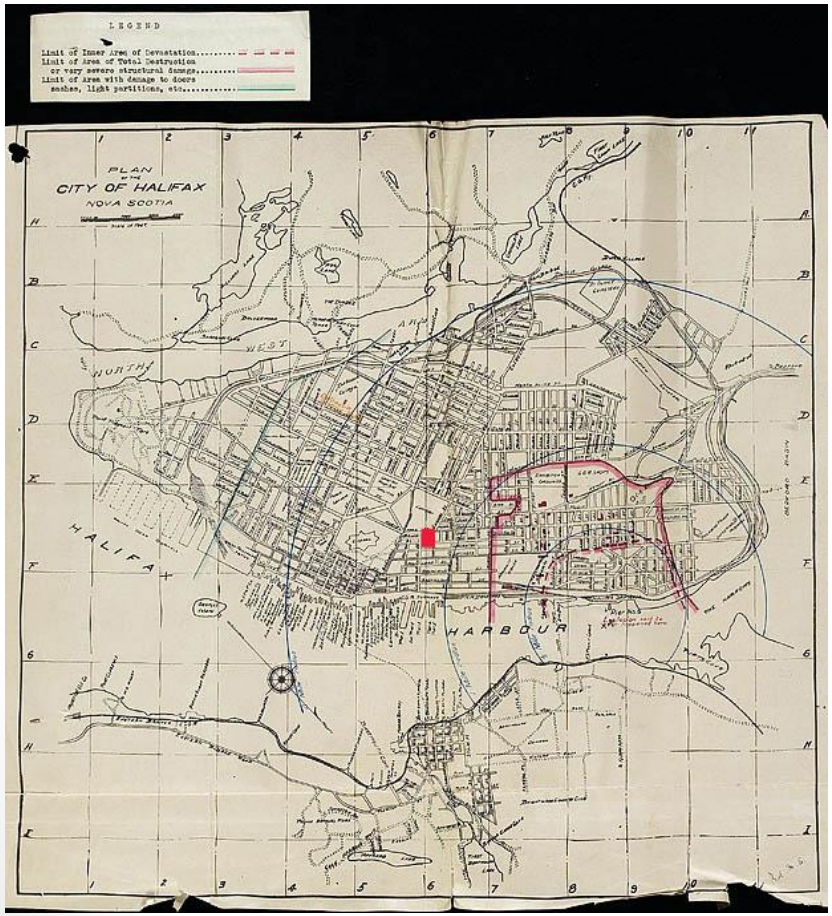
Halifax explosion



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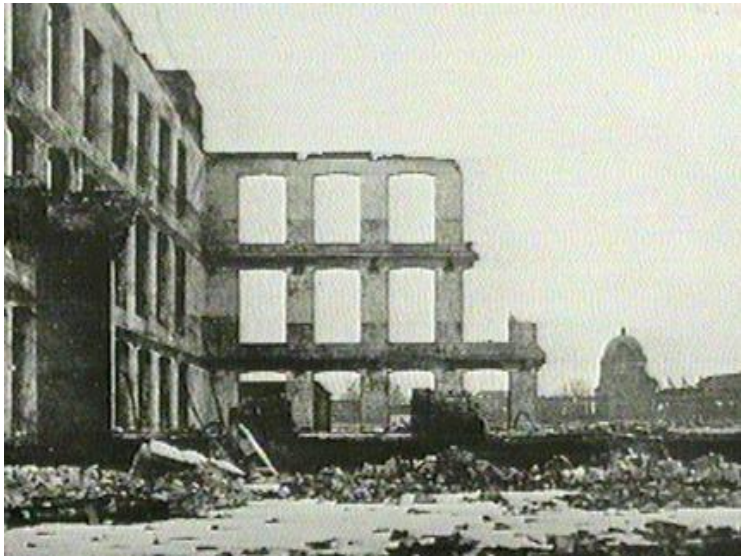
Halifax explosion



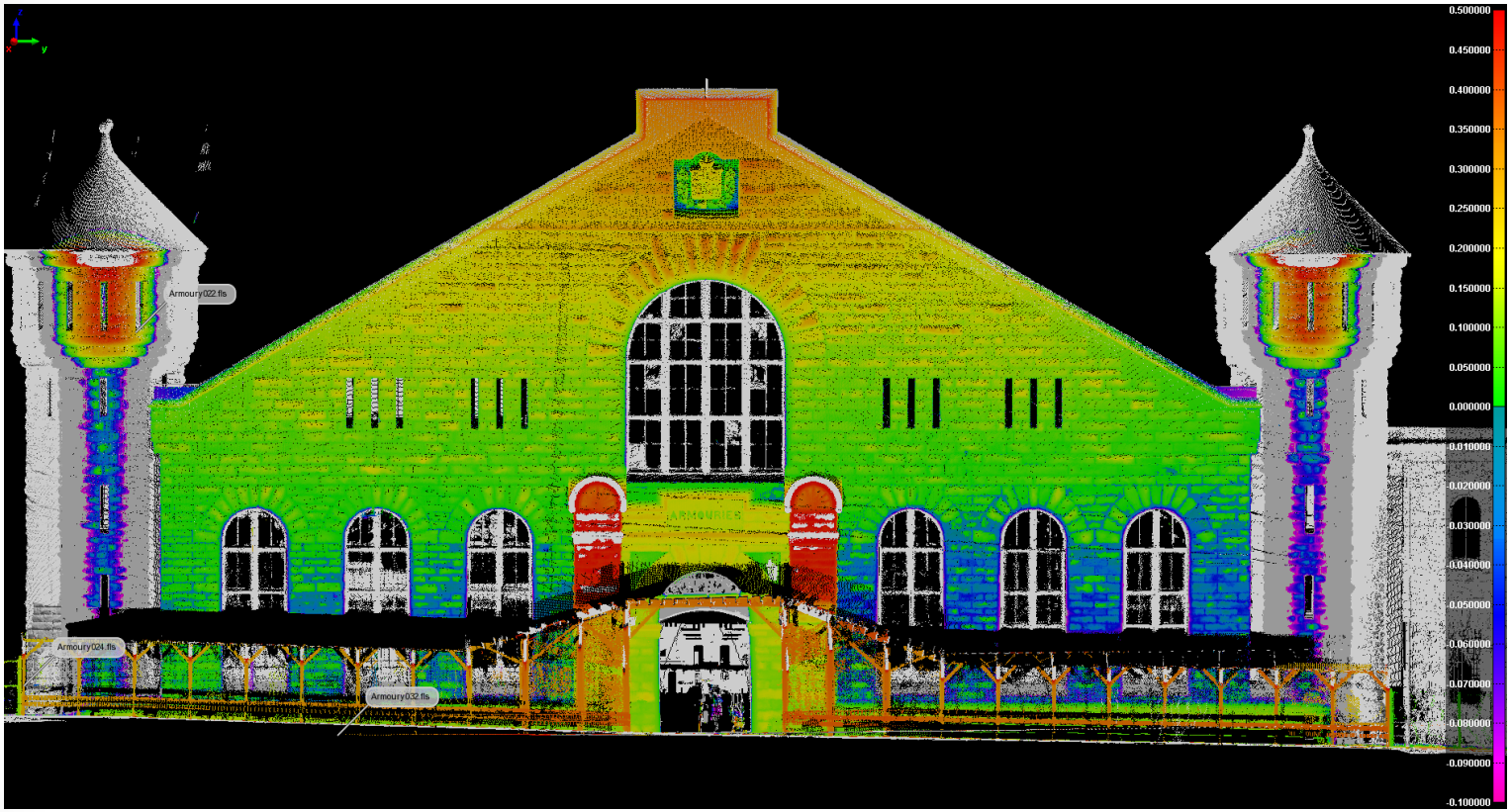
The Hunt For Red Sandstone

Halifax explosion

GREAT HALIFAX EXPLOSION
Utter desolation and devastation so complete that this picture might have been taken on the battlefields of France
—Copyright Underwood & Underwood, N.Y.

The Hunt For Red Sandstone

Halifax explosion



Tilting of West Wall – Halifax Explosion

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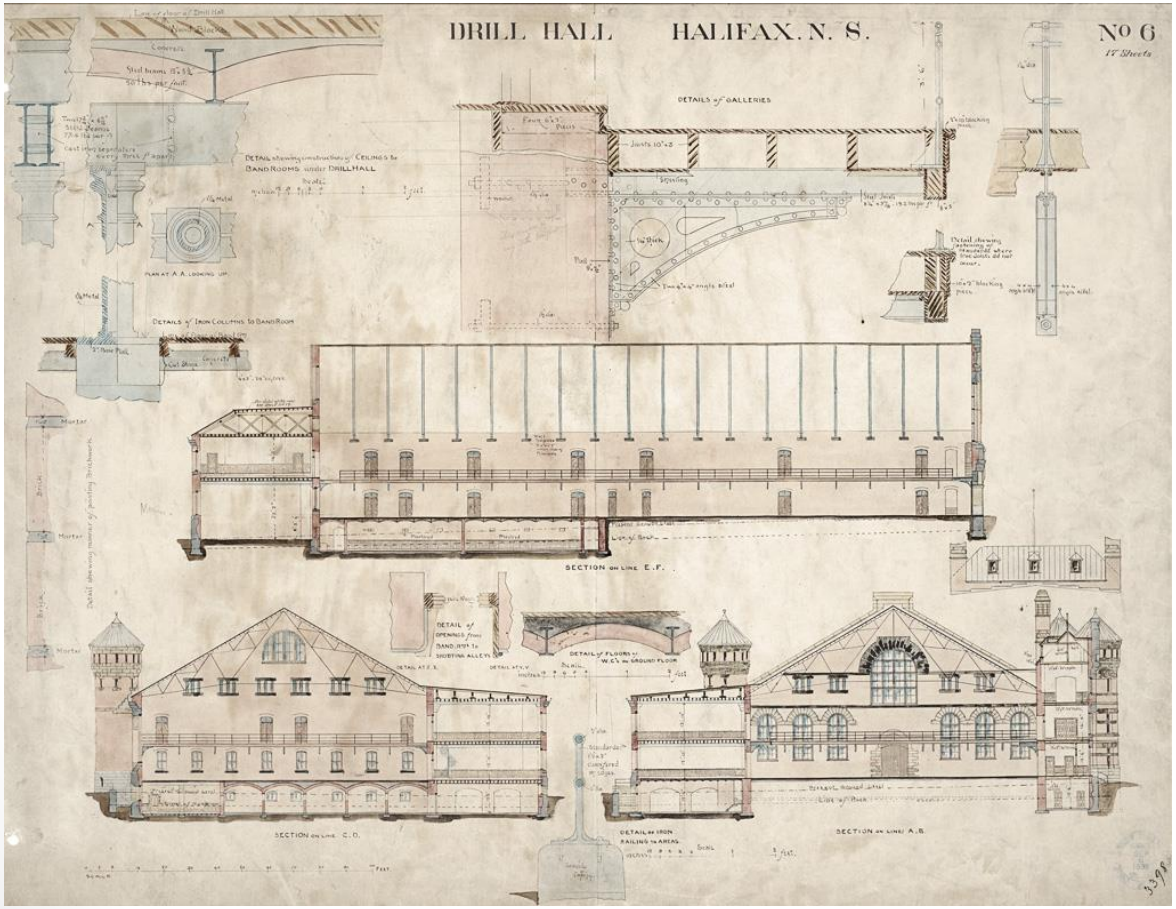
Halifax explosion



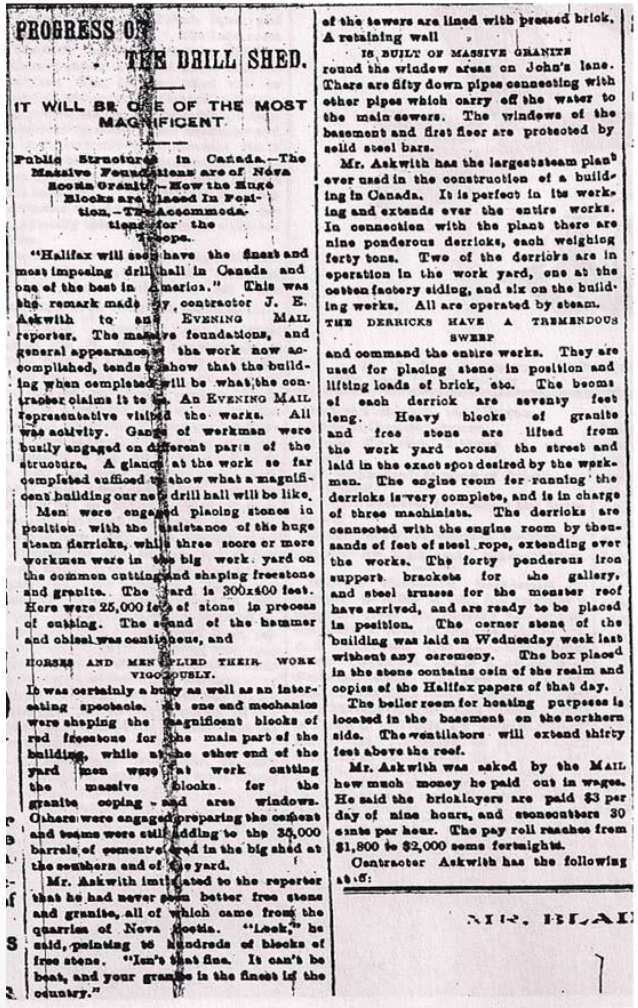
The Hunt For Red Sandstone

Looking for stone replacement options

John E. Askwith, contractor for the North Park Armoury 1895

The Hunt For Red Sandstone

Looking for stone replacement options



PROGRESS OF THE DRILL SHED.

IT WILL BE ONE OF THE MOST MAGNIFICENT

Public Structures in Canada.—The Massive Foundations are of Nova Scotia Granite.—How the Huge Blocks are Placed in Position.—The Accommodations for the Troops.

"Halifax will soon have the finest and most imposing drill hall in Canada and one of the best in America." This was the remark made by contractor J. E. Askwith to an EVENING MAIL reporter. The massive foundations, and general appearance of the work now accomplished, tends to show that the building when completed will be what the contractor claims it to be. An EVENING MAIL representative visited the works. All was activity. Gangs of workmen were busily engaged on different parts of the structure. A glance at the work so far completed sufficed to show what a magnificent building our new drill hall will be like.

Men were engaged placing stones in position with the assistance of the huge steam derricks, while three score or more workmen were in the big work yard on the common cutting and shaping freestone and granite. The yard is 300x400 feet. Here were 25,000 feet of stone in process of cutting. The sound of the hammer and chisel was continuous, and

HORSES AND MEN APPLIED THEIR WORK VIGOROUSLY.

It was certainly a busy as well as an interesting spectacle. At one end mechanics were shaping the magnificent blocks of red freestone for the main part of the building, while at the other end of the yard men were at work cutting the massive blocks for the granite coping and area windows. Others were engaged preparing the cement and teams were still adding to the 35,000 barrels of cement stored in the big shed at the southern end of the yard.

Mr. Askwith imitated to the reporter that he had never seen better free stone and granite, all of which came from the quarries of Nova Scotia. "Look," he said, pointing to hundreds of blocks of free stone. "Isn't that fine. It can't be beat, and your granite is the finest in the country."

of the towers are lined with pressed brick. A retaining wall

IS BUILT OF MASSIVE GRANITE

round the window areas on John's lane. There are fifty down pipes connecting with other pipes which carry off the water to the main sewers. The windows of the basement and first floor are protected by solid steel bars.

Mr. Askwith has the largest steam plant ever used in the construction of a building in Canada. It is perfect in its working and extends over the entire works. In connection with the plant there are nine ponderous derricks, each weighing forty tons. Two of the derricks are in operation in the work yard, one at the cotton factory siding, and six on the building works. All are operated by steam.

THE DERRICKS HAVE A TREMENDOUS SWEEP

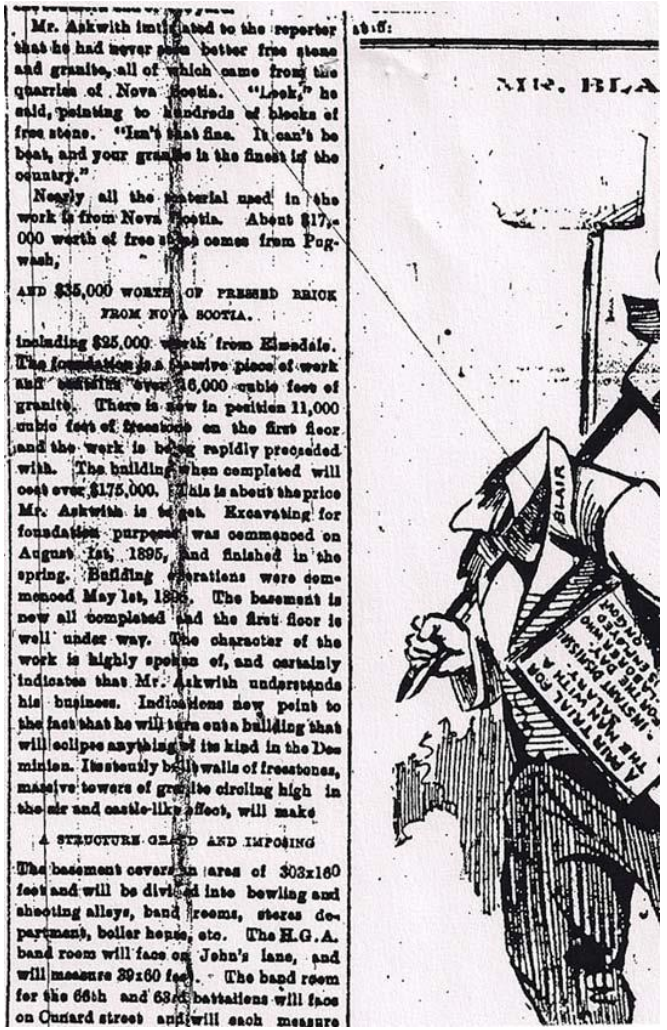
and command the entire works. They are used for placing stone in position and lifting loads of brick, etc. The booms of each derrick are seventy feet long. Heavy blocks of granite and free stone are lifted from the work yard across the street and laid in the exact spot desired by the workmen. The engine room for running the derricks is very complete, and is in charge of three machinists. The derricks are connected with the engine room by thousands of feet of steel rope, extending over the works. The forty ponderous iron supports brackets for the gallery, and steel trusses for the monster roof have arrived, and are ready to be placed in position. The corner stone of the building was laid on Wednesday week last without any ceremony. The box placed in the stone contains coin of the realm and copies of the Halifax papers of that day.

The boiler room for heating purposes is located in the basement on the northern side. The ventilators will extend thirty feet above the roof.

Mr. Askwith was asked by the MAIL how much money he paid out in wages. He said the bricklayers are paid $3 per day of nine hours, and stonecutters 30 cents per hour. The pay roll reaches from $1,800 to $2,000 some fortnights.

Contractor Askwith has the following

MR. BLA



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Nearly all the material used in the work is from Nova Scotia. About $17,000 worth of free stone comes from Pugwash,

AND $35,000 WORTH OF PRESSED BRICK FROM NOVA SCOTIA.

including $25,000 worth from Elmsdale. The foundation is a massive piece of work that contains over 16,000 cubic feet of granite. There is now in position 11,000 cubic feet of freestone on the first floor and the work is being rapidly proceeded with. The building when completed will cost over $175,000. This is about the price Mr. Askwith is to get. Excavating for foundation purposes was commenced on August 1st, 1895, and finished in the spring. Building operations were commenced May 1st, 1896. The basement is now all completed and the first floor is well under way. The character of the work is highly spoken of, and certainly indicates that Mr. Askwith understands his business. Indications now point to the fact that he will turn out a building that will eclipse anything of its kind in the Dominion. Its steady bold walls of freestones, massive towers of granite circling high in the air and castle-like effect, will make

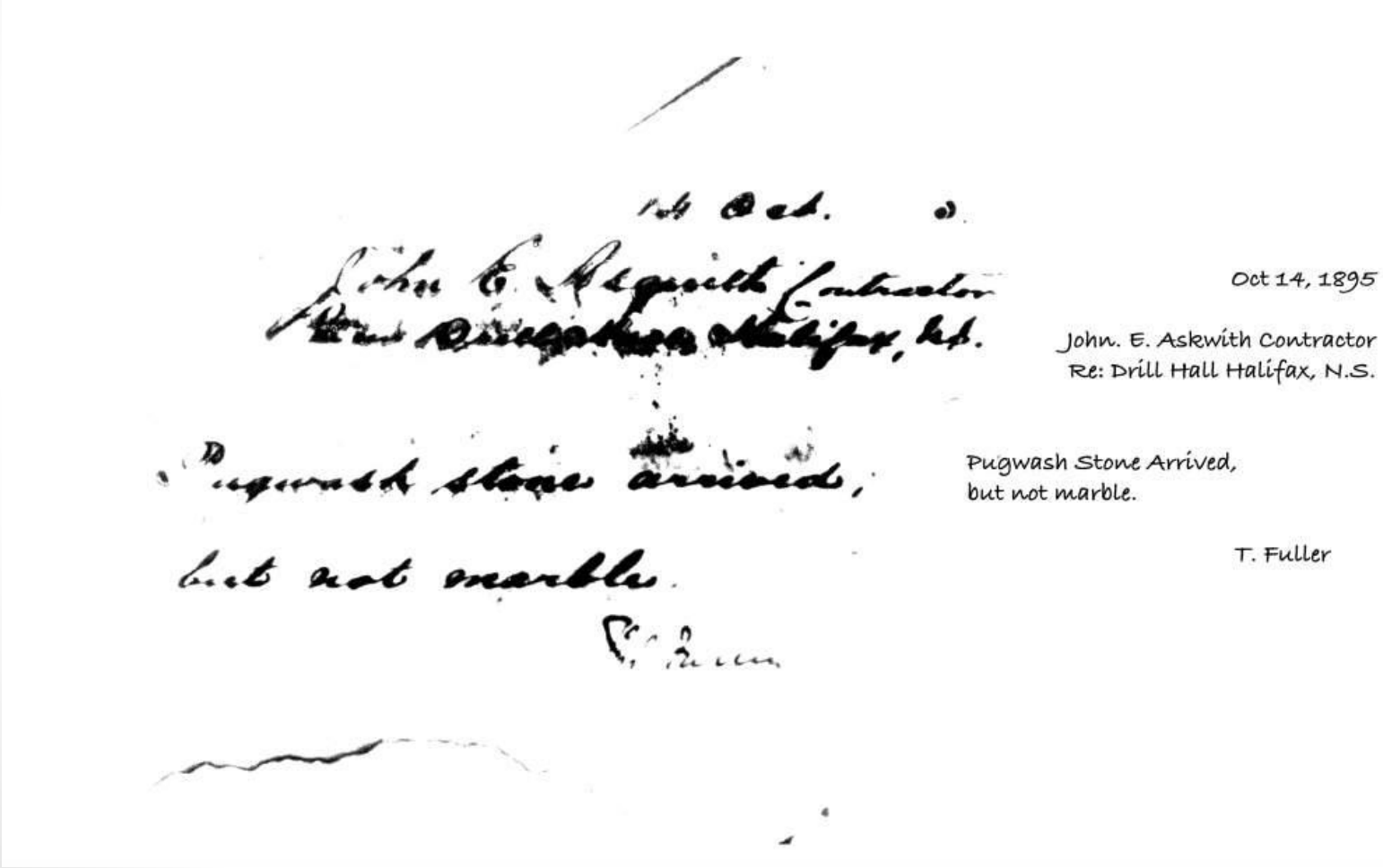
A STRUCTURE GRAND AND IMPOSING

The basement covers an area of 303x160 feet and will be divided into bowling and shooting alleys, band rooms, stores department, boiler house, etc. The H.G.A. band room will face on John's lane, and will measure 39x60 feet. The band room for the 66th and 63rd battalions will face on Cunard street and will each measure

MR. BLA

The Hunt For Red Sandstone

Looking for stone replacement options



Oct 14, 1895

John. E. Askwith Contractor
Re: Drill Hall Halifax, N.S.

Pugwash Stone Arrived,
but not marble.

T. Fuller

The Hunt For Red Sandstone

Looking for stone replacement options

23rd Oct, 1895

Dear Doctor (Damp...?)

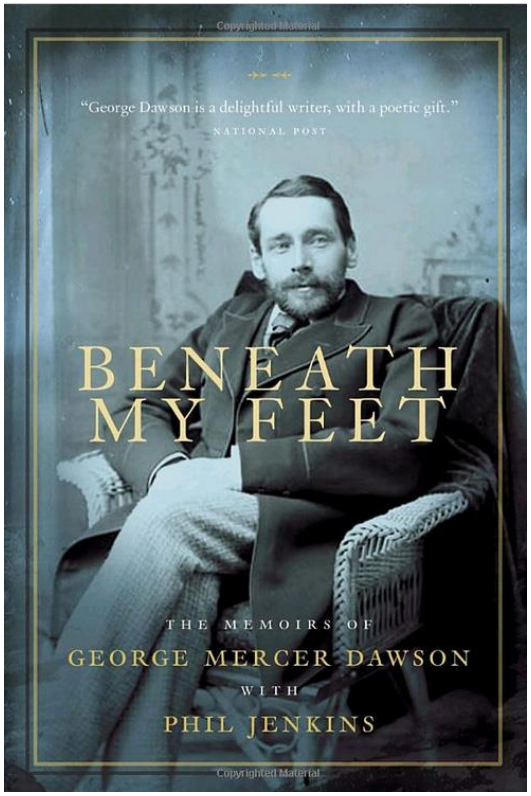
I Send you my necessary sample of "Pugwash" Sandstone.

Will you be good enough to examine this stone and report as if its qualities as a building material

Your (?)
Thomas Fuller

The Hunt For Red Sandstone

Looking for stone replacement options



Dr. George Dawson
Geological Survey of Canada

The Hunt For Red Sandstone

Looking for stone replacement options

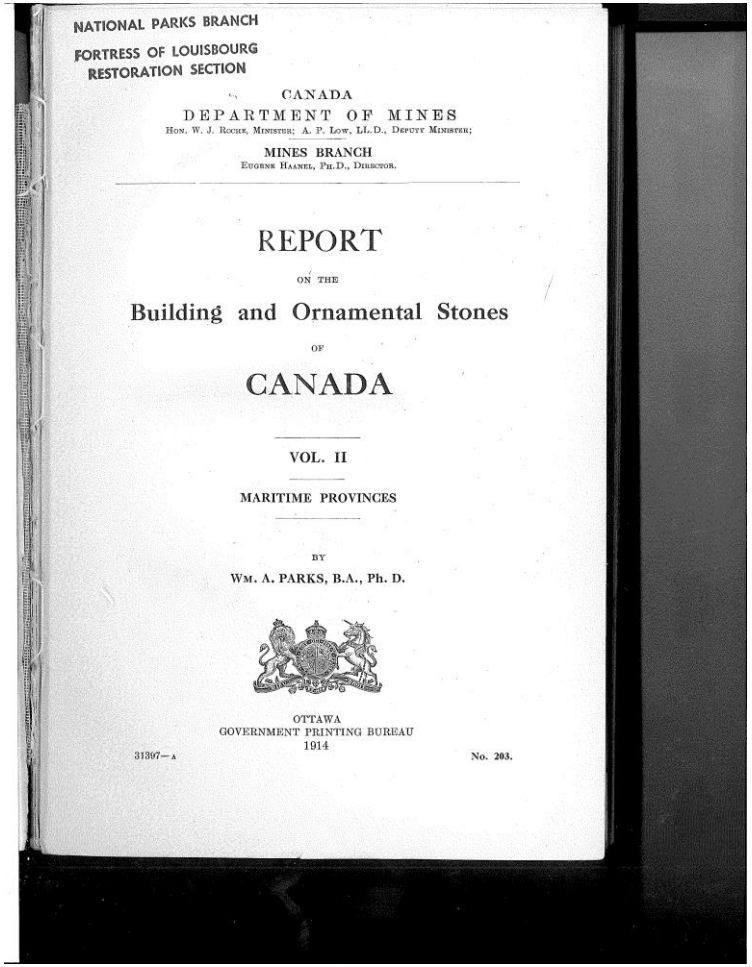
The Hunt For Red Sandstone

Looking for stone replacement options

Pugwash

The Hunt For Red Sandstone

Looking for stone replacement options



NATIONAL PARKS BRANCH

FORTRESS OF LOUISBOURG
RESTORATION SECTION

CANADA
DEPARTMENT OF MINES
HON. W. J. ROCHE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;
MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR.

REPORT
ON THE
Building and Ornamental Stones
OF
CANADA

VOL. II

MARITIME PROVINCES

BY
WM. A. PARKS, B.A., Ph. D.

OTTAWA
GOVERNMENT PRINTING BUREAU
1914

31397—A

No. 203.

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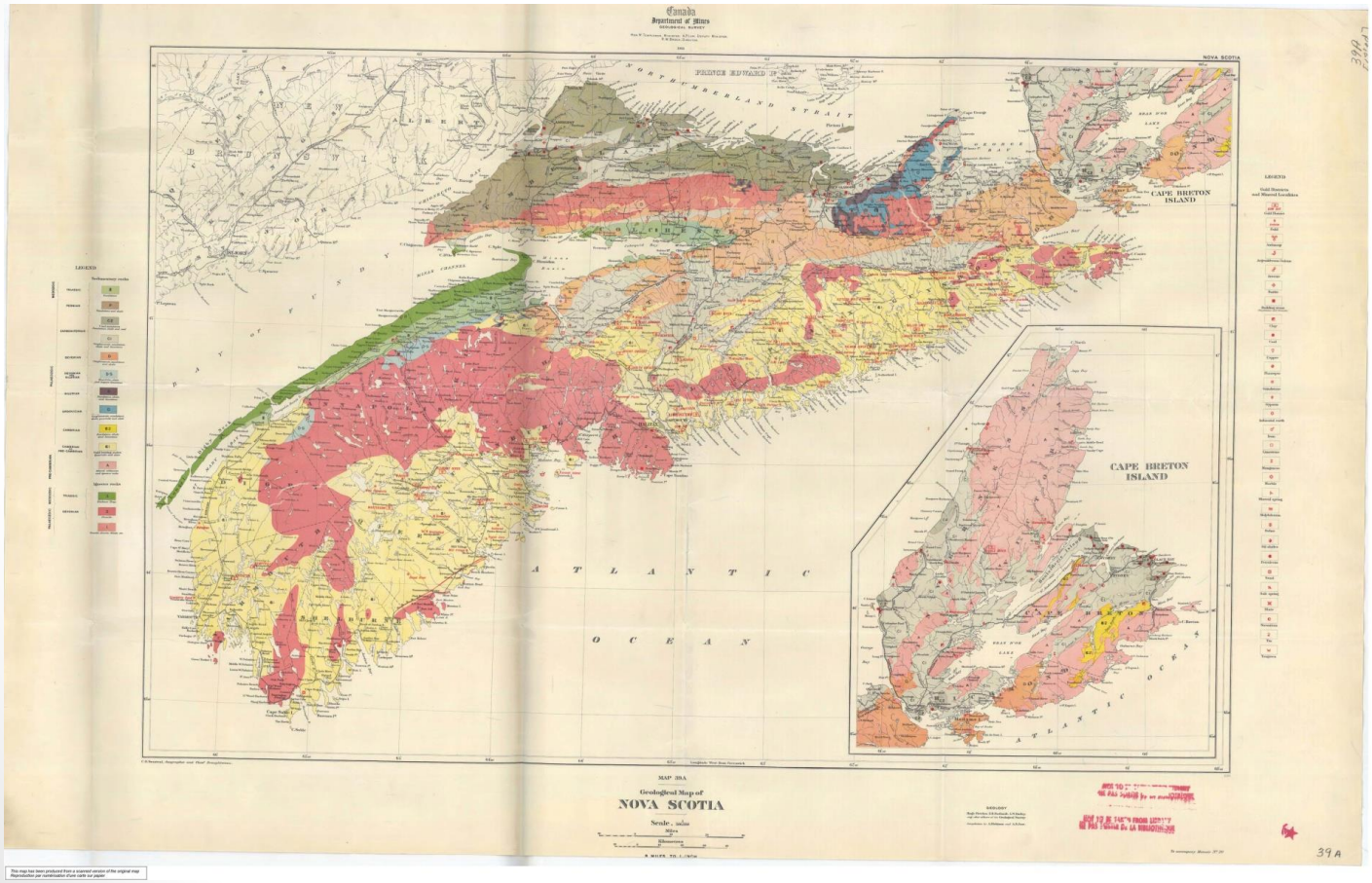
Looking for stone replacement options



The Hunt For Red Sandstone

Looking for stone replacement options

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Looking for stone replacement options

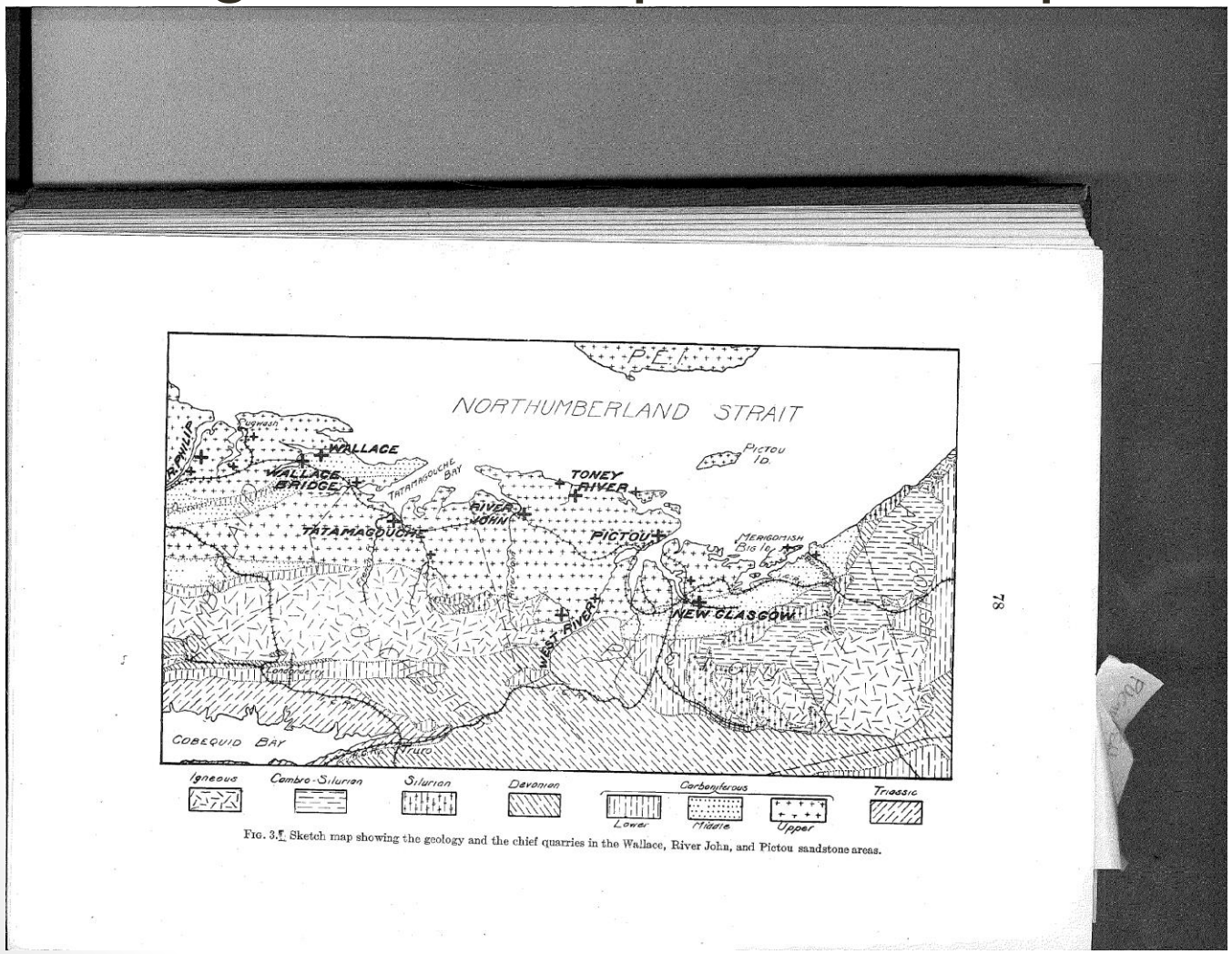
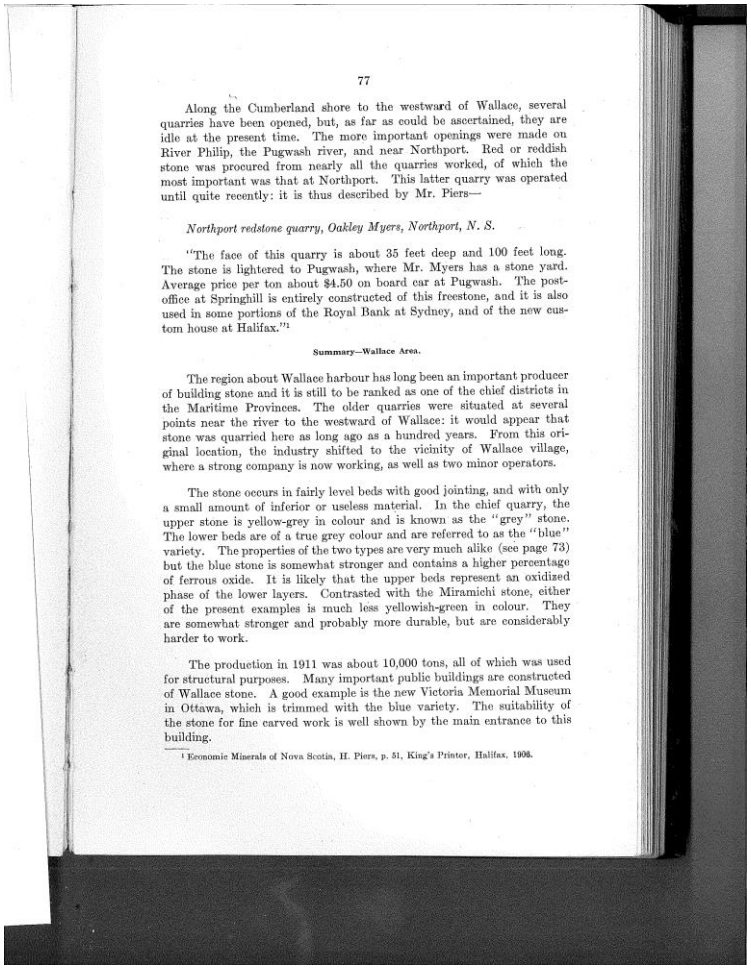


FIG. 3.—Sketch map showing the geology and the chief quarries in the Wallace, River John, and Pictou sandstone areas.

The Hunt For Red Sandstone

Looking for stone replacement options



77

Along the Cumberland shore to the westward of Wallace, several quarries have been opened, but, as far as could be ascertained, they are idle at the present time. The more important openings were made on River Philip, the Pugwash river, and near Northport. Red or reddish stone was procured from nearly all the quarries worked, of which the most important was that at Northport. This latter quarry was operated until quite recently: it is thus described by Mr. Piers—

Northport redstone quarry, Oakley Myers, Northport, N. S.

"The face of this quarry is about 35 feet deep and 100 feet long. The stone is lightered to Pugwash, where Mr. Myers has a stone yard. Average price per ton about $4.50 on board car at Pugwash. The post-office at Springhill is entirely constructed of this freestone, and it is also used in some portions of the Royal Bank at Sydney, and of the new custom house at Halifax."[1]

Summary—Wallace Area.

The region about Wallace harbour has long been an important producer of building stone and it is still to be ranked as one of the chief districts in the Maritime Provinces. The older quarries were situated at several points near the river to the westward of Wallace: it would appear that stone was quarried here as long ago as a hundred years. From this original location, the industry shifted to the vicinity of Wallace village, where a strong company is now working, as well as two minor operators.

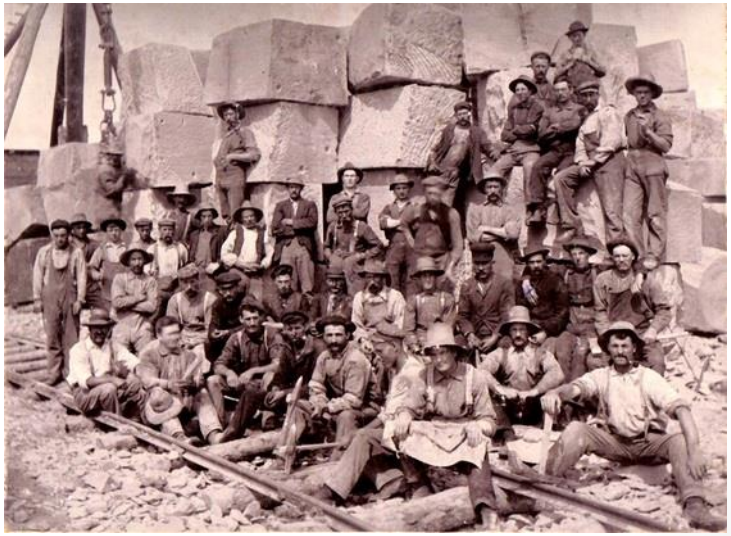
The stone occurs in fairly level beds with good jointing, and with only a small amount of inferior or useless material. In the chief quarry, the upper stone is yellow-grey in colour and is known as the "grey" stone. The lower beds are of a true grey colour and are referred to as the "blue" variety. The properties of the two types are very much alike (see page 73) but the blue stone is somewhat stronger and contains a higher percentage of ferrous oxide. It is likely that the upper beds represent an oxidized phase of the lower layers. Contrasted with the Miramichi stone, either of the present examples is much less yellowish-green in colour. They are somewhat stronger and probably more durable, but are considerably harder to work.

The production in 1911 was about 10,000 tons, all of which was used for structural purposes. Many important public buildings are constructed of Wallace stone. A good example is the new Victoria Memorial Museum in Ottawa, which is trimmed with the blue variety. The suitability of the stone for fine carved work is well shown by the main entrance to this building.

[1] Economic Minerals of Nova Scotia, H. Piers, p. 51, King's Printer, Halifax, 1906.

The Hunt For Red Sandstone

Wallace Quarry



The Hunt For Red Sandstone

A Farmer's Field, Beckwith, NS

The Hunt for Red Sandstone

AMHERST

The Hunt for Red Sandstone

Germany Weser Sandstone

- From near the small German town of Bad Karlshafen, surrounding countryside, including the medieval castle in the town constructed of the red Weser sandstone.

The Hunt for Red Sandstone

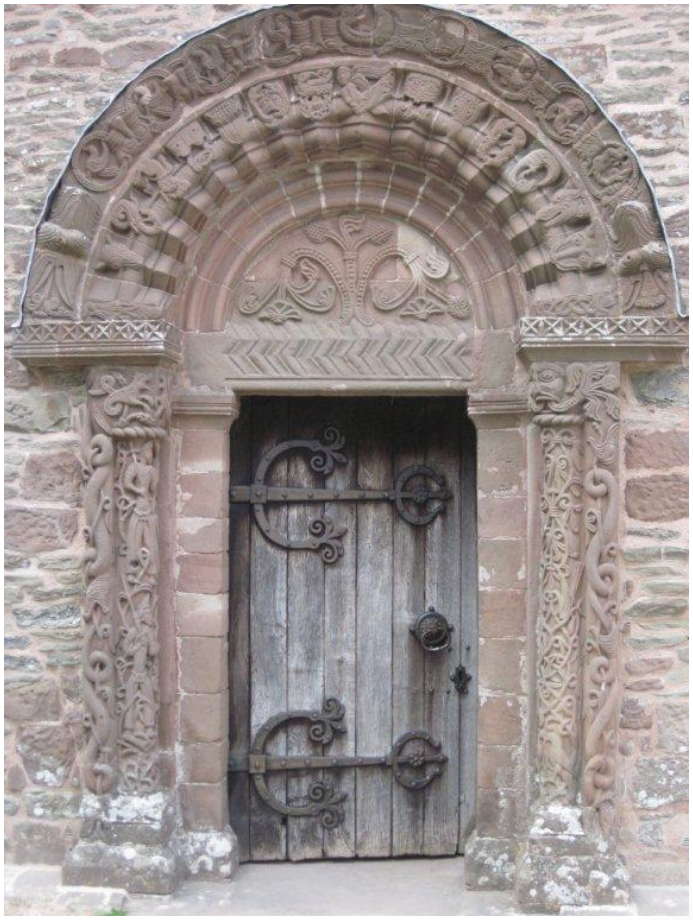
England – Forest of Dean

- colour of the stone was inconsistent given the
- inclusion of grey mottling through its blocks.

The Hunt for Red Sandstone

England - Callow Hill

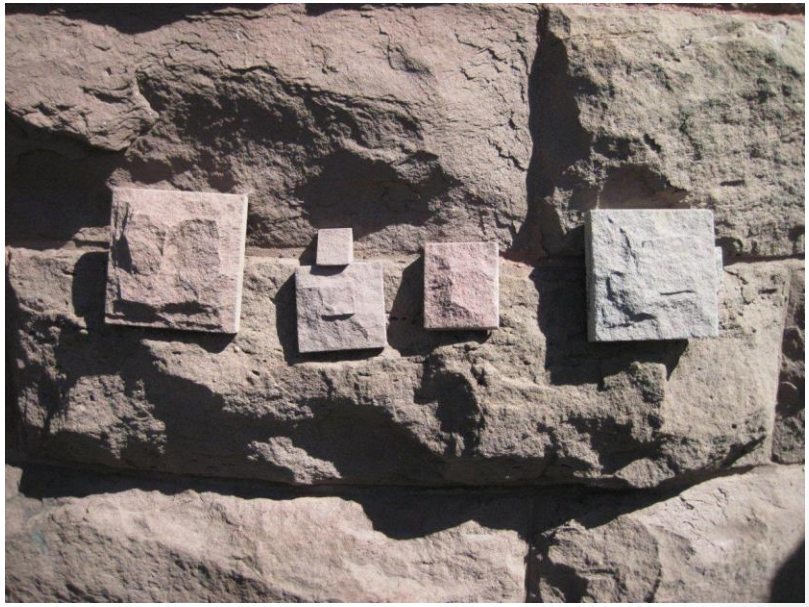
- A nearby Church, Romanesque,
- constructed of Callow Hill,
-



The Hunt For Red Sandstone

Looking for stone replacement options

- Comparing sand stone samples from Europe and Nova Scotia to the colour of the stone at the Armoury.



The Hunt For Red Sandstone

Looking for stone replacement options

HALIFAX ARMOURIES: stone source identification and comments table. **1st draft, April 2010**

STONE ID Nova Scotia New Brunswick UK United States Europe China	LOCATION	SUPPLIER (S) SOURCE CONTACT (SC) OWNER (O)	COLOUR LIKENESS (NO PATINA). GOOD OR LESS THAN GOOD.	PHYSICAL LIKENESS SIMILAR OR LESS THAN SIMILAR	CHEMICAL LIKENESS IDENTICAL OR SIMILAR *"not known" denotes testing required.	BED HEIGHT	AVAILABILITY	MISCELLANEOUS	APPROPRIATENESS FOR USE
Wallace River	Near Wallace, Nova Scotia	Tom Flynn (SC)	Less than good. Dark, lacking purple.	Not known	Not known.	2 foot+	Not available	Old abandon quarry built around by residential.	
Amherst, Coates quarry	Amherst, N.S.	Tom Flynn (SC), Fred Pellerin (SC), Gordon Dickie (SC), Wm. Parks, 1914, pg 67 (SC)	Less than good. Brighter red to slight purple tone	Similar, by hand exam.	Similar. More feldspar, decomposed. Ref. Wm. Parks, 1914	3 -4 foot	Not readily available. good potential.	Old abandon quarry built, nearby residential. Samples taken from Core Library, Stellerton.	
Amherst, possible old Curran quarry	Amherst, N.S. Sample taken from Court House	Fred Pellerin (SC), Wm. Parks, 1914, pg 69 (SC)	Good	Similar by hand exam, though coarser, abundant mica glisten.	Not known.	unknown	Not available	Exact location unknown. Presumed built upon within town centre.	
Beckwith moderate red	Beckwith, N.S.	Tom Flynn (S, SC), Fred Pellerin (S, SC)	Less than good. On bright side.	Similar by hand of coarser type.	Not known.	Reported to be upwards of 2 foot.	Good potential. Quarry not developed sufficiently to determine	Mostly used on a pull and haul basis by suppliers. Extraction challenges due to bed inclination.	
Beckwith brown	Beckwith, N.S.	Fred Pellerin (S, SC)	Good	Similar, medium grain	Not known	Reported to be 2 foot+	Good potential. Quarry not developed sufficiently to determine	Mostly used on a pull and haul basis by suppliers. Extraction challenges due to bed inclination.	Appropriate for use.
Gulf Shore	Pugwash, N.S.	Tom Flynn (SC), McFarland (land owner), Emily Kszan (SC)	Not known. Reported by previous owner to be buff coloured. Related to Chignecto Ship Railway stone supply of which stones are known to be buff coloured.	Not known	Not known	Not known	Not available. Abandoned historic quarry, surrounded by residential.	Emily has connected Pugwash with original stone supply for Armouries. Not clear if actually quarried there. Actual site access to quarry had not been possible to confirm quarry stone connection with Armouries and colour.	
Mt. Thom	Near Truro, N.S.	Shawn Power (SC)	Good -. Colour is on the dark side.	Similar, by hand exam, finer grain	Not known	Reported between 1 and 2 foot, possibly greater.	Fair potential.	Current use as aggregate. Damage by blasting likely.	
River John	River John, N.S.	Tom Flynn (SC), Wm. Parks, 1914	Unconfirmed good. Sample acquisition being sought.	Not known	Not known	Upwards of 3 foot.	Abandoned historic quarry. Potential.	Owners are reported to not want private land excavated.	
Pictou	Pictou, N.S.	Rolland MacDonald (S)	Less than good. Greyish.	Poor quality readily fragments.	Similar.	Beds are poor	Accessible from recently active quarry.	Owner has withdrawn this stone for use based on his own assessment of its poor quality. Excavation by limited blasting is not permitted by province.	
Sackville	Sackville, N.B.	Wm. Parks, 1914, pg 64 (SC)	Less than good. Brighter red, with vibrant interbeds.	Similar, by hand to finer grain of Armouries	Similar. More decomposed feldspar. Ref. Wm. Parks, 1914.	4 foot+	Not available.	Of historic interest only now. Poor quality extracted in 1970's. Sample observed was taken from historic building, Toronto.	
Wood Point	Wood Point, N.B.	Fred Pellerin (S, SC),	Good. Purple brown.	Similar, by	Similar. Wm. Parks,	4-5 foot	Potential for availability.	This stone requires further	

The Hunt For Red Sandstone

Looking for stone replacement options

HALIFAX ARMOURIES: stone source identification and comments table. **1st draft, April 2010**

		Wm. Parks, 1914 Report, pg 61 (SC)		hand exam.	1914	(historically)	Old quarry now Protected, but F. Pellerin describes potential for nearby opening of new quarry.	investigation to determine full potential.	
Mary's Point	Mary's Point, N.B.	Various persons (SC), Fred Pellerin (S?, SC), Wm. Parks, 1914, pg 51	Colours vary from red to light brown. Good red sample exists, if obtainable.	Similar.	Similar.	3-4 foot	Potential for availability in locality, further inland according to F. Pellerin. City of Halifax has stock pile of material reserved for upcoming project.	Despite a continued interest in purchase of this stone for various regional projects, the province is not permitting further extraction.	
Red Hollington	Hollington, Stoke-on-Trent, Uk	Staffordshire Stone Ltd., UK, (S, SC, O), British Geological Survey (SC)	Less than good. Brighter red.	Similar	Similar	2 + foot (to be confirmed)	Available.	Some dark banding flaws that must be avoided when specifying.	
Callow	Pontrilas, Herefordshire, UK	Black Mountain Quarries Ltd. ,UK (S, SC, O), British Geological Survey (SC)	Good.	Similar	Similar	3-4 foot	Available	Good candidate. Some grey veining to be avoided when specifying.	
Pennant Purple (Forest of Dean/Barnhill Lilac/Wattscliffe	Coleford, Forest of Dean, Gloucester, UK	Mine Train Quarry Ltd, UK (S, SC), British Geological Survey (SC)	Good. A shade light in the purple tone	Similar	Similar	2-3 foot	Available	Good candidate. Correct purple colour must be specified	
Realstone Hard Red	China?	Realstone Head Office, Derbyshire, UK (S, SC), British Geological Survey (SC)	Good. On dark side.	Moderately Similar, though very fine grained and compact appearance.	Similar	"Large dimensions"	Available, but continuity of supply/quality is not known.	Imported through UK supplier. Possible other suppliers in US. Quality control needs to be considered, provenance is vague.	
Cove Red	Scotland, UK	Realstone Head Office, Derbyshire, UK (S, SC), British Geological Survey (SC)	Less than good. Terracotta coloured. Dark lines weave through bedding.	Similar	Similar	" Large dimensions"	Available.	Obtaining a sample is still pending. Colour does not look promising.	
Red St. Bees/ Stancliffe	Cumbria, UK	Stancliffe Stone (S, SC), British Geological Survey (SC)	Less than good. Brick red colour	Similar	Similar	3-4 foot	Available	Colour not near enough. This stone enjoys a great deal of popularity within Canada as a replacement red sandstone.	
"Lilac"	East Europe	Traditional Cut Stone, Richard Carbino (S, SC)	Less than good. Purple tone is too vibrant	Less than similar. Relatively fine grained	Similar -	3-4 foot.	Available. Continuity of supply is not known.	Exact location of quarry is kept unknown by the supplier. Quality control may be difficult.	
Weser red sandstone	Bad Karlshafen, Germany	Shawn Power (SC)	Good. On dark side, lacking a degree of purple.	Less than similar. Quite fine grained.	Similar -	4 foot+	Available. Has good reputation for continuity of supply.	Colour is lacking. Rather fine grained.	
Portland Brownstone	Portland Connecticut, US	Mike Meehan (S, SC)	Good.	Less than similar. Interbanding	Similar	Traditionally good bed heights, but currently limited,	Available. Continuity of supply not known.		

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The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

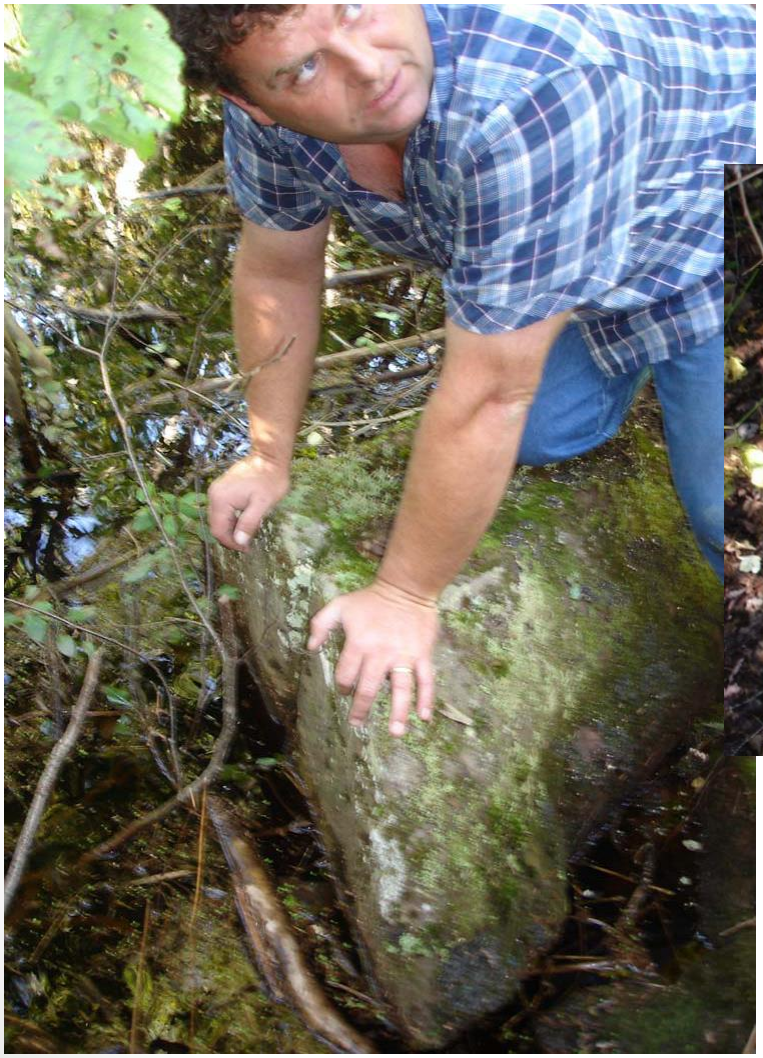
Eel Creek

The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

Eel Creek



The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

Eel Creek

The Hunt For Red Sandstone

Eel Creek

closed in 1899 the year the Armoury was completed

The Hunt For Red Sandstone

The Hunt For Red Sandstone

The Hunt For Red Sandstone

bingo!

Test show the North Park Armoury stone sample together with the Eel Creek and Beckwith samples, all have the same properties.

Figure 2: One specimen from each sample is shown in this image to compare the general appearance and color. Note that all are a uniform red color with little difference in hue. All are monolithic with few obvious sedimentary structures.

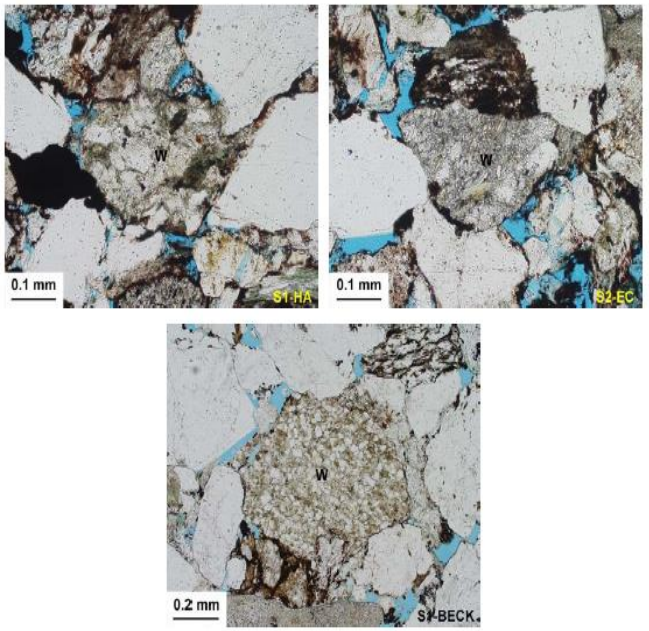
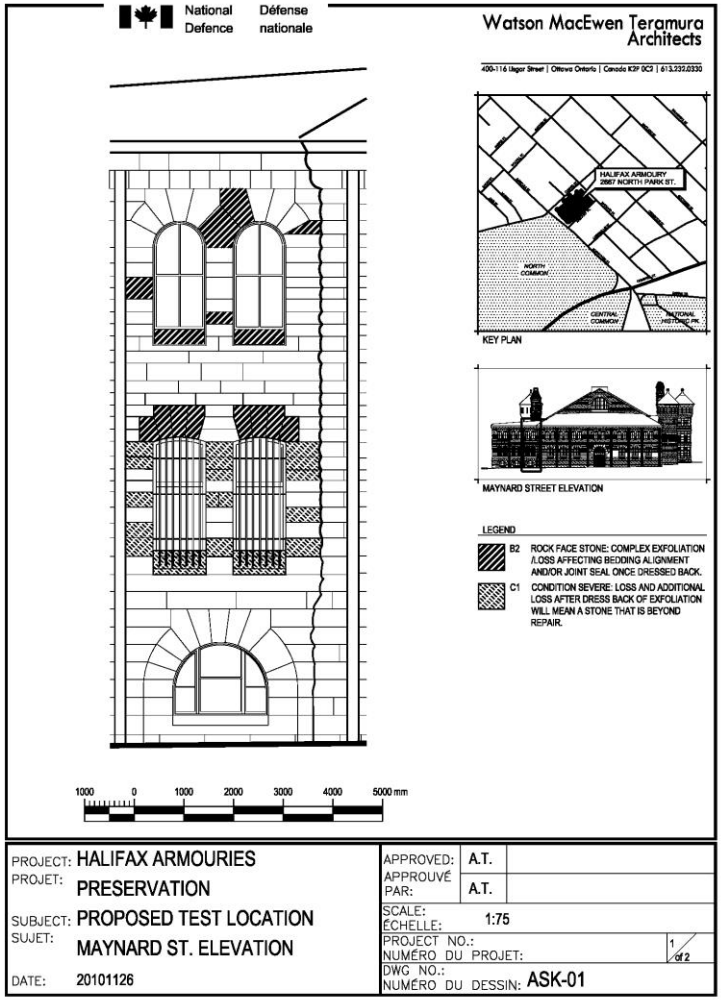


Figure 14: PPL photomicrographs illustrating the occurrence of wacke grains (W) in all three samples. These are highly variable in composition but generally contain fine quartz silt, feldspar, and matrix material. Chlorite is common. The wacke represents a sedimentary source rock eroded to produce all three sandstones examined.

The Hunt For Red Sandstone

Pilot Project



The Hunt For Red Sandstone

Pilot Project

Windows

The Hunt For Red Sandstone

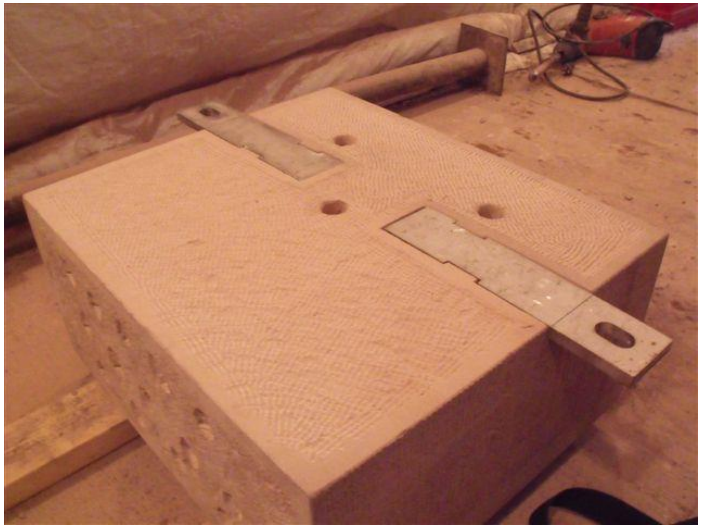
Pilot Project

Stone replacement

Dutch repair

The Hunt For Red Sandstone

Pilot Project



New design for metal grills SS bracket attachment

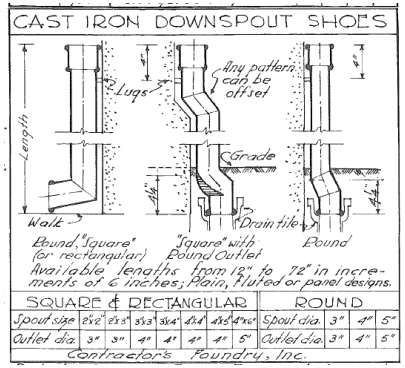
The Hunt For Red Sandstone

Pilot Project

Methodologies for structure support and shoring during repairs

The Hunt For Red Sandstone

Pilot Project



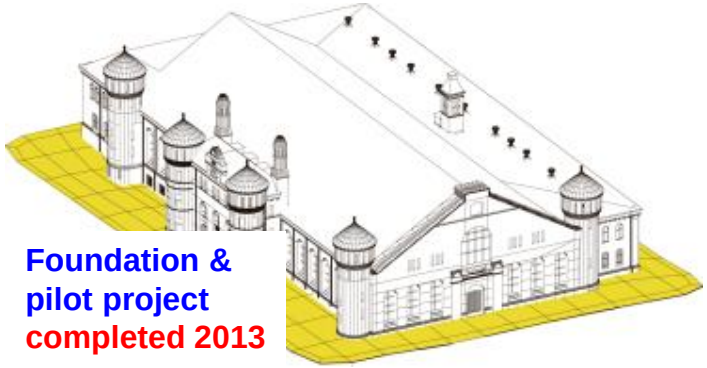
Downspouts and gutters

The Hunt For Red Sandstone

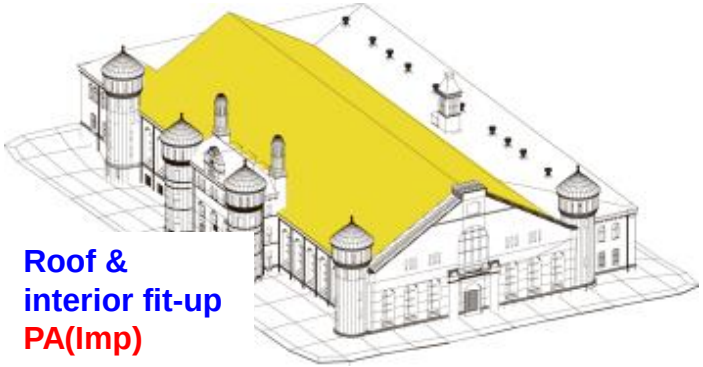
Pilot Project

The Hunt For Red Sandstone

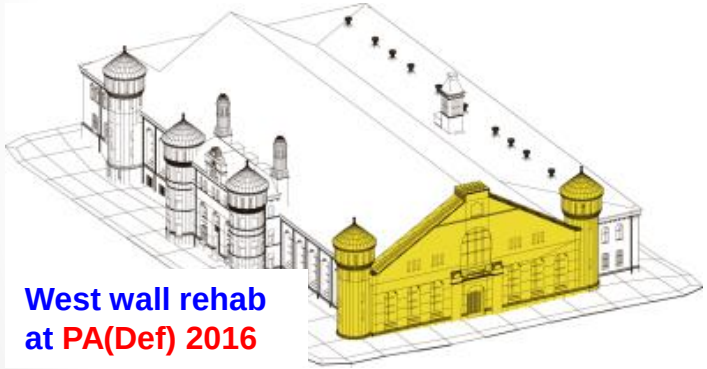
West Wall and other future works



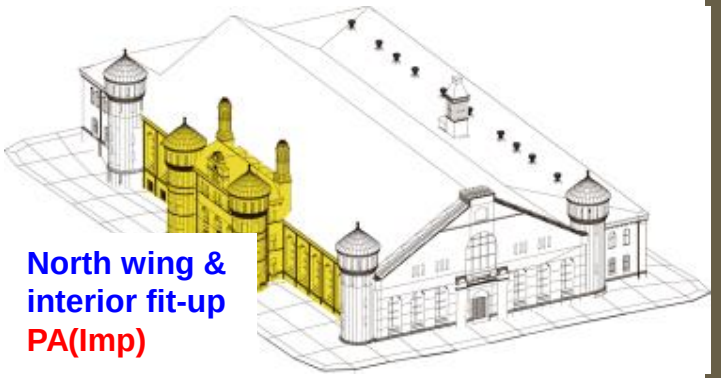
Foundation & pilot project completed 2013



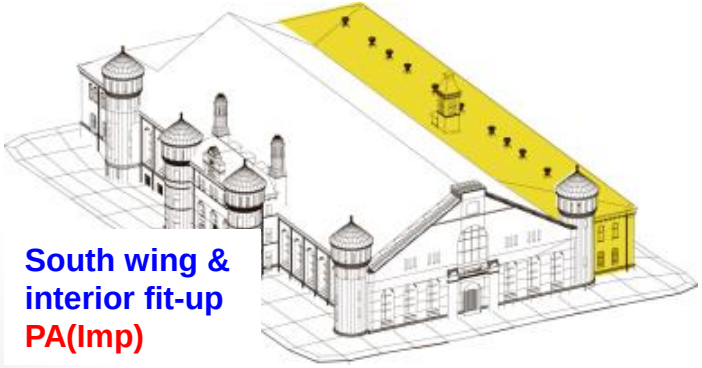
Roof & interior fit-up PA(Imp)



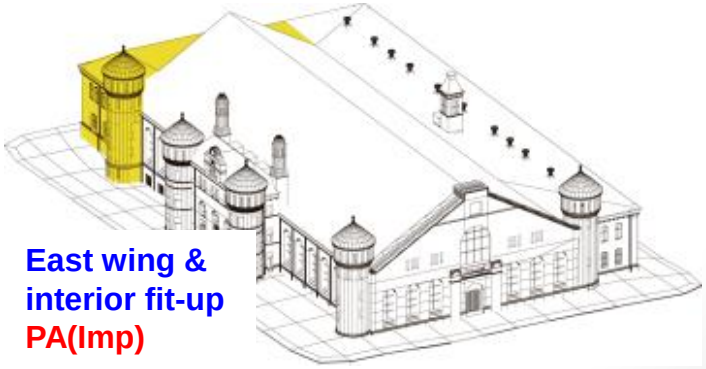
West wall rehab at PA(Def) 2016



North wing & interior fit-up PA(Imp)



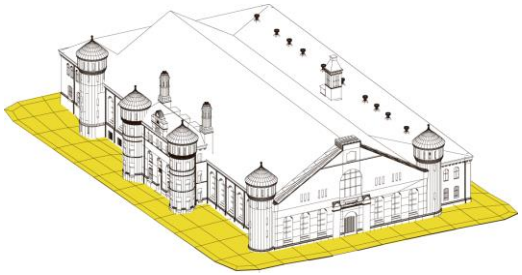
South wing & interior fit-up PA(Imp)



East wing & interior fit-up PA(Imp)

The Hunt For Red Sandstone

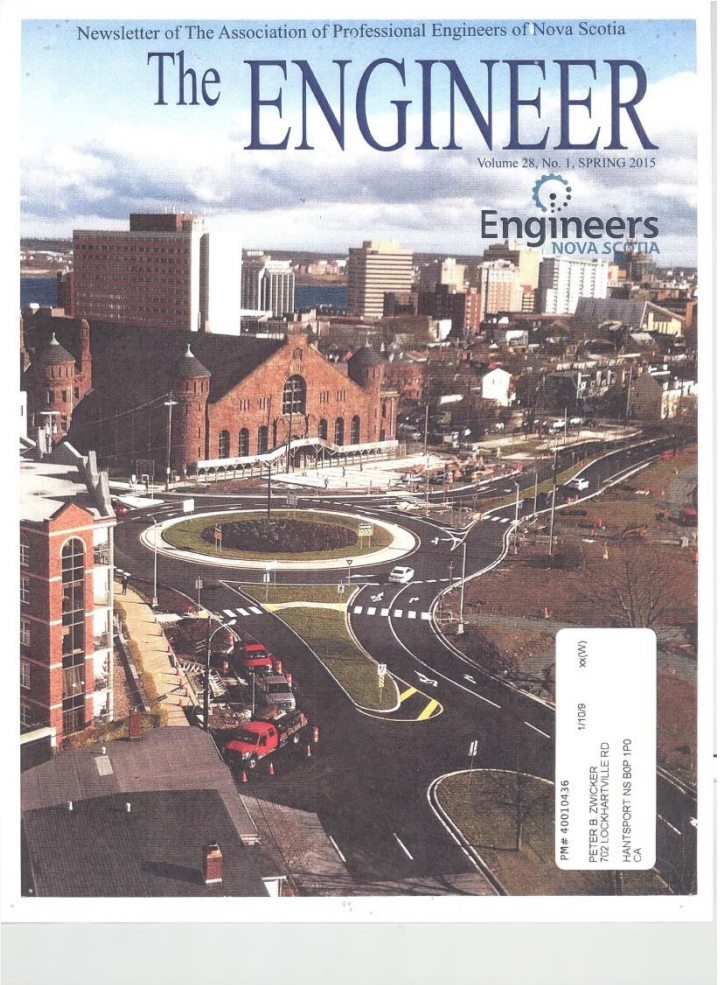
Foundations



The Hunt For Red Sandstone

Foundation Repairs
2013
north elevation, surprise canons

The Hunt For Red Sandstone



Roundabout HRM

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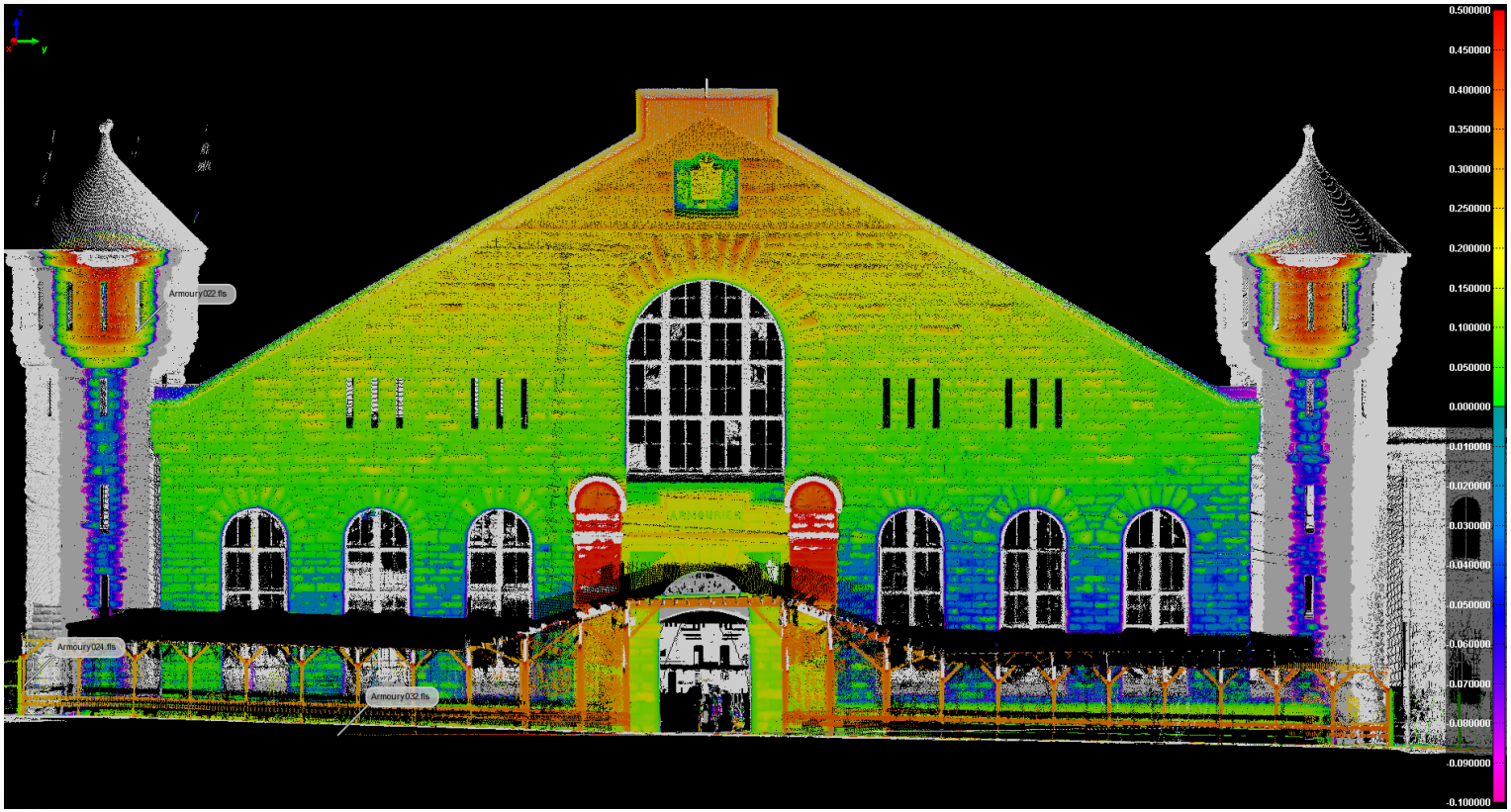
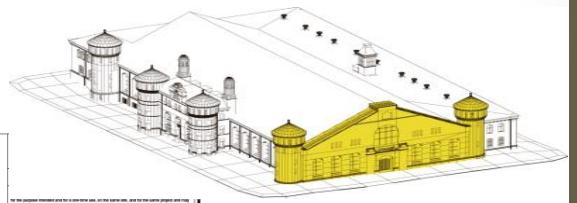
Future works

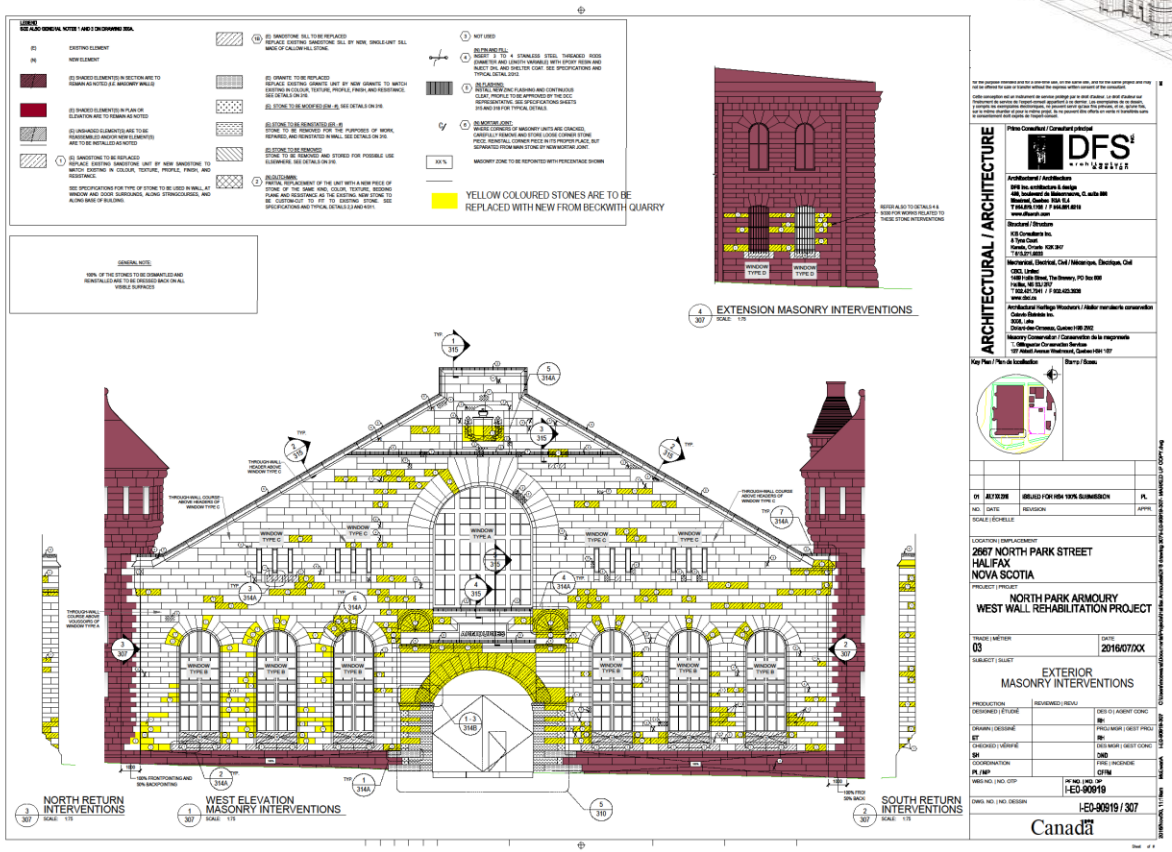


Tilting of West Wall – Halifax Explosion

The Hunt For Red Sandstone

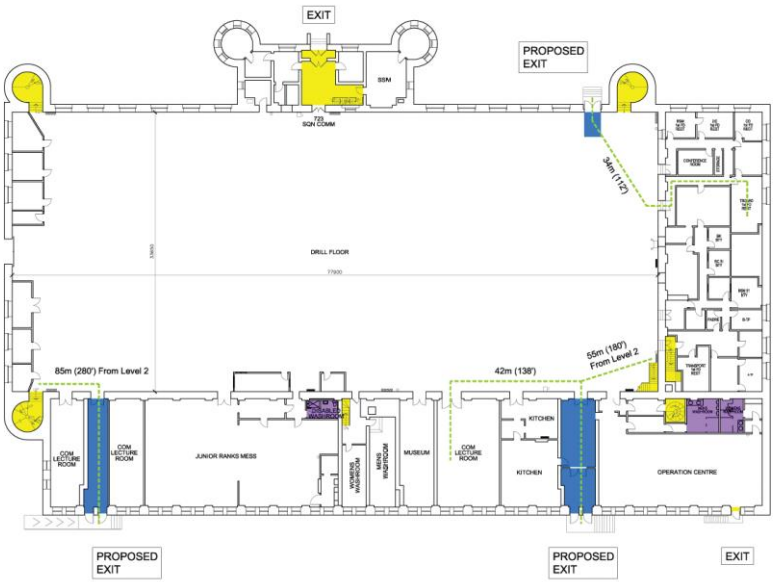
Future works

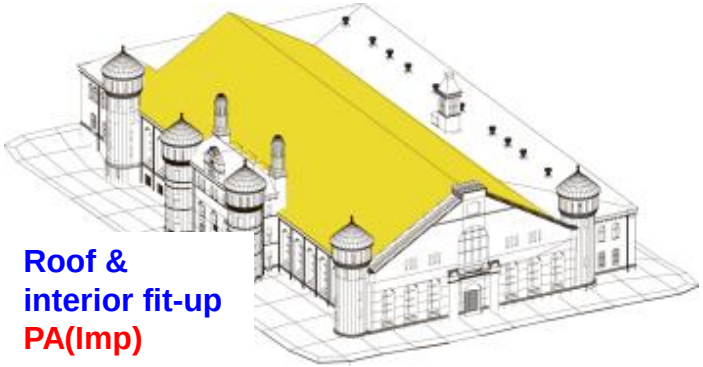




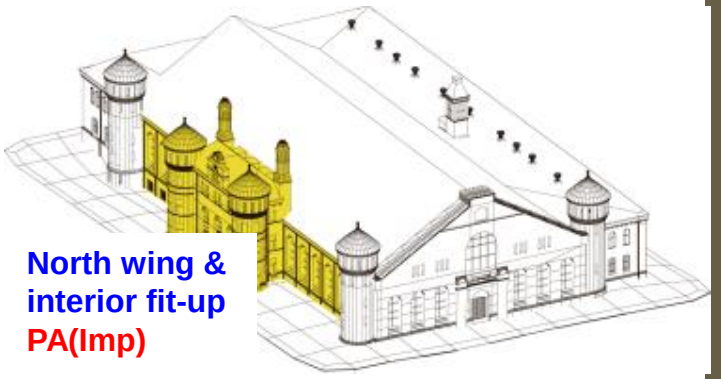
The Hunt For Red Sandstone

Future works Upgrades to health and life safety including upgrades to services

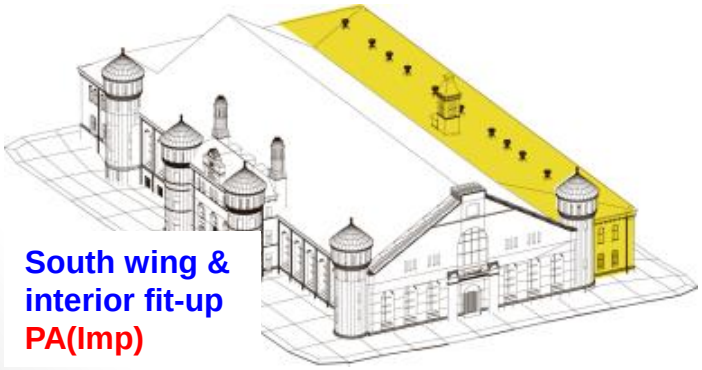




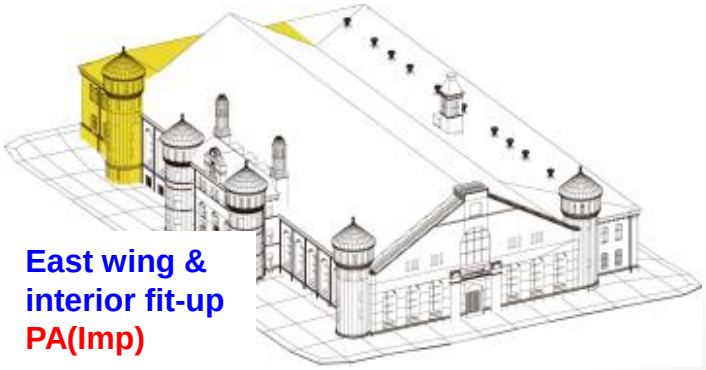
Roof & interior fit-up PA(Imp)



North wing & interior fit-up PA(Imp)



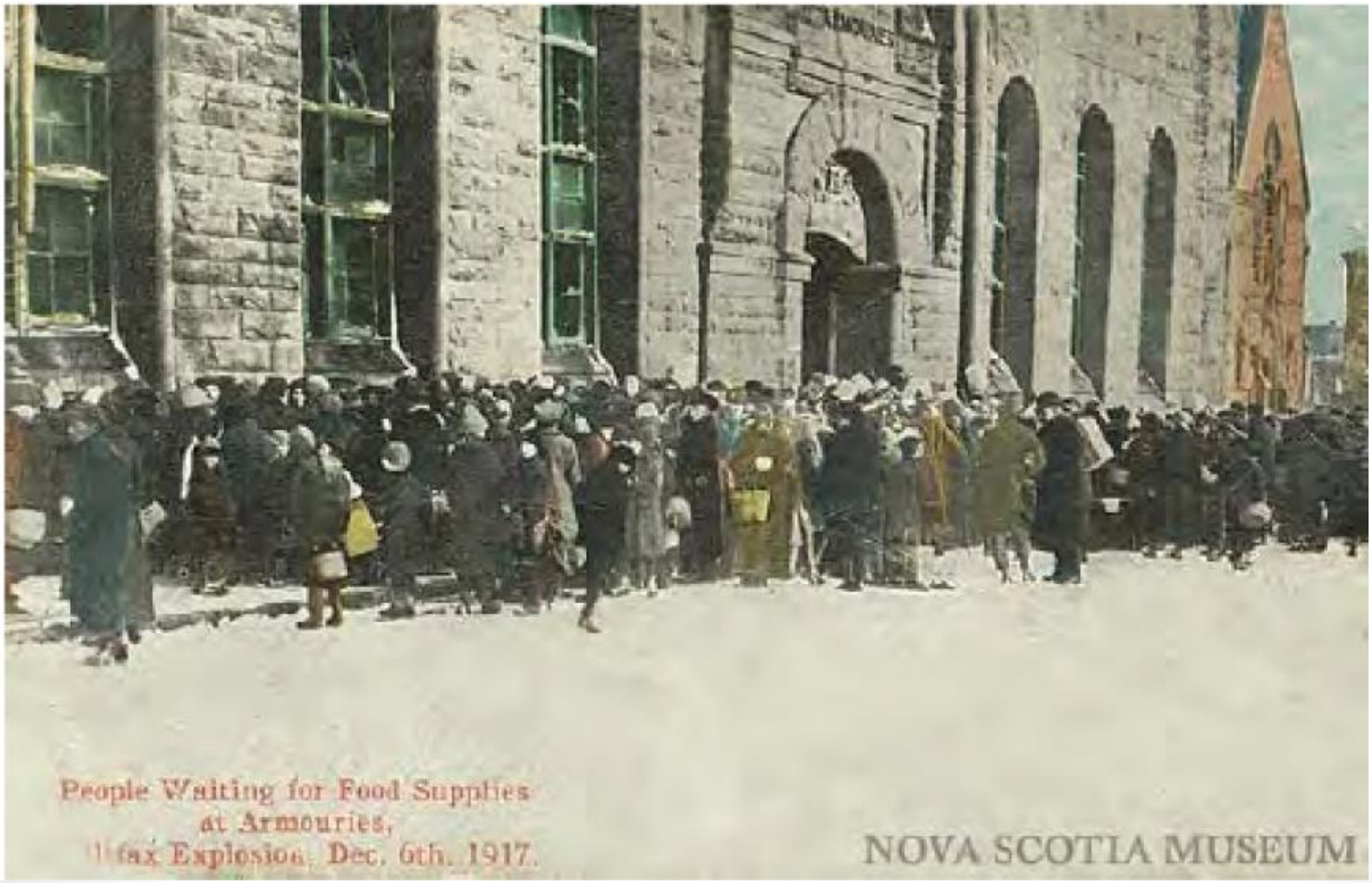
South wing & interior fit-up PA(Imp)



East wing & interior fit-up PA(Imp)

The Hunt For Red Sandstone

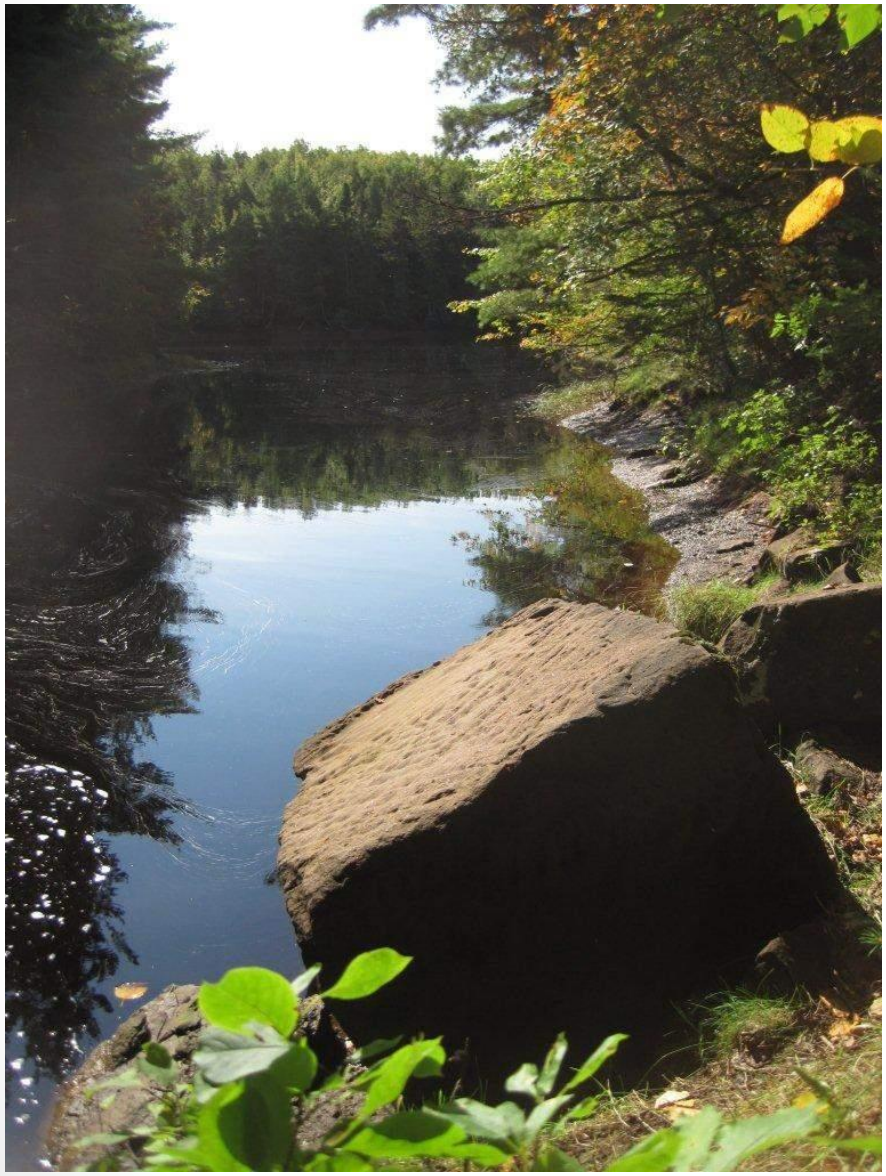
the Armoury as "**Landmark**"



The Hunt For Red Sandstone

the team

The Hunt For Red Sandstone



The End