



Report to Council

Department: Community Services
Division: Parks and Facilities
Date: August 24, 2020
Prepared by: Doug Sweet, Director of Com. Services/Deputy CAO
Report Number: Parks and Facilities-2020-07
Subject: Essex Centre Sports Complex Structural Repairs
Number of Pages: 14

Recommendation(s)

The following recommendations are provided for Council's consideration:

- a) That Community Services Report CS-2020-007 entitled "Essex Centre Sports Complex Foundation Repairs" **be received**; and
- b) That Council **award** the "Request for Tender –Slab Repair and Reconstruction at the Essex Centre Sport Complex" to Vince Ferro Construction Ltd. in the amount of \$329,421.00 excluding non-refundable Harmonized Sales Tax; and
- c) That Council **approve** CIMCO Refrigeration to perform all refrigeration work including but not limited to draining the system, removing and installing all current refrigeration pipes in the repair area in the amount of \$175,000.00 excluding non-refundable harmonized sales tax, and
- d) Council **approve** an overall budget for the Essex Centre Sports Complex Foundation Repair project in the amount of up to \$625,000, which includes items number 2 and 3 above, and the consultant costs (Haddad Morgan and Associates and CT Soils), the boiler removal and installation from mechanical room, the rubber floor removal and installation and repair work from damaged underground electrical conduit for the Shaheen Rink; and further

- e) Council approve, if required, total funding for the Essex Centre Sports Complex Foundation Repair project in the amount of \$625,000.00 by utilizing the \$85,000.00 in approved project CS-20-0018 Essex Arena Floor Repairs (\$42,500 coming from Asset Management Lifecycle Reserve and the other \$42,500 from property taxation) and the remaining unfunded balance of \$540,000.00 being funded accordingly: \$169,259.00 - General Arena Reserve, \$84,600.00 - Essex Arena Expansion Reserve and the remaining \$286,141.00 - Asset Management Lifecycle Reserve.

Purpose

In accordance with the Town Procurement By-Law Number 1043, Council approval is required for purchases in excess of \$100,000.00 and the report additionally seeks Council's approval to award the tender to do the required repairs.

Background and Discussion

In November of 2019, the Essex Centre Sports Complex staff started to notice the hallway in the back third of the Libro Rink (main rink) at the complex was starting to lift. The Manager of Parks and Facilities continued to monitor the area (see Appendix A) and as the area started to heave more the engineering firm of Haddad Morgan and Associates (who were involved in the construction of the facility) was contacted to investigate the cause of the heaving. As part of their investigation Haddad Morgan brought in CT Soils (Geotech Engineers) to core drill a number of holes in various locations at a depth of 1.5 meters. Through these soil tests, it was determined ground water was entering the sub soils and the underside of the glycol lines were saturated (see Appendix B). In addition to the hallway it was identified the heaving expanded to include the mechanical room, cracking on the stairwell to the Libro rink and it appeared to be moving towards the Shaheen Rink. At the time of the soil testing there was no shifting or movement of the walls supported by the footings. Since the ice was removed from both rinks in April the heaving has predominantly subsided and the slab has mostly returned to its original position. Haddad Morgan noted in their review all heaving seems to be in-line with the refrigeration lines suggesting freezing of the sub surface soils. CT Soils found low

temperatures in the soil at the levels around the pipes and soils below the pipe layer were also noticed as being frozen which would have caused the heaving condition. At 1.2 to 1.3 meters below grade CT soils also observed free flowing ground water.

From their review and testing (see Appendix C), Haddad Morgan is recommending that the frost susceptible soils to the underside of footing be removed, big "O" drainage pipe with clear stone be placed at the base of the footings and all tied into a sump pump which will be under the staircase leading to the 2nd floor of the Libro rink to remove the groundwater. The scope of work will include:

- Removing all of the boilers and holding tanks including conduit in the mechanical room;
- Shoring up the under floor pumps for the glycol system that heats the dressing rooms stands, washrooms and meeting rooms;
- In the mechanical room, remove the concrete flooring and all of the sub soils down to the top of the spread footings and then excavate around the spread footing an additional 600mm in depth around the bottom of footings to install the drainage pipe;
- The area of excavation, (see Appendix D) will start in the mechanical room adjacent to the refrigeration plant and will continue across the hall floor of the Libro Rink east end under the staircase, as well as, up the main hall of the Libro Rink dressing rooms to the west side of the dressing room 4. At dressing room 4 the excavation area will travel south to the dasher boards of the Shaheen rink. The entire width of the hallway will be removed and up to 7 meters wide from the dressing room to the dasher boards;
- A double layer of ridged polystyrene insulation will be added along the foundation walls and also under the refrigeration lines pipes wall to wall and extended approximately 1200 mm in areas where there is only one wall to reduce, if not eliminate, movement of the cold downward;
- Glycol will be pumped out of the cold floor and underfloor warm lines and stored to reuse after the new pipes have been installed by CIMCO (current refrigeration contractor for the Essex Centre Sports Complex); and

- The subfloor material and existing refrigeration lines throughout the entire excavation area must be removed in order to place and compact the recommended backfill material of fine concrete aggregate commercial grade to allow for drainage and achieve compaction.

The work will be done in phases with the mechanical room occurring first. Once the mechanical room area is repaired the boilers can be reinstalled to provide hot water for the facility. After the mechanical room the work/excavation will be completed in approximately 40 foot sections. This will allow CIMCO to install new refrigeration lines which includes 4-150mm insulated cold floor lines and 4-75mm underfloor warm lines. Once completed each section will be pressure tested, and once the refrigeration lines are reinstalled the glycol will be returned to the system and the refrigeration plant could be started up while backfilling continues.

After all the work is completed and the concrete slab is laid, the rubber tile flooring will be installed back in the dressing rooms and main halls of the Libro and Shaheen Rink.

The consultant estimates that the work may take up to 50 days to complete and be able to re-open to the public. Once the work is complete and the refrigeration plant is back on line, it will take approximately 1 week to have ice ready in both rinks to be utilized by the public.

With the timeline to have the work complete, Administration did inquire if the work could be delayed until April 2021 when ice is not in the facilities. Haddad Morgan recommends the repairs should be implemented prior to the upcoming 2020 season, as if left, the heaving issue could get worse and spread, creating issues with the rink floors and potentially the public seating areas.

Administration also inquired on what options were available to put one ice pad in (Libro Rink) while the repairs occurred to meet potential ice requests. After discussions with CIMCO, it is possible to run temporary glycol lines from the refrigeration plant along the Libro Rink stands and down to the header trench. The cost to run these temporary lines was quoted at \$70,000 and are not included in Administration's recommendations.

Town Administration worked with the engineer consultant from Haddad Morgan and Associates to develop a Request for Tender to perform a scope of work for the repairs, with the exception that CIMCO Refrigeration would be responsible for all work related to the refrigeration lines and this cost would be separate from the structural repair request in the tender. The Town of Essex sought tenders from qualified contractors for the aforementioned work and a request for tender, following the guidelines as set out in the Town's Procurement By-Law Number 1043 was posted both on the Town's website and Merx, and closed on August 19, 2020 at 3:00:00 pm.

The Tenders were reviewed for arithmetic errors, completeness, legibility, revisions and irregularities. In addition, there were no apparent unbalanced prices in the Schedule of Items and Prices. The results of the submitted tender prices are noted in Table below:

Name of Tenderer	Total Tender Price excluding non-refundable Harmonized Sales Tax (1.76%)
Vince Ferro Construction Ltd	\$329,421
Matassa Incorporated	\$493,224
Elmara Construction Co. Ltd	\$629,170

Vince Ferro Construction Ltd. submitted the lowest bid and upon review of their tender document, it was concluded that their tender is complete and satisfies all of the tender specifications.

Financial Impact

The Town Solicitor/Clerk and the Manager of Parks and Facilities have met with the Town Insurance adjuster to review if this repair would be an eligible claim under the Town's insurance policy. To date, we have not heard back from the adjuster but, Administration will continue to follow up. If all, or a portion of the repairs, cannot be covered through the Town's insurance, an unfunded balance of \$540,000.00 remains.

In the 2020 Community Services Arena Capital Budget, \$85,000.00 is allocated for project CS-20-0018 - Excavate Floor to Add Drainage, (\$42,500 coming from Asset Management Lifecycle Reserve and the other \$42,500.00 from taxation) to be put towards any work that may have to occur to address the heaving issue at the complex. The total estimated cost for this project is \$625,000.00; leaving an unfunded balance of \$540,000.00 that has not been budgeted for in 2020. The Director, Corporate Services and his department, reviewed potential revenue resources to address this unfunded amount and are recommending \$169,259.00 come from the General Arena Reserve, \$84,600.00 from the Essex Arena Expansion Reserve and the remaining \$286,141.00 from the Asset Management Lifecycle Reserve.

Consultations

John Olsen, Manager of Parks and Facilities

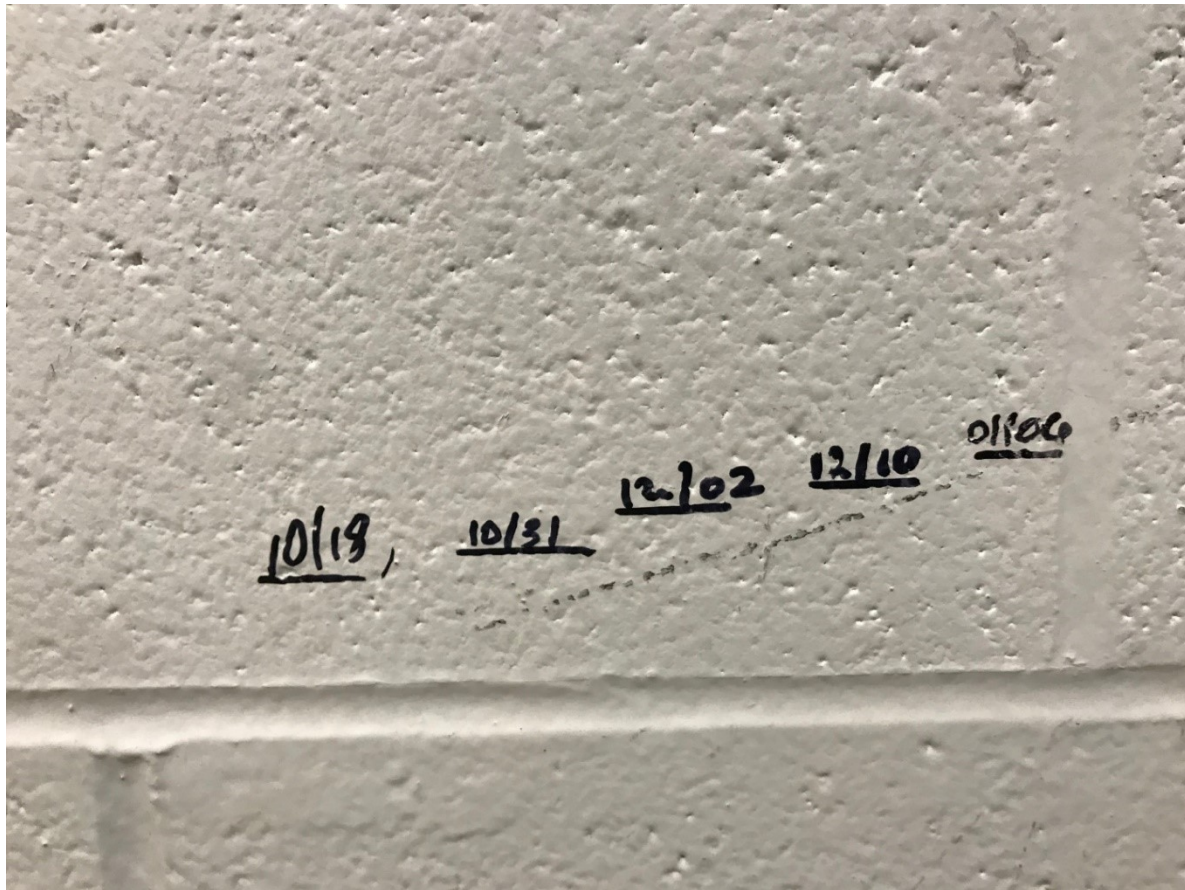
Will Tape, Haddad Morgan and Associates

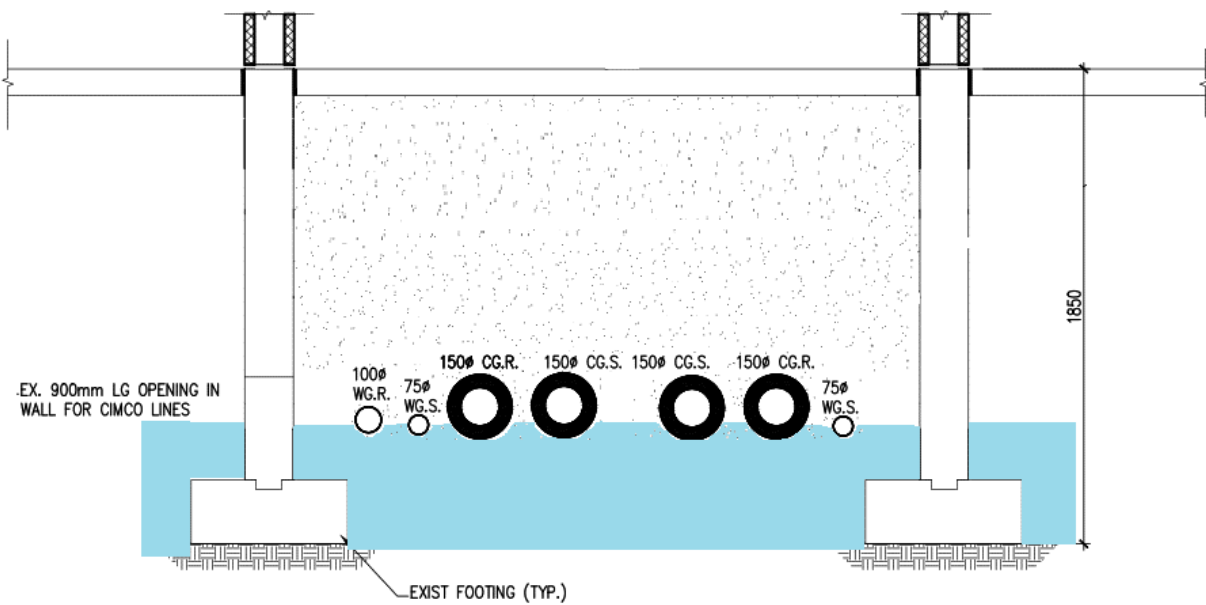
Jeffrey Morrison, Director of Corporate Services

Link to Strategic Priorities

- ☒ Manage, invest and plan for sustainable municipal infrastructure which meets current and future needs of the municipality and its citizens.
- ☒ Create a safe, friendly and inclusive community which encourages healthy, active living for people of all ages and abilities.
- ☐ Provide a fiscal stewardship and value for tax dollars to ensure long-term financial health to the municipality.
- ☐ Manage responsible and viable growth while preserving and enhancing the unique rural and small town character of the community.
- ☐ Improve the experiences of individuals, as both citizens and customers, in their interactions with the Town of Essex.
- ☐ Improve the Town's capacity to meet the ongoing and future service needs of its citizens while ensuring the corporation is resilient in the face of unanticipated changes or disruptions.

Appendix A – ECSC Heaving Benchmarking





Appendix C – Haddad Morgan and Associates Report



July 7, 2020

The Corporation of the Town of Essex
60 Fairview Avenue West
Essex, Ontario
N8M 1X7

Attention Mr. John Olsen, Manager of Parks and Facilities

RE: SLAB HEAVING ISSUES WITHIN THE ESSEX ARENA COMPLEX.
Our Project No. 19-a160

Mr. Olsen,

Pursuant to your office's request our office in conjunction with C.T. Soils & Materials Engineering Inc. have undertaken an investigation into the cause of the slab heaving within the rear areas of the above noted complex. The following report will summarize our findings.

Overview

The Arena building was constructed by Loaring Construction in 2008. The current facility is a Pre-Engineered Building structure with interior loading bearing masonry walls supporting hollow core planking to form the second level. The building houses two (2) ice rinks as well as various other community amenities.

In 2019 your office reported that the floor, towards the rear of the building, was lifting (heaving) as noted by shifting of the rubber floor and trim. Your staff was able to measure the differential movement as it increased.

Since the decommissioning of your rinks for the summer of 2020 this heaving has predominately subsided and the slab has mostly returned to its original position.

During the initial heaving observations you engaged our office and C.T. Soils to undertake an investigation. This included field review by our office and invasive soil testing and monitoring by C.T. Soils.

Observations

Referring to Attached Figure 1, heaving of the slab was initially noted in the main corridor, this area was expanded to include the mechanical room after cracks and heaving were identified in this location. Additional crack was noted in the stairwell from the main rink bowl to the exterior but at that time its relationship to the other heaving issues was undetermined.

As a supplemental note near the end of the investigation your staff did observe heaving in the area adjacent to the south rink. This area was noted as being inline with the refrigeration lines for the system.

At no time has shifting or movement of the walls supported on footings been observed.

It was noted during one of our site visits that the dry pond at rear of the building (east side) was continuously wet suggesting a high watertable. It is our understanding that this is not a common occurrence and has become more obvious in recent times. This is a condition observed at various locations around the Essex County region inclusive of its waterways and drains.

Having reviewed the design drawings for the refrigeration system it was noted that all observed heaving was in line with the refrigeration lines suggesting freezing of the sub surface soils causing the observed effect. As such C.T. Soil's was engaged to carry out a soils assessment to correlate the relationship of all observations and check for potential frozen soil affects.

C.T. Soils found (refer to attached report) low temperatures in the soil at the levels around the pipe. Soils below the pipe layer were also noted as being frozen which would cause the noted heaving condition. The report does note that the soils are saturated at depth of approximately 1.5 to 1.6m which would place these soils under the footing level of the building.

Reviewing the original construction documents and the following items were noted:

- the building does not have weeping tiles to drain the water away from the foundation/footing level. The absence of drainage at this level is consistent with a building without basement, such as this one.
- The associated soils report by Golder Associates does not note a requirement for any special drainage system as a result of the building function.
- The refrigeration system does note the presence of heating lines adjacent to the glycol lines which would be interpreted as preventing the current condition.

Conclusions and Recommendations

The presence of moisture combined with the chilling affect of the glycol lines has created an idea condition for the formation of frozen soils. In order to prevent this issue from reoccurring at least one of the following conditions must occur:

1. Delete any frost susceptible soils;
2. Remove the cooling affect on the soil or maintain a temperature above that which would cause freezing;
3. Remove the water to prevent the heaving.

Should any of the above conditions be removed the condition should be improved.

It is therefore recommended, based on the C.T. Soil's investigation that the frost susceptible soils to underside of footing be removed (point 1 above), and a drainage system be introduced along the pipes to remove excess water (point 3 above). Finally, insulation is to be placed under the pipe and extended for 1200mm (4'-0) past the pipe, or the equivalent thereof, under the pipes (point 2 above) to reduce if not eliminate movement of the cold downward.

Given the condition and observations we recommend that the repairs as noted be implemented prior to restarting the ice development for the 2020 Calendar year use.

Page 3

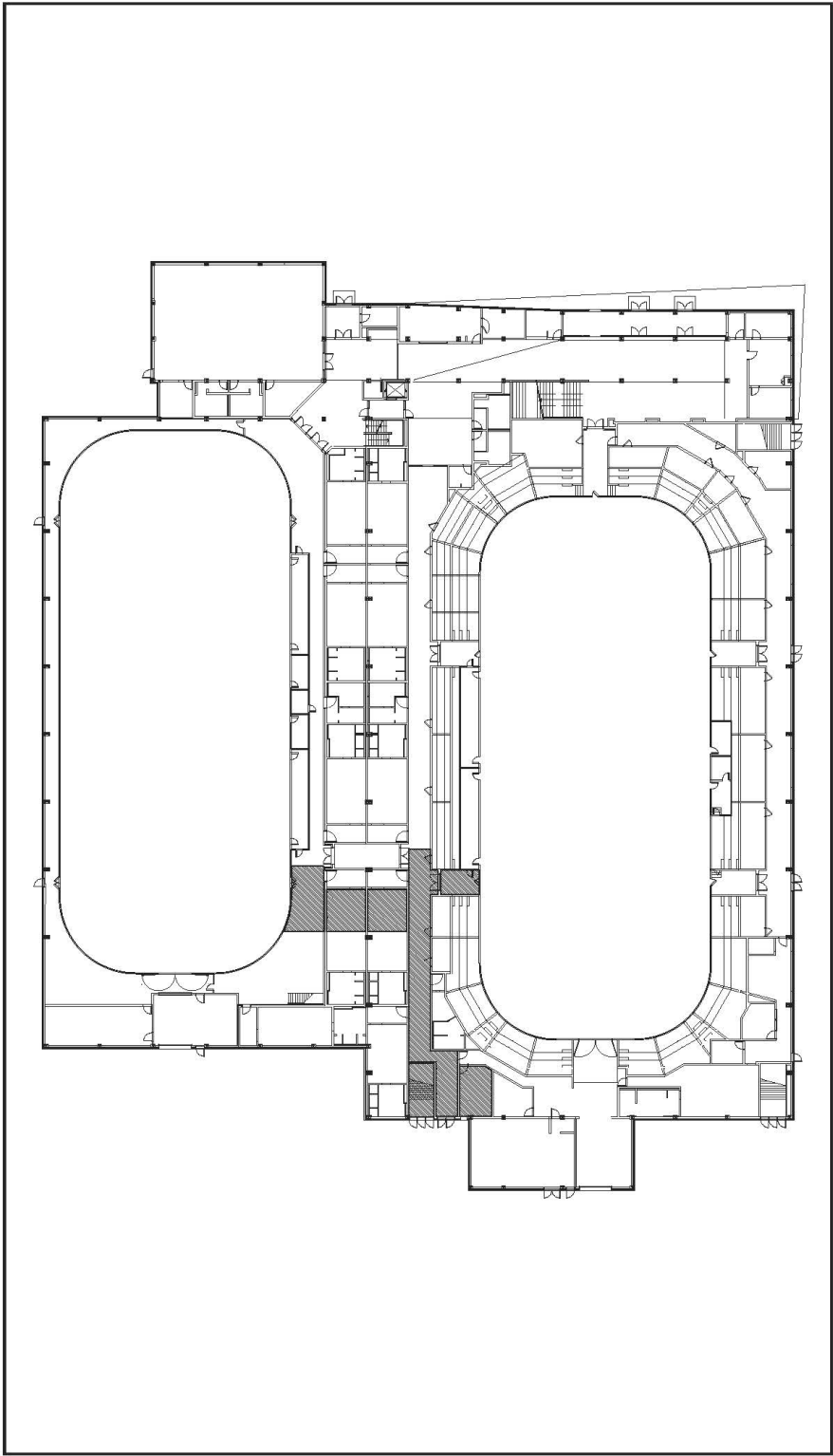
Closing

We trust that the above meets your needs at this time. Should you have any questions or comments please do not hesitate to contact our office. We wait your direction on the next step.

Yours Truly,
HADDAD, MORGAN AND ASSOCIATES LTD.

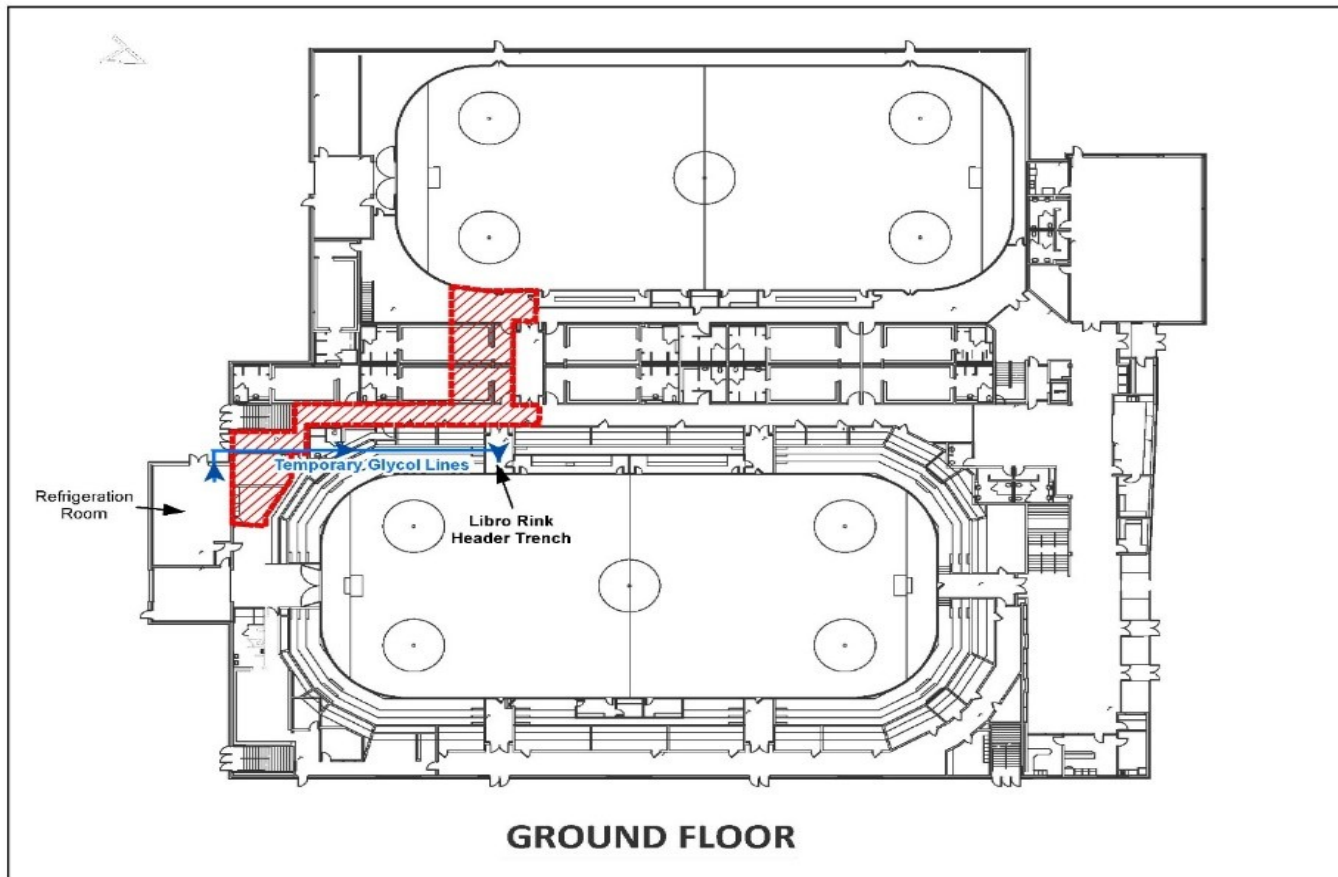
A handwritten signature in black ink, consisting of a large, stylized 'W' followed by a horizontal line extending to the right.

William Tape, Ph.D., P.E., P.Eng.
Senior Engineer



PROJECT		DATE		19-A160	
ESSEX ARENA INVESTIGATION		FIGURE 1		HADDAD, MORGAN AND ASSOCIATES LTD.	
DATE		DATE		CONSULTING ENGINEERS	
DATE		DATE		WINDSOR	
DATE		DATE		ON/AND	
DATE		DATE		FIG 1	

Appendix D – Area(s) to be Repaired



Essex Arena Floor Excavation

