Municipality Of Chatham-Kent

Infrastructure and Engineering Services

Drainage, Asset and Waste Management

Information Report

To: Mayor and Members of Council

From: Tim Dick, C.E.T.
Director, Drainage, Asset and Waste Management

Date: July 4, 2018

Subject: Fact Sheet for Emergency Shoreline Protection Construction, Replacement or Repair

---

This report is for the information of Council.

Background

At the November 6, 2017 meeting of Council, the following motion was approved:

"That the Municipality provide the residents of Erie Shore Drive with a break wall best practice spec sheet."

Comments

Depending on the particular development to be undertaken, the authority for approval of break wall construction falls under the Lower Thames Valley Conservation Authority, Ministry of Natural Resources and Forestry, and/or Fisheries and Oceans Canada. In response to the motion, administration contacted the Lower Thames Valley Conservation Authority requesting an information sheet that could be shared with Council and Erie Shore Drive residents regarding shoreline protection for new construction, replacement or repair. Attached (Appendix A) is the information provided.

Consultation

The Lower Thames Valley Conservation Authority provided the information attached.

Financial Implications

There are no financial implications resulting from this report.

Prepared by:

_____
Tim Dick, C.E.T., Director,
Drainage, Asset and Waste Management

Reviewed by:

_____
Thomas Kelly, P.Eng., MBA
General Manager
Infrastructure and Engineering Services

Attachment: Appendix A – Shoreline Improvement Information Sheet

P:\RTC\Infrastructure and Engineering\I & ES\2018\4025 - Information Report - Shoreline Improvement Information Sheet.docx

Appendix A

Fact Sheet for Shoreline Protection
Information provided by LTVCA - July 2018

Disclaimer:

The agencies involved in permitting shoreline protection works understand that with high water levels on Lake Erie, extreme conditions exist along Erie Shore Drive, which sometimes require emergency replacement/repair of shoreline protection works. Where shoreline protection structures are being rebuilt, the effectiveness and life expectancy (or design life) of works that are 'like-for-like' replacements are unknown and cannot be defined as detailed engineering analysis is generally not completed for these works.

Purpose:

Recent high water on Lake Erie combined with strong wind and wave events on the lake have led to numerous failures of the shoreline protection works along Erie Shore Drive. Typically, protection entails steel wall installations in the form of a shore wall and/or jetties. There has often not been enough time between a structure failure and the next event for a new design, agency review, and construction to be undertaken. As a result, many replacement and repairs are 'like-for-like' rebuilds. This Fact Sheet is being prepared to give property owners some guidance around the process for rebuilding their shoreline protection and some general guidance on what they should expect to see for installation items quoted by contractors.

What does 'like-for-like' mean?

'Like-for-like' refers to a rebuild where the structure occupies the same area as the former one did and is made of the same materials in the same design configuration. Each agency may view this slightly differently. For example, some may not necessarily require the same materials to be used. However, in all cases, the footprint of the structure on the lakebed cannot be increased. If the proposal does not qualify as a 'like-for-like' rebuild, it is considered a new work.

New Shoreline Protection Works:

Proposals for works that change the footprint of a shoreline structure or include infilling of the lakebed are considered 'new' works and typically require a more thorough and lengthy review from the agencies. Engineering studies may need to be undertaken and engineering design will typically be

required. Depending on what is being proposed, the project may need to be evaluated for the following criteria:

a) that the design appropriately considers natural coastal processes;
b) that the design doesn't negatively impact aquatic life including aquatic habitat;
c) that the works are effective against long-term erosion;
d) that existing beach features are preserved; and,
e) that the work does not result in unacceptable adverse impacts to adjacent properties or down drift shorelines.

Permits:

Various agencies are responsible for the review and permitting of shoreline protection works before they are constructed. They include the Lower Thames Valley Conservation Authority, the Ministry of Natural Resources and Forestry, and Fisheries and Oceans Canada. Failure to get the required permits could lead to enforcement actions. Proposals for shoreline protection works can be reviewed more quickly when they are emergency works and are 'like-for-like' rebuilds. Some agencies recommend flagging your proposal as emergency works when submitted to ensure they are dealt with in as timely a manner as possible. As shoreline protection works usually tie into the works on adjacent properties you may also require permission from your neighbours. A neighbour sign-off sheet for this purpose can be obtained from the LTVCA.

For information on obtaining permits, please contact:

- Lower Thames Valley Conservation Authority, 519-354-7310, permits@ltvca.ca
- Ministry of Natural Resources and Forestry, 519-773-9241
- Fisheries and Oceans Canada 1-855-852-8320, fisheriesprotection@dfo-mpo.gc.ca

Recommended Design Elements:

While the agencies always recommend hiring a professional engineer to design and oversee the construction of shoreline protection work, it is understood that residents also want to know themselves what goes into a good design.

Sheet pile structures should be driven deep enough that they are sufficiently below the lake scour depth to ensure structural stability of the works. The depth of sheet pile is an important engineering design consideration and a Rule of Thumb is hard to find. Structural Methods for Controlling Coastal Erosion by Charles O'Neill 1986, suggests that for structures with tiebacks, the depth of wall within the ground below the predicted lakebed scour depth should be 1.5 to 2 times the height above it. For walls without tiebacks, the depth of wall under the lakebed scour depth should be 2.5 to 3 times the height above. Given the cost of a sheet pile wall, most walls do not go that deep and require tiebacks.

Structures should have a means of draining water from the landward side of the wall. This prevents a buildup of pressure behind the wall during an event and helps dry out the area more quickly after an event. This drainage can be achieved with weeping holes through the wall or, if there is too much water, drainage tile behind the wall may be required. Consideration should be given to draining away all the water that comes over the wall during an event.

Consideration should be given to having a splash pad area on the landward side of the wall. This splash pad area should be constructed to limit erosion on the landside of the wall and to protect the tiebacks. Drainage elements could also be incorporated.

In order to prevent the lake from eroding along the side of the wall and eventually in behind it, flanking protection is required. This can be achieved by tying the wall into the walls on neighbouring properties or by the construction of a return wall that extends back landward from the lake.

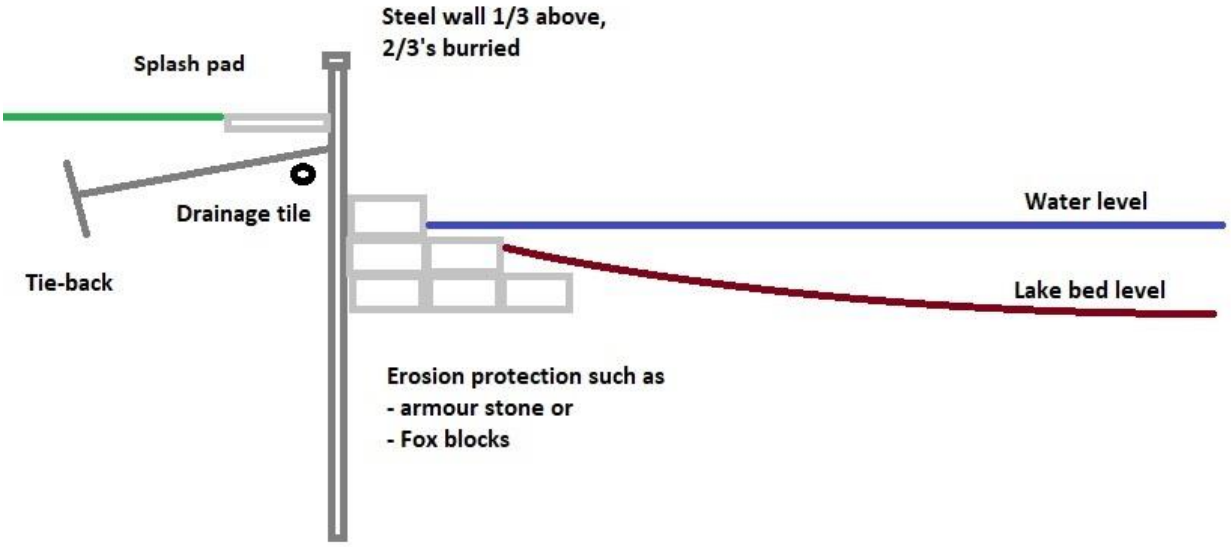
Erosion protection on the lakeside toe of the wall should be considered. This has been shown in some cases to prevent the down cutting of the lakebed. However, the material must be structurally competent so that it does not break down and become hazardous debris, such as flying debris during a wave event or a swimming hazard for you and your neighbours. For example, large armour stone is recommended over broken concrete.

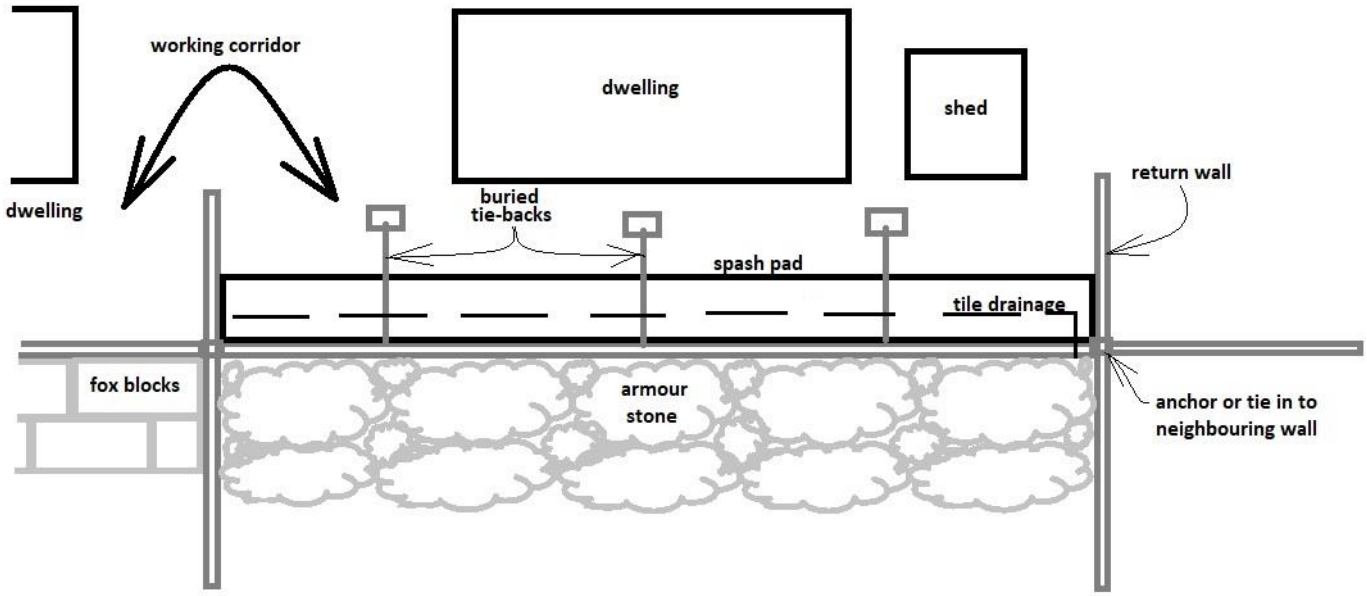
For all design elements, materials should all be free from contaminants and suitable for the purposes in which they are being used. Clean new material is recommended.

If possible, a working corridor should be maintained between the home/cottage and the shoreline protection so that repairs can be made from the land rather than having to go onto the water. Landowners should also consider a travel corridor between the home/cottage and neighbouring structures so that machinery can access the shoreline to undertake repairs.

Appendix A
Fact Sheet for Shoreline Protection
Information provided by LTVCA - July 2018

General Recommendations for Shorewall Design Elements





Shorewall Design Elements - Top View