Technical Guidance on Applications for *WSA* Section 11 Change Approval: *Small Craft Harbours in the Thompson-Okanagan Region*

Regional Water Management
Thompson-Okanagan Region
Ministry of Forests, Lands, Natural Resource Operations and Rural Development

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1. Introduction

This document provides guidance to applicants and qualified professionals (QPs) on Change Approval applications for small craft harbour works in the Thompson-Okanagan Region under the provincial *Water Sustainability Act* (*WSA*) Section 11 "Changes In and About a Stream".

A small craft harbour is a facility constructed to accommodate multiple recreational boats and boating-related facilities. In this Guidance, a small craft harbour means:

- a marina, which is a group moorage facility with commercial activity;
- a private group moorage facility with more than three berths (or slips); or
- a strata title or condominium moorage facility with more than three berths.

This Guidance applies to the construction, repair, upgrading, or removal of major components at a small craft harbour in the Thompson-Okanagan Region. These major components may include piers, platforms, walkways, boat lifts, boat launches, wave attenuators/breakwaters, and their associated elements if applicable (piles and mooring systems), as well as dredging.

This Guidance focuses on major hydrotechnical and engineering considerations of the statutory decision maker (SDM) during adjudication of the applications.

This Guidance does not cover environmental concerns during construction, or ecosystems concerns, nor does it cover the need for crown land permits or tenure. These are important aspects of any small craft harbour project that must also be addressed as part of the application.

2. Regulatory Requirements

For a *WSA* Section 11 application, the applicant must comply with the requirements of the *Act* and associated Regulations, including any directions of the SDM in respect of providing additional information or the giving of notice to potentially affected landowners or rights holders. The applicant will also need to comply with other applicable legislation, regulations, or bylaws. The SDM may refer the application to external agencies.

2.1 Typical Legislation Applicable to Small Craft Harbour Projects

- Federal (*Fisheries Act*, *Navigation Protection Act*, *Species at Risk Act*);
- Provincial (*British Columbia Fire Code*, *Engineers and Geoscientists Act*, *Heritage Conservation Act*, *Land Act*, *Riparian Areas Regulation*, *WSA*, *Wildlife Act*); and
- Regional and municipal (*Local Government Act*)

This may not represent a comprehensive list of all applicable Legislation.

2.2 Change Approval vs. Notification under *WSA*

According to *WSA* Section 11, a person may only make changes in and about a stream in accordance with:

a) the terms and conditions of a **Change Approval**,
b) the regulations,
c) the terms and conditions of an **Authorization**, or
d) an Order.

Part 3 of the Water Sustainability Regulation [1] outlines changes in and about a stream that may be done without a change approval or authorization. As provided in Part 3, a person may undertake certain "**authorized changes**" upon complying with the requirements, including **notification** to the habitat officer, and any specific terms and conditions of the habitat officer. Pursuant to Section 39(1)(d) of the Water Sustainability Regulation, the construction, maintenance or removal of a pier or wharf in a stream is an "authorized change" if the ebb and flow of water and the movement of material under the influence of waves or currents is not obstructed. A **Notification** is reviewed primarily by the Ministry's Ecosystems Section.

A **Change Approval** is required for the construction, maintenance or removal of small craft harbours. An application for **Change Approval** is adjudicated by a SDM within the regional FLNRO office. The applicant is encouraged to contact Regional Water Management (RWM) staff for clarification and instructions. This Guidance contains information to enable the QP to provide a robust application package to Ministry staff with regard to a small craft harbour. Deviations from the Guidance may be considered if supported by sound technical rationale based on quantitative evidence which is provided by a professional who is qualified to make such recommendations. Ministry staff may request more or less information than is presented in this Guidance as dictated by the individual situation. Communication with Ministry staff is encouraged.

3. Primary Considerations for Applications

RWM considers a small craft harbour to be a major project. Small craft harbours can contain millions of dollars of property and may be occupied by many people during peak seasons. Preservation of public safety and protection of property are among the considerations of a SDM when approving a project. Additionally, the SDM is required to consider the effect of a project on the environment and on surrounding infrastructure and other riparian owners or land owners whose property may be physically affected if the application is granted.

3.1 General

1) An appropriate project design is to be prepared for the proposed work. The design will be considered the foundation of the project with respect to decision making.
2) The design and all supporting materials (such as assessments, analyses, and studies) should follow applicable technical codes/manuals/guidelines/standards. References [2-5] (below) provide general design guidelines for a small craft harbour.
3) The project design and supporting technical work should be carried out by QPs. As per the provincial *Engineers and Geoscientists Act*, reporting on, designing or directing construction of harbour works falls within the practice of professional engineering. According to Section 22 of the *Engineers and Geoscientists Act*, the practice of professional engineering shall be carried out by an individual who is a member of Engineers and Geoscientists BC (EGBC) or holds a licence issued by EGBC. Therefore, with few exceptions, Professional Engineers, registered in BC, are the appropriate QPs for design of a small craft harbour. Certain supporting technical work may be conducted by other categories of professionals, for example Professional Geoscientists, and the applicant is encouraged to contact RWM for clarification. A QP must act within his or her area of expertise. When in doubt with regard to whether a QP is qualified to practice in small craft harbour design, a letter of support from EGBC should be sought.
4) The SDM may require independent peer reviews on the submitted design and supporting materials at the applicant's cost.

Other typical requirements are outlined in the following sections. For detailed requirements in a specific application, the applicant is encouraged to contact RWM before submitting the application.

3.2 Site Conditions

1) Common site conditions to be investigated may include weather (wind, precipitation, and ice), hydraulic and hydrologic factors (water levels, currents, and waves), bathymetry, geotechnical conditions (engineering properties of lakebed sediment and subsurface materials), the prevailing sediment transport regime, and topography.
2) Design conditions shall be established for the hydraulic and hydrologic factors, based on return periods, extreme condition, and operational condition. Where applied, extreme condition and operational condition need to be defined clearly.
3) To develop design waves, a detailed wave study may be required, which normally includes wind-wave generation and near-shore wave propagation. Numerical (and even physical) modeling may be necessary. Site conditions shall be considered in the study, such as weather, water levels, bathymetry, lakebed sediments, and influence of nearby obstructions. If applicable, typical near-

shore wave behaviors shall be properly addressed in the study, such as reflection, refraction, diffraction, shoaling, and breaking.

4) Where necessary, boat-generated waves shall be developed for project design, based on applicable boat sizes.
5) Where applicable, the effects of climate change shall be considered in developing site conditions (especially hydrologic and hydraulic conditions).
6) Site conditions shall be developed by QPs.
7) The SDM may request an assessment of site suitability for the proposed project based on site conditions.

3.3 Layout

1) The layout of a small craft harbour specifies locations, configuration, important elevations, and main dimensions for its components, such as berths, docks, walkways, turning basin, entrance, dredging plan, piles, mooring systems, and wave attenuators/breakwaters.
2) The layout shall be designed so as to provide a safe operational environment under site conditions of wind, current, and wave, which can be reflected commonly by two conditions:
   a) During operation seasons, boats can navigate safely around the entrance and in other navigable areas of the small craft harbour given site wind, current, and wave conditions; and,
   b) During operational seasons, if a harbour basin is subjected to wave impact, berthing tranquility is maintained under design wave conditions for berthed boats which are not secured at boat lifts; that is, actual wave heights at berths do not exceed prescribed acceptable maximum wave heights.
3) For the above two conditions, detailed design criteria need to be established, and satisfied through project design. General design criteria for berthing tranquility are provided in References [2, 4].
4) To assess conditions in 2(a) and (b), a wave study, which may include detailed modeling, may be necessary to specify wave conditions at different locations.
5) Conditions in 2(a) and (b) may be satisfied by implementing engineering measures, for example breakwaters or wave attenuators; or mitigating management plans, for example, limiting operation if a certain wind speed is exceeded. Engineering measures shall be appropriately designed for site conditions. Management plans shall be quantitatively developed based on site conditions of wind, current, and wave, as well as applicable boat sizes.

3.4 Impact on Wave Climate

1) When proposing the construction, removal, or major modification of a breakwater, wave attenuator, bulkhead structure, panel wall, rubble-mound structure, gravity structure, or floating structure, the applicant shall assess changes of wave conditions at the project site and in adjacent waters due to the proposed work. This wave assessment shall be quantitative.
2) For structures with densely-spaced piles, or for dredging projects, a wave assessment may be required to address changes of wave conditions if the SDM considers that the proposed work may alter wave climate around the project site.
3) The design and construction of a proposed small craft harbour shall avoid increasing wave loadings on adjacent structures and shoreline protection works.
4) Requirements of the wave assessment:
   - The assessment compares important wave characteristics under typical return periods at representative locations between pre- and post-project conditions, such as wave height, wave period, wave direction, and current velocity.
   - To perform the assessment, a detailed near-shore wave study, with numerical (and even physical) modeling may be required. Site conditions are considered in the study, and, if applicable, the typical near-shore wave behaviors are properly addressed.
   - Depending on results of the assessment, the SDM may request further studies, such as the long-term impact on sediment transport in adjacent waters.
5) It is recognized that any proposed works would create a potential change in wave conditions. An allowable change in wave conditions around the project site may be considered at RWM's discretion based on the assessment.

3.5 Water Quality

1) A proposed small craft harbour and associated construction activities must not cause adverse impacts on the existing water quality pattern within harbour basin or in adjacent waters.
2) When proposing the construction, removal, or major modification of a small craft harbour, the applicant may be required to assess the impact on water quality within the harbour basin and in adjacent waters due to the proposed work, if its harbour basin is subjected to poor water circulation and mixing (e.g., substantially enclosed by breakwaters, wave attenuators, bulkhead structures, panel wall, rubble-mound structures, gravity structures, or floating structures), the harbour is located in a substantially enclosed water area, or the harbour substantially shields a water area in a hydrodynamic sense. This water quality assessment shall be quantitative.
3) In other situations, for example, structures with densely-spaced piles or dredging projects, an impact study on water quality may be required if the SDM considers that the proposed work may cause a significant adverse impact on water quality around the project site.
4) Requirements of the water quality assessment:
    - The assessment employs an appropriate approach, and where necessary, numerical modeling shall be undertaken.
    - Water quality at representative locations under post-project conditions are modelled in the assessment, and compared with pre-project background conditions.
    - In the assessment, site conditions are properly considered, such as climate, waves, water levels, limnology, potential pollutant sources, background water quality, and bathymetry.
    - Provincial water quality guidelines and site-specific water quality objectives may apply to the assessment. The applicant is encouraged to contact RWM for clarification.
    - If applicable, seasonal variation of water quality is considered in the assessment.

3.6 Impact on Sediment Transport

1) A proposed small craft harbour work must not significantly modify sediment processes around the project site.
2) When proposing the construction, removal, or major modification of a breakwater, wave attenuator, bulkhead structure, panel wall, rubble-mound structure, gravity structure, or floating structure, the applicant may be required to investigate potential resultant long-term effects on the sediment transport regime with a sediment transport study which identifies:
    - local sedimentation processes (erosion, transport, and deposition);
    - sediment stabilization/destabilization factors for the stream mouth and beach/shoreline; and,
    - scouring and deposition around existing structures.
3) For structures with densely-spaced piles, or for dredging projects, a sediment transport study may be required if the SDM considers that the proposed work may cause a significant adverse impact on sediment processes around project site.
4) Requirements of the sediment transport study:
    - Long-term impacts on sediment processes, long-shore and cross-shore, caused by the proposed project are quantified in the study.
    - The study employs an appropriate approach. Where necessary, numerical modeling may be required.
    - Site conditions are considered in the study, such as weather, water levels, bathymetry, waves, sediment characteristics, water circulation, and influences of nearby obstructions.

3.7 Others

1) For important structural members such as piles, connections, and mooring systems, the SDM may request an independent peer review of their design at the applicant’s cost.
2) All proprietary designs of structural members shall take site conditions into consideration.
3) Where applicable, potential submarine geohazards, such as submarine slope failure, must be considered in the site suitability assessment, project design, and construction methods.

4) If a fueling station is involved at a small craft harbour project, an assessment for fire protection around project site, prepared by a QP such as a fire protection engineer, may be required. The assessment shall take site conditions into consideration, and be in compliance with *British Columbia Fire Code*.

4. Application Materials

General application procedure and materials for WSA Section 11 Change Approval are specified by the *Act* and the regulations. Additional information or help is available from FrontCounter BC. This Guidance describes typical requirements for design-related materials for a small craft harbour work.

4.1 Design Details

1) The project design, along with all supporting documents (such as assessments, analyses, studies, and drawings), must be submitted for the SDM's review.
2) It is understood that, for large projects, some design details may not be fully developed until final construction. In general, a Section 11 Change Approval focuses on major design details which are important for decision making. It is recommended that these major design details be fully developed, and remain for the final construction. If the applicant wants to modify these details after a Change Approval is issued, a written request shall be submitted to the SDM for further review.
3) Applicable major details to be provided for the SDM's consideration include, without limitation:
    - developed site conditions;
    - a general layout, which covers location, configuration, alignment, and dimensions of main components such as berths, docks, walkways, turning basin, entrance, and wave attenuators and breakwaters, and coordinates of important base points. The layout should be presented clearly by use of drawings;
    - the structural form of docks, platforms, walkways, wave attenuators/breakwaters, and mooring systems of floating structures;
    - elevations of main structural components, such as top and bottom of decking;
    - depth and draft of floating structures;
    - a pile plan for pile-supported structures (location, diameter, material, approximate bottom elevation of piles);
    - a dredging plan (plan dimensions and area, side slopes, target elevation of dredging, approximate dredged volume); and
    - construction methods for major components (especially piles).

4.2 Drawings

Submitted drawings must clearly illustrate design concepts as reflected in the design details above.

For detailed drawing requirements, the applicant is encouraged to follow "Appendix 4 Application Requirements – Example Plans" in the provincial ***Crown Land Use Operational Policy: Private Moorage***, which is available at http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/private_moorage.pdf

However, drawing formats/styles typically used in the general engineering practice of harbour design may be also acceptable. The applicant is encouraged to contact RWM for clarification.

References

[1] The Province of British Columbia (2016). *Water Sustainability Act* - Water Sustainability Regulation. Victoria, BC. Available at http://www.bclaws.ca/civix/document/id/loo99/loo99/36_2016

[2] American Society of Civil Engineers (2012): *Planning and Design Guidelines for Small Craft Harbors (Third Edition)*, ASCE Manuals and Reports on Engineering Practice No. 50.

[3] World Association for Waterborne Transport Infrastructure (2016): *Guidelines for Marina Design (Part I)*, PIANC RecCom WG 149.
[4] World Association for Waterborne Transport Infrastructure (2016): *Guidelines for Marina Design (Part II)*, PIANC RecCom WG 149.
[5] World Association for Waterborne Transport Infrastructure (2017): *Guidelines for Marina Design (Part IV)*, PIANC RecCom WG 149.