SECTION 3

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the overall condition of Waitsfield Town Pond Dam is ***POOR***. The dam was found to have the following deficiencies:

- A separation of the first joint in the outlet pipe has facilitated internal erosion of the earthen embankment leading to the development of a sinkhole. This sinkhole is evident from visual observation of the dam crest.
- The corrugated metal riser has become corroded and has several perforations allow leakage below the water line.
- The crest of the dam has a significant depression at the maximum section.
- The condition of the low level outlet is unknown and assumed to be inoperable, thus providing no feasible method to drain the pond.
- The anti-vortex, trash rack device is no longer usable due to corrosion.
- There is evidence of geotextile fabric within the earthen structure.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the dam. Prior to undertaking recommended maintenance, repairs and remedial measure, the applicability of environmental permits needs to be determined prior to undertaking activities that may occur within resource areas under the jurisdiction of local conservation commissions, VTDEC, or other regulatory agencies.

3.2 Studies and Analyses

No further studies are recommended for the Town Pond Dam.

3.3 Routine Maintenance Recommendations

It is recommended that the owner/caretaker conduct the following routine observation and maintenance activities:

- Mowing of the grass cover should continue at a regular frequency to prevent overgrowth of unwanted shrubs and weeds.
- The willow tree on the embankment crest should be removed.

3.4 Recommendations for Minor Repairs

It is recommended that the owner/caretaker conduct the following minor repair activities as soon as practicable to limit the risk of dam failure until appropriate dam rehabilitation is designed and constructed.

- No minor repairs are recommended at this time.

3.5 Remedial Measures

The following is a presentation of alternatives for remedial measures. The alternatives provided generally describe the recommended approach to address current deficiencies at the dam.

3.5.1 No Action

Town Pond Dam is currently in a POOR condition. This condition will only be exacerbated as time progresses and no action is taken to correct the deficiencies. Under the current Section 1272 Order, Line A, the pond must be drawn down. This is occurring currently. The pond will not be placed back into service until the deficiencies have been addressed, per the current Order.

The No Action alternative does not satisfy the objectives of the Town to address the identified deficiencies at Town Pond Dam and is not considered beyond this point in the report. It is recommended that minimal remedial measures be implemented in the immediate future.

3.5.2 Dam Removal

Weston & Sampson Engineers understands that the Town Pond is a community resource. The pond provides fire protection for the Waitsfield community. It also provides aesthetic and recreation opportunities. In addition, this pond provides stormwater treatment for runoff from Winter Park Common.

Removing Town Pond Dam would involve the removal of the embankment, armoring the stream channel with rock to prevent erosion, and planting wetland shrubs and trees. Plantings along the top of the streambanks is recommended to add delineation and stabilization. These plantings should include alders and dogwoods. Joint planting techniques in the rock protection should also be employed for additional streambank stability and aquatic ecosystem benefit. Once the planting full root, the pond area would likely return to a natural wetland.

Weston & Sampson believes that a dam removal is a viable alternative should a comparable fire protection resource be identified and an alternative stormwater treatment practice be developed. In the absence of achieving these two objectives, the implementation of the Dam Removal alternative is not recommended.

Advantages
The advantages to the Dam Removal alternative involve the elimination of ongoing maintenance and operations costs. Beyond the capital costs to implement this measure additional costs are not anticipated.

Disadvantages
Town Pond is a recreational, fire protection and stormwater treatment resource for the Town. The loss of these resources is considered a disadvantage.

It is in our opinion that the probable construction cost to implement this remedial measure is approximately $10,000 to $20,000. This cost range does not include a provision for a replacement fire protection source or stormwater treatment practice.

3.5.3 Dam Rehabilitation

The primary concern with the Town Pond Dam is the separation in the outlet pipe facilitating the internal erosion of the embankment and the overall deterioration of the primary spillway structure. To address these deficiencies it is recommended that the primary spillway be replaced.

The corrugated metal that comprises the riser and outlet pipe is corroding. The design life for this material is typically 25 years. Currently they have surpassed their design life. While they may be able to remain in service for a few more years this is an opportunity to replace them with a material that will extend the design life of the dam an other 30 to 50 years. To achieve this, the replacement riser and outlet pipe should be precast concrete. The current configuration is functioning as intended and is appropriately sized and therefore the replace will be identical in size.

The LLO will be replaced in kind. The existing 8 inch corrugated metal pipe will be replaced with either high-density polyethylene (HDPE) pipe or ductile iron. A valve will be installed immediately outside of the new precast concrete riser. The operator for the valve will be accessible from the riser. The pipe should be extended into the pond with the inlet end supported 2 feet above the pond bottom. This is will prevent the end becoming silted over. With frequent operation, the LLO will remain in service for the duration of the design life of the primarily spillway.

Schematic drawings and information of the primary spillway concept are provided in Appendix E.

Due to the internal erosion, excavation of the embankment is required. Several factors require that the embankment be excavated. The primary factor is the voids created by the internal erosion. These voids need to be exposed and filled. The second factor is the separation on the outlet pipe. To replace the primary spillway the embankment must be excavated to the invert of the outlet pipe.

Excavating the embankment material will also achieve another beneficial objective. From conversations with officials familiar with the construction of this embankment, it is believed that during the placement of the embankment material, it was too wet to allow free movement of construction equipment and therefore geotextile fabric was used. This prevented the equipment from sinking into the material, and facilitated the construction of the embankment. Unfortunately, during construction of the earthen embankments if the material is too wet to allow equipment travel, it is too wet to achieve the proper compaction. Therefore, as the embankment dewaters it settles. This is evidenced by the low area along the crest. Removing and recompacting the embankment material will address this deficiency.

Other dam rehabilitation alternatives were considered, such as slip lining of the riser and outlet pipe. It was determined that this option has a lower cost efficiency than a full replacement. Therefore, it was not further considered.

Advantages
The primary advantage to the Dam Rehabilitation alternative is that the existing structure remains in service. This alternative addresses the deficiencies without significant reconstruction or total removal. Given that the existing dam is structurally stable it is an advantage to rehabilitate rather than replace the structure.

Disadvantages
There are no notable disadvantages to this alternative, although construction in this area could disrupt the pedestrian traffic that travel across the dam crest.

It is in our opinion that the probable construction cost to implement this remedial measure is approximately $30,000 and $50,000. The subsequent engineering and permitting fees will range between $8,000 and $10,000.

3.5.4 Dam Replacement

A full dam replacement was not fully considered due to the financial expense and limited benefits.

3.6 Conclusions and Preferred Recommendations

This report examined the existing conditions of the Waitsfield Town Pond Dam. From a visual dam safety inspection several deficiencies were identified and subsequently alternatives for remedial measures were evaluated. The evaluation culminated with the presentation of two viable alternatives for remedial measures: Dam Removal or Dam Rehabilitation. Each alternative was evaluated primarily on its ability to address the deficiencies, but also on capital costs and physical impact on the area.

The ultimate objective of the Town is to address the deficiencies of the dam with least cost long-term solution while providing preserving the benefits of having the pond. To address those objectives, Weston & Sampson recommends the implementation of the Dam Rehabilitation alternative. The Dam Rehabilitation alternative addresses the identified deficiencies while meeting the objectives of the Town in a cost efficient manner.